PROCEEDINGS

OF THE

Biological Society of Washington

VOLUME 51
1938

WASHINGTON
PRINTED FOR THE SOCIETY

COMMITTEE ON PUBLICATIONS

HERBERT FRIEDMANN, *Chairman*

REMINGTON KELLOGG — F. C. LINCOLN

E. P. KILLIP — ESTHER SCOTT

J. S. WADE

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
H. L. & J. B. McQUEEN, INC.
WASHINGTON, D. C.

OFFICERS AND COUNCIL

OF THE

BIOLOGICAL SOCIETY OF WASHINGTON

(FOR 1938–1939)

(ELECTED MAY 14, 1938)

OFFICERS

President

WM. B. BELL

Vice-Presidents

(In the order of election)

C. W. STILES
E. P. WALKER
J. E. SHILLINGER
A. L. NELSON

Recording Secretary

S. F. BLAKE

Corresponding Secretary

J. S. WADE

Treasurer

F. C. LINCOLN

COUNCIL

Elected Members

A. A. DOOLITTLE
I. N. HOFFMAN
F. THONE
H. B. HUMPHREY
J. E. BENEDICT, JR.

Ex-Presidents

V. BAILEY
PAUL BARTSCH
C. E. CHAMBLISS
H. C. FULLER
E. A. GOLDMAN
W. P. HAY
A. D. HOPKINS
L. O. HOWARD
H. H. T. JACKSON
C. HART MERRIAM
H. C. OBERHOLSER
T. S. PALMER
S. A. ROHWER
H. M. SMITH
L. STEJNEGER
A. WETMORE

STANDING COMMITTEES—1938-1939

Committee on Communications

J. E. SHILLINGER, *Chairman*

H. C. BRYANT
C. COTTAM
L. K. COUCH
E. HIGGINS
E. G. HOLT
PHOEBE KNAPPEN
L. P. SCHULTZ
F. THONE

Committee on Zoological Nomenclature

H. C. OBERHOLSER, *Chairman*

PAUL BARTSCH
AUSTIN H. CLARK
H. H. T. JACKSON
A. C. MARTIN
C. F. W. MUESEBECK

Committee on Publications

HERBERT FRIEDMANN, *Chairman*

REMINGTON KELLOGG
E. P. KILLIP
F. C. LINCOLN
ESTHER SCOTT
J. S. WADE

Trustees of Permanent Funds

T. S. PALMER (1938–1940), *Chairman*

H. C. OBERHOLSER (1937–1939)
M. B. WAITE (1937–1939)

EX-PRESIDENTS

OF THE

BIOLOGICAL SOCIETY OF WASHINGTON

*Theodore N. Gill, 1881, 1882
*Charles A. White, 1883, 1884
*G. Brown Goode, 1885, 1886
*William H. Dall, 1887, 1888
*Lester F. Ward, 1889, 1890
C. Hart Merriam, 1891, 1892
*C. V. Riley, 1893, 1894
*Geo. M. Sternberg, 1895, 1896
L. O. Howard, 1897, 1898
*Frederick V. Coville, 1899, 1900
*F. A. Lucas, 1901, 1902
*B. W. Evermann, 1903, 1904
*F. H. Knowlton, 1905, 1906
L. Stejneger, 1907, 1908
T. S. Palmer, 1909, 1910
*David White, 1911
*E. W. Nelson, 1912, 1913
Paul Bartsch, 1914, 1915
W. P. Hay, 1916, 1917
*J. N. Rose, 1918
Hugh M. Smith, 1919
A. D. Hopkins, 1920
*N. Hollister, 1921
Vernon Bailey, 1922
*A. S. Hitchcock, 1923
*J. W. Gidley, 1924
S. A. Rohwer, 1925
H. C. Oberholser, 1926–1927
E. A. Goldman, 1927–1929
Alexander Wetmore, 1929–1931
H. H. T. Jackson, 1931–1933
C. E. Chambliss, 1933–1935
H. C. Fuller, 1935–1938

*Deceased.

TABLE OF CONTENTS.

The Committee on Publications declares that each paper of this volume was distributed on the date indicated on its initial page. The contents, minutes of meetings, and index for 1938 (pp. v–xiii; 217–228) were issued on February 4, 1939. The title page and lists of officers and committees for 1938–1939 (pp. iii–iv) were issued on August 23, 1938.

PLATES.

Vol. 51, pp. ix–xiii

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 1938 were held in the new lecture hall of the Cosmos Club.

January 8, 1938—857th Meeting.

President Fuller in the chair; 95 persons present.

Informal communications: M. B. Waite, Note on the capture of a weasel in the white pelage; I. N. Hoffman, Exhibition of a flowering specimen of *Meratia praecox;* S. F. Blake, Note on the use of poison ivy fruits in Christmas decoration under the name of "fossil mistletoe berries"; E. B. Calvert, Note on an enormous flight of guano birds in Peru; T. Ulke, Exhibition of ice worms from Mt. Rainier, Washington; J. S. Wade, Exhibition of new books.

Formal communications: A. A. Lindsey, Biology of Little America, Antarctica; C. W. Gilmore, Something about dinosaurs.

January 22, 1938—858th Meeting.

President Fuller in the chair; 150 persons present.

Informal communication: F. Thone, Exhibition of new books.

Formal communication: G. Pinchot and A. K. Fisher, Biological collecting in the South Seas by the Pinchot Expedition.

February 5, 1938—859th Meeting.

President Fuller in the chair; 240 persons present.

New member elected: A. H. Trowbridge.

Formal communication: W. M. Mann, The National Geographic and Smithsonian Expedition to the East Indies.

February 19, 1938—860th Meeting.

Vice-President Bell in the chair; 57 persons present.

Informal communications: T. Ulke, Exhibition of photographs of wormlike fossil Algae from a doorstep in the city; J. S. Wade, Exhibition of new books.

Formal communications: Joseph Dixon, Biological resources of the Sequoia National Park; E. G. Holt, The Third American Wild Life Conference, Baltimore.

March 5, 1938—861st Meeting.

President Fuller in the chair; 110 persons present.

Informal communications: F. Thone, Exhibition of new books; T. Ulke, Note on an extension of the Upper Sonoran Zone into British Columbia; W. Spawn, Note on the book and pamphlet exchange.

Formal communications: H. G. Deignan, An ornithologist in Siam; R. A. St. George, Termites, what they do and how they live.

March 19, 1938—862d Meeting.

President Fuller in the chair; 56 persons present.

New member elected: John McChord.

Informal communications: E. P. Walker, Notes from the Zoo; F. Thone, Exhibition of new books; M. B. Waite, Note on the flowering of the native species of bamboo; R. F. Griggs, Exhibition of a specimen of *Monotropsis odorata.*

Formal communications: L. K. Couch, Applying research to wild life conservation; S. T. Brooks, The circumpolar land area and its influence on the distribution of land and water mollusks.

April 2, 1938—863d Meeting.

President Fuller in the chair; 45 persons present.

Informal communications: E. P. Walker, Report on the book and pamphlet exchange; J. S. Wade, Exhibition of new books; C. E. Chambliss, Report on the work of the Junior Biological Society.

Formal communications: C. C. Presnall, Animal life in the National Parks in Utah; W. R. Chapline, Forest and forage management in Europe.

April 16, 1938—864th Meeting.

President Fuller in the chair; 50 persons present.

New members elected; A. R. Barwick, Mary E. McLean, L. W. Saylor.

Formal communications: L. P. Schulz, Fish studies in the Pacific Northwest; R. L. Sexton, Optical staining of living specimens.

April 30, 1938—865th Meeting.

President Fuller in the chair; 56 persons present.

New members elected: Myer Katz, W. L. Necker, Josselyn Van Tyne.

Formal communications: R. S. Bray, Historical resume of bird study around Washington; A. M. Day, National wildlife restoration through the Pittman-Robertson Act.

May 14, 1938—866th Meeting.
FIFTY-NINTH ANNUAL MEETING.

President Fuller in the chair; 17 persons present.

The reports of the Recording Secretary, Corresponding Secretary, and Treasurer were read. Reports were presented for the Board of Trustees, Publications Committee, Committee on Zoological Nomenclature, and Committee on Membership, as well as on the Junior Biological Society and the Book and Pamphlet Exchange.

The following officers and members of council were elected: President, W. B. Bell; Vice-Presidents, C. W. Stiles, E. P. Walker, J. E. Shillinger, A. L. Nelson; 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. Benedict, Jr., F. Thone, H. B. Humphrey.

October 1, 1938—867th Meeting.

President Fuller in the chair; 40 persons present.

New members elected: D. C. Braungart, G. J. Brilmyer, J. J. Clarke, G. C. Hamilton, A. J. Harriman, F. J. Hermann, J. M. Leonard, G. H. Lowery, Jr., J. B. Parker, W. H. Phelps, W. F. Simpson, and A. J. van Rossem.

Informal communications: H. C. Bryant, Note on fish in Boulder Dam; I. N. Hoffman, Note on possible injury to native

avifauna by introduction of Old World gamebirds; T. Ulke, Note on discovery of Scott's spleenwort in this region; J. S. Wade, Exhibition of new books; W. B. Bell, Note on increase in the herd of muskoxen on Nunivak Island.

Formal communications: F. M. Wadley, Brief report on Rocky Mountain Conference of Entomologists; T. S. Palmer, Brief report on meeting of American Society of Mammalogists; H. E. Rothrock, Some geological processes illustrated in our National Parks.

October 15, 1938—868th Meeting.

President Bell in the chair; 62 persons present.

New member elected: W. B. Davis.

Informal communications: M. B. Waite, Recollections of the Biological Society fifty years ago; T. Ulke, Note on recent excavations of nearby Indian villages; A. Wetmore, Note on occurrence of Arkansas kingbird in Maryland; E. P. Walker, Note on a squirrel seen chewing a dried bone; V. Bailey, Note on the good acorn crop; J. S. Wade, Exhibition of new books.

Formal communications: V. Bailey, Badgers at work and play in Nevada; R. T. Moore, Nesting of rare birds in northwestern Mexico.

October 29, 1938—869th Meeting.

President Bell in the chair; 50 persons present.

New member elected: Bryant Tyrrell.

Informal communications: F. Thone, Exhibition of new books; M. B. Waite, Note on the unusual autumn coloration; P. B. Johnson, Note on the shape of the pupil in pinnipeds; A. A. Doolittle, Exhibition of pods of Kentucky coffeetree.

Formal communications: E. H. Graham, Plant exploration in the Unita Basin of Utah and Colorado; F. C. Lincoln, Individual vs. mass migration of birds.

November 12, 1938—870th Meeting.

President Bell in the chair; 72 persons present.

New members elected: R. F. Mason III, A. T. Nye, L. R. Wolfe.

Formal communications: H. C. Oberholser, Bird sanctuary magic; H. DuBuy, Plant hormones and vitamins.

November 26, 1938—871st Meeting.

President Bell in the chair; 73 persons present.

New member elected: G. M. Sutton.

Informal communication: F. Thone, Exhibition of new books.

Formal communications: D. E. McHenry, The biology of the trees in the parks of Washington; Elmer Higgins, The trend of fishery research.

December 10, 1938—872d Meeting.

President Bell in the chair; 45 persons present.

New members elected: Floyd Andre, D. B. Beard, A. B. Gurney, Brooke Meanley, C. C. Presnall, J. F. Yeager.

Informal communications: A. V. Smith, Note on occurrence of *Andropogon ternarius* in nearby Maryland; M. B. Waite, Exhibition of flowering specimens of New Mammoth tobacco; E. C. O'Roke, Note on a disease of red blood cells of deer; P. Knappen, Studies of birds striking the Washington Monument.

Formal communications: R. K. Beattie, A new wilt disease of the American persimmon; Henry Stevens, Biological aspects of allergic responses to pollens and other substances.

Vol. 51, pp. 1–6 February 18, 1938

PROCEEDINGS
OF THE
BIOLOGICAL SOCIETY OF WASHINGTON

BUTTERFLIES FROM VIRGINIA AND THE DISTRICT OF COLUMBIA.

BY AUSTIN H. AND LEILA F. CLARK.

Since the publication of our "Preliminary List of the Butterflies of Virginia" (Proc. Biol. Soc. Washington, vol. 50, pp. 87–92, June 22, 1937) Professor Ellison A. Smyth, Jr., and Mr. Carl W. Gottschalk of Salem have been so very kind as to send us records of three additional species from Roanoke and Montgomery Counties, we ourselves have taken two new to the fauna of the State, and a species recently described by Dr. William T. M. Forbes proves to be common and widely distributed throughout the region.

Furthermore, during the past year a number of records of more than usual interest have been given us by several of our friends, or have come to our notice during the course of our personal investigations.

It has seemed advisable to list the additions to the fauna of Virginia and the more interesting records in order to bring up to date the list of species known from the State and to call attention to extensions of known ranges or casual occurrences of the more localized or rarer forms.

The following six species and subspecies are herein for the first time recorded from Virginia: *Neonympha areolatus areolatus*, *Phoebis philea*, *Erynnis baptisiae*, *Hesperia attalus*, *Polites mystic*, and *Atrytone bimacula*. The addition of these six raises the total number of species and subspecies definitely known from Virginia to 139.

Two species are added to the fauna of the District of Columbia; these are: *Papilio palamedes* and *Erynnis baptisiae*. Of these the first is merely a casual or accidental visitor, and the second has heretofore been confused with *E. persius*.

To the Maryland list we add *Erynnis baptisiae*.

The records of *Calpodes ethlius* are practically all based upon larvae which we found between September 24 and October 3, during a trip to the eastern counties of Virginia. We did not find the species anywhere in the western portion of the State. In view of the great abundance of the larvae and the resultant extensive damage to cannas in the eastern coastal plain it is interesting to note that we have never seen the adult of this species in Virginia, and only twice have we seen it in Washington.

For their courtesy and generosity in giving us the records included herein we wish to express our appreciation and gratitude to Professor Ellison A. Smyth, Jr., of Salem, Va.; Professor Ivey F. Lewis, of the University of Virginia; Professor Lorande Loss Woodruff, of Yale University; Mr. Frank Morton Jones, of Wilmington, Del.; Dr. George W. Rawson, of Detroit, Mich.; Mr. Carroll M. Williams, of Richmond, Va.; Mr. Carl W. Gottschalk, of Salem, Va.; Mr. W. Herbert Wagner, of Washington, D. C.; and Mr. C. C. Walton, of Clifton Forge, Va.

Neonympha areolatus areolatus (Smith).

Nansemond Co.: about eight miles south of Suffolk, May 30, 1937. A few specimens taken here agree with typical examples from South Carolina and Georgia, though most are intermediate between *areolatus* and *septentrionalis*, usually nearer the former. Some are very close to *septentrionalis*. The latter occurs alone at Brinkley, a few miles away.

Euphydryas phaëton (Drury).

Giles Co.: Mountain Lake, Aug., 1937 (Ivey F. Lewis).

Argynnis bellona (Fabricius).

Tennessee: northeastern corner of Johnson Co., July 12, 1936.

Argynnis myrina (Cramer).

Nelson Co.: Montebello, Aug. 9, 1937.

Argynnis diana (Cramer).

Nansemond Co.: Dismal Swamp, near Suffolk, June 29, 1937 (W. H. Wagner).

Nymphidia pumila Boisduval and LeConte.

Nansemond Co.: Dismal Swamp, near Suffolk, Oct. 2, 1937. Brinkley, Sept. 26, 1937.

Lycaena phlaeas hypophlaeas (Boisduval).

ab. fulliolus Hulst.

Fairfax Co.: Rocky Run, May 2, 1937, one male. In this aberration the coppery red on the upper surface, and the red on the under surface of the hind wings, are replaced by light yellow with a metallic luster. Dr. Hulst's type, now in the U. S. National Museum, is a male from Clifton, New Jersey.

Glaucopsyche lygdamus (Doubleday).

Montgomery Co.: Blacksburg, April 16, 1898; April 10, 18, 1903; April 14, 1905; May 2, 1921 (Ellison A. Smyth, Jr.). *Roanoke Co.:* Salem, April 24, 1927; May 3, 1931; May 19, 1932 (Ellison A. Smyth, Jr.). *Bedford Co.:* Peaks of Otter, May 31, 1935.

Atlides halesus (Cramer).

Princess Anne Co.: Virginia Beach, Aug. 20, 1936 (W. H. Wagner). *Nansemond Co.:* Dismal Swamp, July 23, 1925 (Frank Morton Jones). Dismal Swamp, near Suffolk, Sept. 26 and Oct. 2, 1937.

Strymon titus mopsus (Hübner).

Fairfax Co.: Rocky Run, June 30, July 7, 1935. *Fauquier Co.:* Catlett, June 26, 1937. *Henrico Co.:* Richmond, June 21, 1933 (C. M. Williams).

Strymon m-album (Boisduval and LeConte).

Nansemond Co.: Dismal Swamp, near Suffolk, June 26, 1937 (G. W. Rawson and W. H. Wagner). Same locality, Oct. 2, 1937. Suffolk, Sept. 24, 1937. Whaleyville, Sept. 24, 1937.

Strymon edwardsii (Saunders).

Augusta Co.: Sherando, July 4, 1937.

Strymon cecrops (Fabricius).

ab. **gottschalki,** nov.

Mr. Carl W. Gottschalk has been so very kind as to present to the U. S. National Museum an interesting aberration of *Strymon cecrops* that he captured during the past summer. This aberration, previously undescribed, corresponds to ab. *fulliolus* Hulst of *Lycaena phlaeas hypophlaeas.*

Description.—Above, paler and more brownish than usual, perhaps due to fading, with sparse blue scaling at base of primaries and on inner half of secondaries. *Beneath,* pale, drab, with all the red replaced by maize yellow having a metallic lustre.

Type specimen.—A female, somewhat worn, from Scout Troop 54 Cabin, Fort Lewis Mountain, Roanoke County, Virginia, collected by Carl W. Gottschalk on August 11, 1937 (Cat. No. 52256, U. S. National Museum). A second very worn specimen was captured at the same place and time.

Incisalia henrici (Grote and Robinson).

Westmoreland Co.: Glebe, May 9, 1937 (W. H. Wagner). *Fairfax Co.:* Rocky Run, May 2, 9, 1937.

Ascia monuste (Linné).

Accomac Co.: Chincoteague Island, at flowers of a privet hedge, July 28, 1928; three specimens, one of which is a representative of the dark form *phileta* Fabricius (Frank Morton Jones).

Phoebis philea (Linné).

Roanoke Co.: Salem, Oct. 15, 1928 (Ellison A. Smyth, Jr.).

Colias philodice eurytheme (Boisduval).

In previous years it had been noticed in Virginia that the males of this form, in contrast to those of typical *philodice*, were not attracted to mud. A few years ago when both forms were common the males of typical *philodice* in late summer might be seen individually or in troops of various sizes on every suitable muddy spot, but the males of *eurytheme* remained always in the fields.

During the past summer, however, the males of *eurytheme* have been noticed singly or in groups on mud in several different places in western Virginia. On August 14, 1937, near Moscow, Augusta County, about 35 males of *eurytheme* were seen in a compact group on mud in a road together with three males of *philodice* and a few males of *Terias lisa*, these last at some distance from the others.

Terias jucunda (Boisduval and LeConte).

Roanoke Co.: Salem (Ellison A. Smyth, Jr.). Salem, 1935, two males; spring of 1937, one male (Carl W. Gottschalk).

Papilio polyxenes asterius Cramer.

The very considerable number of fresh individuals of both sexes found in Norfolk, Nansemond, and Isle of Wight Counties, Virginia, in late September and early October indicates that in this region this species has three broods.

Papilio cresphontes Cramer.

Giles Co.: Mountain Lake, Aug. 1937 (Ivey F. Lewis).

Papilio palamedes Drury.

Northampton Co.: Mr. Frank Morton Jones writes us that he has located a colony of this species in a low swampy woodland on the west side of Sea Side Road—the first woodland south of Townsend—beginning where the road to Magotha diverges toward the east. Along the stream or ditch extending westward through the woods, several hundred feet back from the road, many shrubs and small trees of *Persea pubescens*, *Magnolia virginiana*, *Myrica*, etc., grow under the taller pines. Here on October 18, 1936, Dr. Robert R. Tatnall, who accompanied Mr. Jones, found a swallowtail caterpillar on a *Persea* leaf. The caterpillar, taken home by Mr. Jones, pupated, and from the pupa a fine *palamedes* emerged on May 4, 1937. On June 1, Mr. Jones saw *palamedes* on the wing here, and on October 3 he found the larvae common on the *Persea* trees, resting conspicuously on the upper surface of the leaves. *Nansemond Co.:* Whaleyville, Sept. 24, 1937. *King William Co.:* Duane, July 19, 1937. *Fauquier Co.:* New Baltimore, Aug. 7, 1937.

District of Columbia: Washington, July 31, 1937 (W. H. Wagner). This individual and the one from New Baltimore were presumably strays.

Epargyreus clarus (Cramer).

In late September and early October we found fresh individuals of this species common in and about the Dismal Swamp—more common than we have ever found them earlier in the season in this region. Here apparently the species has three complete, or practically complete broods. In the western portion of Virginia, where it is very abundant, there is only one full brood and a partial second, with occasional rare individuals late in the season representing a third brood. Half or more of the pupae from larvae from the eggs laid by the first brood, and normally all of the progeny of the second brood, hibernate.

Erynnis baptisiae (Forbes).

Giles Co.: Mountain Lake, July, 1936 (L. L. Woodruff). *Alleghany Co.:* Clifton Forge, July 19, 26, Aug. 16, 19, 1936 (C. C. Walton). *Rockbridge Co.:* Goshen Pass, Aug. 10, 1937. *Augusta Co.:* Mountain Lake (Shenandoah Acres), July 5, Aug. 8, 1937 (kindly identified for us by Dr. Forbes). *Rockingham Co.:* Swift Run Gap, Aug. 7, 1937. *Madison Co.:* Big Meadows, Aug. 16, 1937. *Arlington Co.:* July 9, 1908 (Ernest Shoemaker). *Caroline Co.:* Corbin, July 19, 1937. *King William Co.:* Aylett, July 18, 1937. *Southampton Co.:* Courtland, Aug. 25, 1936 (C. M. Williams).

Maryland: Cabin John, July 29, 1928.

District of Columbia: Washington (Henry F. Schönborn).

The specimens from Arlington Co., Va., Cabin John, Md., and Washington were recorded under the name of *persius* in "The Butterflies of the District of Columbia and Vicinity."

Hesperia attalus (W. H. Edwards).

Roanoke Co.: Salem (Carl W. Gottschalk).

Polites mystic (Scudder).

Montgomery Co.: Blacksburg, near the old Preston graveyard, 22 specimens, 1899 (Ellison A. Smyth, Jr.). *Roanoke Co.:* Salem (Carl W. Gottschalk).

Polites manataaqua (Harris).

District of Columbia: Washington; a gynandromorph with the left side male and the right side female, Aug. 12, 1935 (W. H. Wagner).

Atrytone bimacula (Grote and Robinson).

Augusta Co.: Mountain Lake (Shenandoah Acres), July 5, 1937, one female.

Lerodea eufala (W. H. Edwards).

Princess Anne Co.: Virginia Beach, Sept. 30, 1937. *Nansemond Co.:* Brinkley, Sept. 26, 1937. South of Whaleyville on the North Carolina line, Sept. 24, 1937. Suffolk, Sept. 26, 1937. Chuckatuck, Oct. 1, 1937. *Nelson Co.:* Lovingston, Aug. 12, 1937.

Calpodes ethlius (Cramer).

Princess Anne Co.: Kempsville, Sept. 29; Londonbridge, Sept. 29; North Landing, Sept. 29; Oceana, Sept. 29; Princess Anne, Sept. 29; Virginia Beach, Sept. 29. *Norfolk Co.:* Bowers, Sept. 29; Burrell, Sept. 29; Butts, Sept. 29; Deep Creek, Sept. 29; Great Bridge, Sept. 29; Hickory, Sept. 29; Norfolk, Sept. 30; Portsmouth, Sept. 30; South Norfolk, Sept. 30. *Nansemond Co.:* Chuckatuck, Sept. 27; Drivers, Sept. 30; Reids Ferry, Sept. 27; Suffolk, Sept. 24; Whaleyville, Sept. 24. *Isle of Wight Co.:* Battery Park, Oct. 1; Carrsville, Sept. 24; Isle of Wight Court House, Sept. 27; Rescue, Oct. 1; Rushmere, Sept. 27; Smithfield, Sept. 27; Walters, Sept. 24; Windsor, Sept. 27. *Southampton Co.:* Boykins, Sept. 24; Franklin, Sept. 24; Ivor, Sept. 27. *Sussex Co.:* California, Sept. 27; Gray, Sept. 24; Wakefield, Sept. 27. *Surry Co.:* Dendron, Oct. 1; Elberon, Oct. 1. *Warwick Co.:* Denbigh, Oct. 3; Hilton Village, Oct. 3; Lee Hall, Oct. 3. *James City Co.:* Lightfoot, Oct. 3; Norge, Oct. 3; Toano, Oct. 3; Williamsburg, Oct. 3. *York Co.:* Grove, Oct. 3. *New Kent Co.:* Barhamsville, Oct. 3. *King William Co.:* West Point, Oct. 3. *Gloucester Co.:* Glenns, Oct. 3. *Westmoreland Co.:* Montross, Oct. 3. *Spotsylvania Co.:* Fredericksburg, Oct. 3. *Arlington Co.:* Alexandria, and between Alexandria and Washington, Sept. 12.

District of Columbia: Washington, Department of Agriculture grounds, Sept. 14, 20.

The preceding records, all based upon larvae, are for 1937. Records for adults are: Virginia Beach, Aug. 21, 1936 (W. H. Wagner). Department of Agriculture Grounds, Washington, Sept. 20, 1937 (two).

Vol. 51, pp. 7–10 February 18, 1938

PROCEEDINGS

OF THE

BIOLOGICAL SOCIETY OF WASHINGTON

TWO NEW ASTERACEAE FROM THE CHARLESTON MOUNTAINS, NEVADA.

BY S. F. BLAKE.

The range of mountains in west-central Clark County, Nevada, known as the Charleston Mountains, the Spring Mountains Range, or the Spring Mountains (the last being the name approved by the U. S. Geographic Board), reaches in Charleston Peak an elevation of 3633 meters (11912 ft.).[1] Being an isolated mountain mass surrounded by deserts, the range naturally harbors a number of endemic or local plants. In 1916 the late Dr. H. M. Hall described two very distinct new Asteraceae, *Chrysothamnus gramineus* and *Tanacetum compactum*, from specimens collected in Lee Canyon, Charleston Mountains, in August, 1913, by A. A. Heller. The range of the former has since been extended to Death Valley, California, but the latter, which was made the basis of a new genus (*Chamartemisia*) by Rydberg, has not been found except in the region of the type locality. The botanical exploration of the Charleston Mountains has been actively prosecuted during the last three years by Mr. Ira W. Clokey of South Pasadena, California, and the two new Asteraceae here described are among the fruits of his work.

Antennaria soliceps Blake, sp. nov.

Herba perennis caespitosa, stolonibus brevibus decumbentibus foliosis; folia basalia et ea stolonum spathulato-obovata 6–9 mm. longa 2.5–4 mm. lata obtusa v. acutiuscula non calloso-mucronulata in basem petioliformem laminam aequantem abrupte v. sensim angustata utrinque dense albido-tomentosa 1-nervia; caules 1–2 cm. alti erecti monocephali sicut folia tomentosa foliis 3–5 erectis donata, foliis imis lineari-oblongis v. spatulato-

[1] On the older maps the elevation of this peak is given as 10874 ft. (about 3314 m.), but the most recent measurement, made by means of vertical angles by the U. S. Coast & Geodetic Survey, makes the height 11912 ft.

oblongis non apiculatis, foliis superioribus linearibus v. anguste lanceolatis apice appendice scariosa oblonga obtusa glabra ca. 2 mm. longa infra nigrescenti-brunnea supra albida donatis; capitulum foemineum brevissime pedunculatum campanulatum maturitate 8–10 mm. alta ca. 60-flora; involucri ca. 5-seriati gradati 7–8.5 mm. alti appressi phyllaria oblonga 1–1.5 mm. lata obtusa v. late rotundata infra viridescentia albido-tomentosa prope medium nigrescenti-maculata apice firme scariosa albida leviter brunneo- v. viridescenti-tincta interdum virescentia v. nigro-viridescentia; corollae fl. fem. supra saturate rubrae; achenia glabra.

Forming mats up to 45 cm. diam.; stolons prostrate with ascending tips, 1–2.5 cm. long, equably leafy throughout, their leaves densely whitish-tomentose beneath with moderately thick and at first slightly silky tomentum, above equally or sometimes less densely tomentose and then somewhat grayish, the earliest leaves of the stolons and those at base of stem sometimes glabrate or glabrescent in age; stem leaves 5–8 mm. long, 1–2 mm. wide, gradually reduced above, tomentose like the stolon leaves, or the upper rarely glabrescent, the upper 2–4 with conspicuous scarious appendages, an intermediate leaf sometimes bearing a subulate mucro about 0.6 mm. long; heads in young fruit (as pressed) 8–10 mm. high, 9–12 mm. thick, 60–64-flowered; phyllaries with erose tip, the outer phyllaries with large and conspicuous blackish-brown spot, this weak or obsolete on the inmost phyllaries; receptacle rounded, shallowly alveolate; pistillate corollas reddish above, 4.3–4.7 mm. long; achenes 1.5 mm. long; pappus white, 6 mm. long, of about 22–26 minutely hispidulous bristles deciduous in a ring.

Nevada: Cliffs, north exposure, Charleston Mts., alt. 3355 m., 22 June 1926, *E. C. Jaeger* (herb. Pomona Coll.); gravelly open slope, growing with *Pinus aristata*, ridge near Charleston Peak, Charleston Mts., Clark Co., alt. 3350 m., 8 July 1937, *I. W. Clokey & R. Bean* 7459 (type no. 1,699,460, U. S. Nat. Herb.); same locality, alt. 3500 m., 8 Aug. 1935, *I. W. Clokey* 7776 (herb. Clokey); among broken rock at timberline, Charleston Peak, alt. 3500 m., 16 July 1936, *I. W. Clokey & Russell Bean* 7365 (U. S. Nat. Herb.)

A species of the *Antennaria media* group, distinguished by its comparatively large and solitary heads. It is apparently unique among the United States species of its immediate group in its regularly solitary heads. Mr. Clokey states that among hundreds of specimens examined only one was found with 2 heads and one with 3. It was observed only along a ridge from about 3200 m. (10500 ft.) almost to timberline at about 3505 m. (11500 ft.).

Cirsium clokeyi Blake, sp. nov.

Bienne unicaule 0.45–1.5 m. altum foliosum maxime armatum paene glabrum; caulis simplex validus cavus valde striatus; folia numerosa caulina linearia acuta sessilia breviter decurrentia semi- v. subpedalia pallide viridia subcoriacea alte pinnatifida, lobis ca. 20–28-jugis deltoideis v. quadratis 3–4-dentatis 4–10 mm. longis (spinis exclusis), dentibus acutis apice spina valida albida 6–17 mm. longa donatis margine inter dentes

breviter spinoso, rhachi foliorum inter lobos 5–7 mm. lata non armata; folia basalia similia sed breviter petiolata et brevius armata; capitula saepius 4–14 apice caulis racemosa breviter pedunculata interdum solitaria v. apice caulis aggregata et subsessilia late campanulata sicc. 5–5.8 cm. alta 3–6 cm. atla (bracteis exclusis); involucri flores subaequantis v. paullo longioris basi saepe folio reducto suffulti ca. 8–9 seriati 5–5.8 cm. alti phyllaria exteriora inter sese paullum gradata interiora valde superantia corpore lanceolato margine dense spinuloso spinis 3–9 mm. longis apice spina valida alba 2–3.5 cm. longa donato subglabro subherbaceo, interiora ca. 3-seriata parum gradata anguste lanceolata acuminata erecta margine ciliolata dorso dense et minute tuberculata infra apicem saepius macula lanceolata saturate viridi v. purpurascenti-viridi donata apice albido substramineo non spinoso; corollae pallide roseo-purpureae v. albidae, tubo fauce duplo breviore, dentibus fauce paullo brevioribus.

Root vertical 10–12 cm. long, 1–2 cm. thick; stem greenish or purple-tinged, 1–1.5 cm. thick below, erect, glabrous, strongly striate with rounded brownish ribs; internodes mostly 3–8 cm. long; lowest leaves crowded, linear, slightly tapering at both ends, short-petioled, 19–29 cm. long (including petiole, this about 4–6 cm. long), 3–5 cm. wide (including the spines), sparsely pilose on both sides, especially on costa, with lax jointed hairs or nearly glabrous, deeply pinnatifid with 20–28 pairs of mostly crowded often overlapping lobes, stiffly white-spinose and -spinulose, the lobes mostly 2–3 times as long as the breadth of the rachis between them, the costa broad, whitish on upper side, 3–6 mm. wide, the petioles sparsely spinulose or unarmed, broadened at base; stem leaves similar but sessile, gradually reduced above, more strongly spiny, decurrent for 0.5–1 cm. by a rounded clasping spiny base, this 3–6 mm. wide (excluding spines); upper leaves (subtending the heads) 5–18 cm. long, much surpassing or the upper about equaling the heads; peduncles 1-headed, 2–14 cm. long or occasionally suppressed, bearing a few very spiny much reduced leaves; outer phyllaries about 5-seriate, strongly spinose, the body lanceolate, about 10–13 mm. long, 3–4 mm. wide, sparsely pilose or pilosulous or essentially glabrous, greenish except at the whitish base, 1-costate or -vittate with the ridge not evidently glandular, densely short-spinulose on margin with somewhat fascicled white spines mostly 2–9 mm. long, tapering into a strong white spine 2–3.5 cm. long (spreading in the outermost phyllaries, ascending to erect in the inner), the inner with a thin arachnoid tomentum on margin near apex of body and there often with a lance-shaped dark green or purplish-green spot; inner phyllaries with body pale greenish and densely and finely tuberculate above, usually with terminal, lanceolate, dark green or purplish green spot, the attenuate, flattish, substramineous, whitish, ciliolate apex 4–6 mm. long; corollas whitish or pale rosy-purple, glabrous, 3.3 cm. long (tube 6.5–7 mm., throat slightly but definitely wider than the tube, 13–14 mm., teeth linear, subequal, obtusish, at apex slightly thickened dorsally and internally crested, 11.5–12.5 mm. long); anthers pale pink-purple, acuminate, the apex about 0.5 mm. long, the filaments strongly papillose on margin except toward apex; style with very obscure node, pink-purplish above; submature achenes obovate-oblong, glabrous, 6.5 mm. long;

pappus whitish, 1.8 cm. long, the bristles all plumose except at the merely hispidulous not thickened tip.

Nevada: Head of Lee Canyon, Charleston Mountains, alt. 2950 m. (9700 ft.), 5 Aug. 1913, *A. A. Heller* 11068; brushy bottom and sides of ravine, Rainbow Falls, Charleston Mountains, alt. 2600 m., 24 July 1936, *I. W. Clokey* 7401; gravelly slope, Rainbow Falls, alt. 2670 m., 3 Aug. 1937, *I. W. & C. B. Clokey* 7455; canyon bottom and lower slope in yellow pine belt, Deer Creek, Charleston Mountains, alt. 2800 m., 27 July 1937, *I. W. & C. B. Clokey* 7454; on gravelly open slope with *Pinus aristata*, ridge near Charleston Peak, Charleston Mountains, Clark Co., alt. 3200-3350 m., 6 Aug. 1937, *I. W. Clokey* 7456 (type nos. 1,699,454–9, U. S. Nat. Herb.); same locality, 22 July 1937, *I. W. Clokey* 7457; stray plant by roadside, yellow pine belt, Charleston Park, Charleston Mts., alt. 2270 m., 11 July 1937, *I. W. Clokey* 7458 (herb. Clokey).

Allied to *Cirsium eatoni* (A. Gray) Robinson, but readily distinguished by its much larger heads and the much longer spines of the leaves and involucre, especially of the outer phyllaries. *Cirsium clokeyi* is, in fact, the most savagely armed of all the United States species of *Cirsium*. Mr. Clokey supplies notes on its occurrence from which I extract the following information:

"The natural habitat seems to be on dry ridges from 10500 ft. to timberline. Here the plants occupy open ground, scattered, usually fairly close to ledges and to *Pinus aristata*. Open grassy slopes seem to be out of their habitat. Some plants are reduced to a single head and a few were not over 18 inches tall. I have found this plant at four lower locations where it had apparently been carried down from the ridge. At Rainbow Falls it grows on hillsides, more or less scattered, in a limited area. The plants average somewhat larger than on the ridge. At Deer Creek the plants are found a short distance above the stream and on the lower slope. Usually scattered, in a few places they grow close together. The plants here evidently have more moisture and are up to about five feet tall with more numerous heads. At Little Falls (alt. 2500 m.) I found three or four plants and collected a specimen. In all the above stations no branching was observed. At Charleston Park, at an elevation of 7500 feet, a single plant was found. Worms had destroyed the main stalk and several branches had formed from near the base."

Vol. 51, pp. 11–14 February 18, 1938

PROCEEDINGS
OF THE
BIOLOGICAL SOCIETY OF WASHINGTON

A NEW SUBGENUS AND SPECIES OF THYSANOPTERA FROM THE CAMEROONS.

BY J. DOUGLAS HOOD,
Cornell University.

The thrips which is the subject of this paper has been in the author's collection for more than twenty years, and is one of the last to be described of many new ones collected in Africa by Mr. Arthur W. Jobbins-Pomeroy.

Genus TAENIOTHRIPS Serville, 1843.

Subgenus **EUGENEOTHRIPS,** nov.

(*εὐγενής*, goodness of its kind; *θρίψ*, a wood-worm.)

Like *Tæniothrips* and *Cricothrips*, but with only one pair of major setæ at posterior angles of pronotum; antennæ long and slender, with very long, forked trichomes on antennal segments III and IV; IV and V each with its base separated from the distal portion of the segment by a paler and evidently less sclerotized ring-like area; fore wings with venation normal, the anterior vein with only two or three setæ in distal half, the posterior vein rather closely and evenly setose; tergum VIII of abdomen with complete comb of long, slender, closely-spaced teeth.

Type: *Tæniothrips* (*Eugeneothrips*) *priesneri* sp. nov.

The species upon which this new subgenus is based has been labeled for many years as representing a new genus. In according it lower rank, the writer is deferring to the opinion of Dr. H. Priesner, who has also studied it with some care and who is more familiar with the Oriental and Ethiopian species to which it is allied. The character of one seta, only, at each posterior angle of the pronotum would seem sufficient for its separation from both *Tæniothrips* and *Cricothrips*. Priesner recognizes the latter as a subgenus of the former and would place the present species in *Cricothrips*.

Oxythrips Uzel, 1895, is not to be confused with *Eugeneothrips*, for its antennal structure is very different.

Tæniothrips (Eugeneothrips) priesneri, sp. nov.

Female (macropterous).—Length about 1.3 mm. (fully distended, about 1.8 mm.). *Color* brown, with bright vermilion internal pigmentation in

thorax and abdomen; coxæ and femora brown, not quite as dark as body; tibiæ paler than femora, brown basally, gradually paling to yellow distally, the fore pair lighter; all tarsi clear lemon-yellow; antennæ with segments I and II nearly as dark as head, I paler across base and II at middle of apex, both with vermilion pigmentation; III-VIII brown, slightly paler than I and II, without internal pigmentation, the pedicel of III (except for the usual shelf-like thickening, which is brown), and a narrow ring just beyond the pedicels of III, IV, and V, nearly colorless, the narrowed apical portion of III only slightly paler than the middle portion; fore wings dark brown, with a nearly colorless subbasal area which extends to about the third seventh of the wing; hind wings pale, with a nearly complete dark brown median vein; setæ of body and wings brown; ocellar pigmentation deep red.

Head distinctly wider than long, broadest across the rounded cheeks, its dorsal surface with several dark transverse striæ; vertex with one pair of dark setæ (about 23μ long) shortly in advance of median ocellus and nearly as far apart as outer margins of posterior ocelli, the interocellar setæ a trifle closer together, about 24μ long, situated on lines tangent to outer margins of ocelli, and somewhat closer to posterior ocelli than to the median one; postocular setæ shorter and slenderer than the others, the innermost pair longest (20μ) and situated behind the posterior ocelli, their centers about 46μ apart, the last of the remaining six pairs situated on profile of cheeks. *Eyes* somewhat protruding, their dorsal length, width, and interval approximately 79, 49 and 80μ, respectively. *Ocelli* of posterior pair slightly behind middle of eyes, their interval 33μ, diameter 21–22μ, distance from median ocellus 20μ, the latter 21μ in diameter. *Antennæ* slender, about 2.44 times the length of head; segments III and IV much longer than any of the others, much narrowed beyond the origin of the long (67μ) forked trichomes whose tips extend, respectively, nearly to the middle of segment IV and beyond the proximal two-thirds of segment V; V broadest near apex, VI near base. *Mouth-cone* extending about 140μ beyond posterior dorsal margin of head.

Prothorax somewhat shorter than head, less distinctly and not so darkly cross-striate as head; posterior angles with one long pair of setæ, only, these nearly straight and about 57μ long, the inner pair very much shorter (17μ) and about comparable with the antero-angular pair and some of the larger ones on disk, as well as with the two pairs on posterior margin. *Mesothorax* and metathorax normal in structure and sculpture. Wings of fore pair about 0.78 mm. long, nearly straight, about 54μ wide at middle, the anterior vein with 4+5 (or 4+6) setæ in basal half and 1+2 beyond, the posterior vein with 12–14 equally spaced ones.

Abdomen broadest at segment IV; sterna without accessory setæ; tergum VIII with comb complete, composed of evenly-spaced long (23μ) teeth; tergum IX with the three pairs of major setæ respectively about 130, 152, and 143μ long; tergum X without trace of dorsal suture, its setæ about 150μ long.

Measurements of female (holotype), in mm.: length about 1.29 (fully distended, 1.76). Head, median dorsal length 0.146, width across eyes

0.178, greatest width across cheeks 0.179. Prothorax, median length of pronotum 0.135, greatest width 0.238. Abdomen, greatest width (at segment IV) 0.364; tergum VI, median length 0.086, VII 0.087, VIII 0.084, IX 0.087, X 0.063.

Antennal segments:	1	2	3	4	5	6	7	8
Length (μ):	26	40	76	83	48	57	12	15
Width (μ):	37	29	29	28	19	19	8	6

Total length of antenna 0.357 mm.

CAMEROONS: Ossidinge, October, 1915, A. W. Jobbins-Pomeroy, 15 ♀ ♀ without further data, though certainly taken from flowers [Hood Nos. 58 and 59]. Holotype and paratypes in the author's collection.

This species is very suggestive in many ways of *Tæniothrips smithi* (Zimmermann), described from Java and subsequently recorded from Formosa. The antennal segments of *smithi* are much longer, however, particularly the third and fourth, and the coloration of the antennæ is different. Minor structural differences are also to be found in the lengths of the antennal sense-cones and the pronotal setæ.

Vol. 51, pp. 15–16 February 18, 1938

PROCEEDINGS
OF THE
BIOLOGICAL SOCIETY OF WASHINGTON

A NEW POCKET GOPHER FROM NEVADA.

BY E. RAYMOND HALL AND FLOYD E. DURHAM,
Museum of Vertebrate Zoology, University of California, Berkeley, California

Receipt of recently collected pocket gophers from western Nevada has lead to a re-study of material of the genus *Thomomys* of that region. This re-study shows that the pocket gophers from Eastgate are not typical of *Thomomys bottae canus*, to which race they were previously referred (Hall and Davis: Univ. Calif. Publ. Zool., vol. 40, p. 394, 1935), but are different; enough so, in our opinion, to warrant recognition as a separate geographic race. This may be known as:

Thomomys bottae lucrificus, new subspecies.

Type.—Male, adult, skin and skull; no. 70602, Mus. Vert. Zool.; Eastgate, Churchill County, Nevada; May 15, 1936; collected by W. C. Russell; original no. 4392.

Range.—Known only from the type locality and, at an elevation 600 feet higher, along the creek which flows from the Desatoya Mountains westward to the type locality.

Diagnosis.—Size: Large (see measurements). Color: Winter pelage: near (18″h to j) Tawny Olive (capitalized color names after Ridgway: Color Standards and Nomenclature. 1912) above, or grayish, tinged with buff; below plumbeous tipped with whitish. Summer pelage: more reddish (less of smoked effect) above, and plumbeous lightly tipped with white below. In both pelages, pectoral region plumbeous sometimes with buffy tinge; inguinal region plumbeous or white. Skull: Large, nasals expanded distally; hamular processes of lacrimals large; tympanic bullae angular anterolaterally and but little inflated; occiput anterodorsally inclined.

Comparisons.—*Thomomys bottae lucrificus* resembles *T. b. canus* and *T. b. fumosus* in size (see external measurements) and is larger than *T. b. depressus* and *T. b. solitarius*. In color *lucrificus* is intermediate between *canus* and *fumosus* but distinctly closer to the latter in both winter and summer pelage. Adult male skulls differ from those of topotypes of *canus*

and specimens of *canus* from Fallon, as follows: Upper incisors shorter and narrower; nasopremaxillary sutures convex medially rather than straight; nasals expanded distally and bluntly extended medially rather than truncate anteriorly and straight-sided. Hamular processes of lacrimals larger; occiput more anterodorsally (less vertically) inclined; dorsal margin of foramen magnum rarely, as opposed to commonly, notched; interpterygoid space averaging more narrowly V-shaped; tympanic bullae anterolaterally angular rather than smoothly rounded, and less inflated ventrally and medially. Differences of the same nature but of lesser degree are shown by females. Selected differences of adult male and female skulls of *lucrificus* from those of *fumosus* are: Larger size; relatively as well as actually, greater zygomatic breadth; larger jugals; dorsal outline of skull viewed laterally, without the marked dorsal convexity at junction of rostrum and interorbital region.

Remarks.—*T. b. lucrificus* appears to be as closely related to *T. b. fumosus* as to *T. b. canus*. The range of *canus* corresponds in general with the northwestern reaches of Lake Lahonton. The fifty-odd miles of extremely arid desert between the type locality of *lucrificus* and the easternmost record station of *canus*, near Fallon, is not known to be inhabited by pocket gophers of any species. If any occur there, we would expect them to be of, or closely related to, the race *T. b. depressus*. The fifty-mile extent of country separating *T. b. lucrificus* from *T. b. fumosus* to the eastward, is occupied by *Thomomys quadratus*, a distinct species. *T. b. lucrificus*, then, is thought to be geographically isolated from other races of its species, excepting possibly *T. b. solitarius* and *T. b. depressus*. An individual of either of these races is hardly half the mass of one of *lucrificus*. For example, adult males of *lucrificus* average 200 grams in weight and those of the other two mentioned races, only 100 grams.

Measurements.—Average and extreme measurements, in millimeters, of 6 adult males and 11 adult females, are as follows: Total length, ♂ 255 (238–265), ♀ 229 (216–245); length of tail, 81 (72–88), 72 (65–79); length of hind foot, 32.2 (31.0–33.0), 30.2 (27.0–31.0); basilar length, 37.6 (35.1–39.2), 33.2 (32.0–35.2); length of nasals, 16.2 (15.5–17.2), 13.5 (12.8–14.5); zygomatic breadth, 28.3 (27.0–29.3), 24.2 (23.0–26.7); mastoidal breadth, 22.6 (22.1–23.0), 20.4 (19.5–21.3); breadth of rostrum, 8.9 (8.6–9.3), 8.0 (7.5–8.6); interorbital constriction, 7.1 (6.9–7.5), 7.0 (6.7–7.2); alveolar length of upper cheek teeth, 8.5 (8.0–8.8), 8.2 (7.6–8.6); depth of skull (palate to frontal), 16.3 (14.9–17.2), 14.6 (13.8–15.6); length of rostrum (middle of anterior border of nasals to lateral junction of maxilla with hamular process of lacrimal), 19.2 (17.7–20.2), 16.4 (15.7–17.5).

Specimens examined.—Total number, 37; type locality, 31; at 5025 feet elevation, along creek flowing from the Desatoya Mountains westward to the type locality, 6.

Vol. 51, pp. 17–24 February 18, 1938

PROCEEDINGS

OF THE

BIOLOGICAL SOCIETY OF WASHINGTON

NOTES ON KIT FOXES (*VULPES MACROTIS*) FROM MEXICO.

BY SETH B. BENSON,

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

Little is definitely known concerning the distribution and systematic status of the kit fox (*Vulpes macrotis*) in Mexico. It has been stated that this species is present in the desert regions of Sonora and Chihuahua, but published records of specimens from definite localities are few or wanting. For this reason the results of study of kit foxes arising from attempts to identify specimens obtained in Sonora and Coahuila during 1937 should be of interest. It was found that one of the supposed geographic races of *Vulpes macrotis* is not recognizable, and that specimens from Coahuila, in addition to extending the known range of the species a long distance to the southeast, represent a geographic race different from those already known.

Specimens of kit foxes are not numerous in collections of mammals, probably because few collectors reach the areas where the habitat is suitable for kit foxes, and when they do, they usually pay more attention to the rodents there than to the carnivores. Furthermore, kit foxes are now as a rule few in number even in the areas which seem suitable to them. They are so unsuspicious that they are easily trapped and even more easily poisoned. Consequently, wherever trappers are active, and especially wherever control campaigns involving the use of poison have been carried out against predatory animals on areas inhabited by kit foxes, the foxes have been greatly reduced in number or entirely eliminated. Unfortunately, there are few kit fox habitats in the United States that escape visitation by these agencies.

There are now available in the Museum of Vertebrate Zoology 68 specimens of kit foxes from California, Nevada, Arizona, New Mexico, Sonora, and Coahuila. Most of these are winter-taken skins and skulls prepared by experienced collectors. This material is not sufficient in itself to serve as a basis for a revision of all the kit foxes, although study of this material and, especially, study of the published systematic accounts indicate that a thorough and careful revision of the group is greatly needed. However, it does provide a more adequate basis for determining the systematic status of the kit fox in southwestern Arizona and northwestern Sonora than has been available before this time.

Systematic Status of Sonora Kit Foxes.

Three kit foxes were obtained by Margarito Delgadillo and me in the period January 13 to 15, 1937, near the fishing village of Punta Peñasca on the Gulf of California in northwestern Sonora. The foxes were trapped in the sand dunes behind the beach about one mile north of the village.

It was expected that these specimens would be of the race *Vulpes macrotis arizonensis*, the range of which was given in the original description (Goldman, Journ. Washington Acad. Sci., vol. 21, 1931, p. 249) as "Desert region of southwestern Arizona and adjoining parts of Sonora." However, the specimens did not possess the characters ascribed to that race. This led to a careful study of other specimens from within the range of *arizonensis* and it was found that these also did not possess the characters of "*arizonensis*," at least to any marked degree. Furthermore, it was found that the Arizona specimens could not be distinguished from specimens of *V. m. arsipus* from the area west of the Colorado River in California and Nevada, although it was suggested in the original description of "*arizonensis*" that the river acted as barrier between "*arizonensis*" and *arsipus*.

The original description of "*arizonensis*" was based upon six specimens from localities as follows: Tacna, 1; Tule Tanks, 2; Yuma, 2; Vicksburg, 1. The Museum of Vertebrate Zoology contains 10 specimens from southwestern Arizona as follows: *Mohave County:* Fort Mohave, 1 (skin only); Mellen (=Topock), 1. *Yuma County:* Ehrenberg, 1; Wellton, 1; 1½ miles south Tinajas Altas, 1; 3 miles south Tinajas Altas, 5.

Specimens of *arsipus* are available from localities in California as follows: *Inyo County:* Kelly's Well, Amargosa River, 1; Death Valley, 1 (skull only); Triangle Spring, Death Valley, 2. *Los Angeles County:* Lovejoy Buttes (near Lancaster), 1 (skull only). *San Bernardino County:* Victorville, 2; Morongo Pass, 1; Colorado River, 29 miles south Needles, 2 (in collection of Ralph E. Ellis). *Imperial County:* Colorado River, opposite Cibola, 1; Colorado River, near Pilot Knob, 2.

Some specimens of kit fox from southern Nevada were also of value in working out the status of *arizonensis*. *Clark County:* near Mesquite, 5; Colorado River, 14 miles east Searchlight, 1 (skin only); Colorado River, opposite Fort Mohave, 1 (skull only).

According to the original description, "*arizonensis*" differs from *arsipus* in smaller size, shorter winter pelage, smaller brush, dorsum less heavily

overlaid with silvery-white. The last-named character was deemed especially worthy of note. Yet on careful comparison of the specimens, taking into consideration variations resulting from sex, age, and season, not one of these characters, nor any combination of them appears to have any correlation with geographic distribution. One specimen, from Wellton, collected November 6, 1931, by Bernard Bailey, does appear to have a considerably smaller amount of white on the dorsum, but this, together with the shortness of the pelage, is evidently the result of a stage in hair replacement, the white-banded guard hairs, and the fur hairs, not yet having grown out to full length. Specimens from near Tinajas Altas, which is only 13 miles west of the type locality of "*arizonensis*," are to me indistinguishable from comparable specimens of *arsipus* with regard to these characters. Measurements of the body and of the skull show nothing significant in the way of size differences between the populations on either side of the Colorado River.

Characters cited as differentiating the skull of "*arizonensis*" from *arsipus* are: "(*1*) sides of brain-case converging in more nearly straight lines (tending more distinctly to bulge outward in *arsipus*); (*2*) interpterygoid fossa narrower; (*3*) anterior processes of frontals broader, more prolonged, meeting ascending branches of premaxillae (frontal processes separated from ascending branches of premaxillae by a distinct gap along maxillo-nasal suture in *arsipus*)."

These skull characters, like the external characters, do not appear to have any geographic significance in the specimens available here. The first character appears to be more closely correlated with size and age than with geographic distribution. It can not be relied upon to distinguish "*arizonensis*" from *arsipus*. Unfortunately, this character is not easily measured with instruments, but must be judged by eye.

The second character, that of width of the interpterygoid fossa, does lend itself to measurement. In order to avoid error in judging the width, three measurements were made: (1) distance between the ends of the hamular processes of the pterygoids measured from the outside; (2) outside width across interpterygoid fossa at the juncture between palatine and pterygoid bones; (3) inside width of same place as in 2.

The first measurement could not be made in some of the specimens because the delicate pterygoids had been lost from some skulls or were loose or broken. Reliable measurements (all measurements given in millimeters) from three adult males of California *arsipus* were 7.5, 9.0, 9.3, while in four males of "*arizonensis*" measurements were 7.9, 8.2, 8.4, 10.0. Two females of California *arsipus* were 6.8, 7.3, while six female "*arizonensis*" were 7.9, 8.0, 8.1, 8.2, 8.2, 8.4. Thus the average of the males is the same. It is noteworthy that the largest measurement, indicating the widest interpterygoid space, is of an Arizona specimen.

The other two methods of measuring the fossa yield results so much alike that only the results of the third need be given here. In nine male specimens of California *arsipus* this distance ranges from 8.7 to 9.5 and averages 9.1. In five male "*arizonensis*" the distance ranges from 9.1 to 10.3 with an average of 9.6. In three female California *arsipus*, the range is from 7.8

to 10.0 with an average of 8.7. In six female "*arizonensis*" the range is from 8.1 to 9.3 with an average of 8.7.

These results indicate that "*arizonensis*" does not have a narrower interpterygoid space than *arsipus;* indeed, the reverse condition seems to be indicated by these specimens. Yet the individual variation is so great that the slight average difference seems not to be significant. The conclusion may safely be drawn that the width of the interpterygoid fossa does not serve as a differentiating character between "*arizonensis*" and *arsipus.*

The third character, that of the width and prolongation of the anterior processes of the frontals, appears on inspection to be extremely variable. Comparable measurements of the width of the anterior processes can not be made satisfactorily because of great variations in shape, but the distance between the premaxillae and frontals on the surface of the skull can be measured with fair accuracy. Measurements were made on both the right and left sides, because it was evident on inspection that the two sides often were considerably different. For instance, in a specimen of *arsipus* from Kelly's Well, Amargosa River, the distance was 1.4 on the right and 4.3 on the left.

In nine male *arsipus* from California the distance between the frontals and premaxillae on the right side ranged from 0 to 4.8 and averaged 2.5; on the left, the range was from 0 to 4.9, averaging 3.1. In five male "*arizonensis*" on the right the range was 0 to 3.5, average 1.8, on the left, range from 0 to 4.3, average 1.9. In three female California *arsipus,* on the right, the measurements were 0, 2.6, 5.4; on the left, 2.0, 1.7, 4.8 respectively. In six female "*arizonensis*" on the right the range was 0 to 7.1, average 3.1; on the left 0 to 8.0, average 4.0.

These measurements reveal no significant differences between *arsipus* and "*arizonensis*" in this character. The two bones meet just as often in *arsipus* as in "*arizonensis.*" The average difference between males and females of "*arizonensis*" is greater than the differences between males of "*arizonensis*" and *arsipus.* In addition, the greatest separation between the frontals and premaxillae was found in a female of "*arizonensis,*" the reverse of what should be true according to the original diagnosis. It is therefore obvious that this character is so highly variable that it does not appear to have even a small amount of correlation with geographic distribution. The same can be said for the width of the frontal processes although these were not measured.

None of the characters listed as differentiating "*arizonensis*" from *arsipus* do so differentiate the 13 specimens from within the range of "*arizonensis.*" Furthermore, no other differentiating characters were detected. As the number of specimens is greater than the number available to the original describer of "*arizonensis*" (six were listed in the original description), it may safely be assumed that they better represent the population inhabiting the region. Consequently, it may be concluded (1) that the name *V. m. arizonensis* is a synonym of *V. m. arsipus,* (2) that the Colorado River does not seem to be an effective barrier to kit foxes, and (3) that the kit foxes of northwestern Sonora are of the race *Vulpes macrotis arsipus.*

Systematic Status of Coahuila Kit Foxes.

On June 15, 1937, three specimens of kit foxes were obtained from Guillermo Rodriguez who on that day trapped them near San Antonio de Jaral (El Jarral or Jaral of most maps) in southeastern Coahuila (approx. lat. 25° 40′ N., long. 101° 25′ W.). These are, I believe, the first kit foxes recorded from Coahuila and from any place so far to the southeast. The specimens, while definitely of the long-eared species (*Vulpes macrotis*) appear to represent a race hitherto undescribed which may be known as:

Vulpes macrotis zinseri, new subspecies.

Type.—Adult male, skin and skull, no. 76292 Mus. Vert. Zool., collected by Guillermo Rodriguez at San Antonio de Jaral, southeastern Coahuila, Mexico, on June 15, 1937. Original number 2568 W. B. Richardson.

Distribution.—Known only from the type locality, but probably ranging in the desert plains of Coahuila and San Luis Potosí.

Diagnosis and comparisons.—A race of *Vulpes macrotis* characterized by large size (equal to *V. m. mutica* or *V. m. neomexicana*), dark color, heavy, wide-spreading zygomatic arches, and a generally rugose skull. Compared with *neomexicana: zinseri* differs in darker color, more rugose skull, anterior face of zygomatic arch more deeply excavated at juncture of maxilla and jugal, anterior part of zygomatic arches more bowed out anteriorly, postorbital processes more strongly developed; base of zygomatic process of maxilla wider.

Color.—The color pattern of *zinseri* is the same as in other races of *Vulpes macrotis*, but the pigmentation is more intense. Compared with *neomexicana*, the increased intensity of pigmentation is especially apparent on the back of the ears, the limbs, the muzzle at the base of the vibrissae, and in the bases of the pigmented hairs over the whole body. Combined with the increase in intensity of dark pigmentation is an increase in the relative width of the dark-pigmented portions of the hairs, and a reduction in width of the light-colored bands. This is most noticeable on the face and dorsal surface. These characters are shown both in the hairs of the old winter coat and in the hairs of the new coat.

Measurements.—Adult male (type), adult female, and young adult female respectively: Total length, 822, 765, 725; tail, 325, 295, 287; hind foot, 123, 122, 120; ear from notch, 80, 79, 83; weight in grams, 2098, 1762, 1461. Skull: Total length (measured with calipers perpendicular to plane surface on which skull was resting dorsal side up), 116.1, 111.7, 108.9; condylobasal length, 112.1, 108.8, 107.4; greatest width of braincase, 43.7, 41.7, 42.4; greatest zygomatic width, 63.6, 61.3, 59.4; least width of rostrum (measured behind roots of canines), 18.4, 16.5, 16.6; least interorbital width, 23.8, 21.6, 21.6; maxillary toothrow (anterior face of canines to most posterior part of last molar), 53.2, 52.1, 50.1; length of pm^4 (crown length of outer side), 10.2, 10.0, 9.6; width of pm^4 (anteriorly), 5.3, 4.8, 4.8.

Remarks.—This fox is named for Señor Juan Zinser, Jefe del Servicio de Caza, Departamento de Forestal y de Caza y Pesca, México, D. F.

More knowledge concerning the detailed distribution of the kit fox on the

Mexican Plateau must await the acquisition of more specimens and data. However, the distribution of the kit fox in the eastern part of its range so closely parallels the distribution of *Dipodomys spectabilis* that it is quite possible that this correlation exists in Mexico. If this is true the kit fox may be expected to occur as far south as the state of Aguas Calientes.

Descriptions of races of mammals are sometimes faulty in that they do not give enough information to allow the reader to judge the perspective from which the describer viewed the group being dealt with. For this reason I present some of the opinions concerning kit foxes that I have formed in the course of this study. One opinion is that kit foxes are so little known and apparently are becoming so rare, that every effort should be made to preserve as specimens the individuals that are killed. Another is that a thorough study of the variation and geographic distribution of the kit foxes is greatly needed. It is necessary for the user of the scattered systematic papers to have specimens at hand in order to find out the true characters of the geographic races. The descriptions are imperfect because most of them were based on limited material which did not permit an adequate appraisal of individual variation. As a result some of the characters supposedly diagnostic for the subspecies are not racial characters at all. In view of this, it was somewhat surprising to me to find that most of the races seem to be valid, even though the original descriptions did not always list the proper characters. A useful revision, therefore, must contain new definitions and diagnoses of the geographic races and give some account of the large amount of individual variation that exists in kit foxes. A mere list of the races recognized by the reviser, referring back to the original descriptions for characters, would not be helpful.

No specimens of the two races of *Vulpes velox* were available to me, so I can add no new information to the problem as to whether or not *velox* and *macrotis* are distinct species. For the same reason I can add nothing to the knowledge of *V. m. macrotis*, now probably extinct, of southern California, or of *V. m. tenuirostris* and *V. m. devia* of Lower California. However, specimens of the other races did give some basis for judging them. The race *V. m. mutica*, inhabiting the San Joaquin Valley and Walker Basin in California, is a strongly distinct form. The race *V. m. arsipus*, ranging east of the Pacific slope drainage, is

easily distinguishable from *mutica*. I have not seen a sufficient number of specimens from Nevada to be certain of the status of *V. m. nevadensis*, but specimens from southern Nevada are clearly *arsipus* and a few specimens from within the range ascribed to *nevadensis* also do not appear to differ from *arsipus*. I suspect that this race, if its distinctness from *arsipus* is confirmed by work on more material, will not be found to be a strongly marked one. The race *V. m. neomexicana* appears to be well marked.

Vol. 51, pp. 25–26 February 18, 1938

PROCEEDINGS
OF THE
BIOLOGICAL SOCIETY OF WASHINGTON

A NEW *MYOPHONUS* FROM NORTH SIAM.

BY H. G. DEIGNAN.

Among the birds collected in Siam by Dr. Hugh M. Smith are two female specimens of a Whistling-Thrush, which appear worthy of subspecific recognition. For them I propose the name

Myophonus caeruleus rileyi, subsp. nov.

Type.—Adult female, United States National Museum, no. 311561; collected at 7,000 feet on Doi Angka (Khao Inthanon), Chiengmai province, North Siam, 6 December, 1928.

Diagnosis.—Nearest to *Myophonus caeruleus temminckii* Vig. of India and *M. c. changensis* Riley of S. E. Siam, but readily distinguished from either in having the spangles fewer and much reduced in size, both above and below. The white tips to the lesser upper wing-coverts are similarly reduced in size and number. The ground-color of the body-feathers, where not blue, is without the distinctly brownish hue of *temminckii*, but is blackish as in *changensis*. The bill of the new form is not so large and heavy as that of *changensis*, but is like that of *temminckii*.

Measurements of type.—Wing (chord), 167.5; exposed culmen, 22; tail, 115; tarsus, 50.

Range.—The only specimens I have seen were collected on Doi Angka. The bird from Khun Tan, referred by Gyldenstolpe to *temminckii* (Ibis, 1920, p. 479) doubtless belongs to this form.

Remarks.—*Rileyi* belongs to that section of the genus which has white tips to the lesser upper wing-coverts, and the concealed parts of the flank-feathers and of many of the contour-feathers below white or whitish. I believe that *M. caeruleus*, *M. temminckii*, and their races, may properly be considered forms of a single species, under the name *caeruleus*. There is regular variation in the size and color of the bill from north to south, as shown in the accompanying table, and there seems to be no other character which can be used for specific separation. There is a tendency in the group to develop a white patch on the outer median under wing-coverts. This character increases both in frequency and in extent from north to south; it occurs only rarely in *temminckii* from the Himalayas and in *caeruleus* and *immansuetus* of China.

Myophonus eugenei Hume, which lacks all the various concealed white markings of *caeruleus* and its races, I consider to be a distinct and probably monotypic species, occurring within the ranges of *immansuetus*, *temminckii*, *rileyi*, and *changensis*, and apparently everywhere the commoner form. Its bill is like that of *changensis* both in size and color.

Specimens Examined.

M. c. caeruleus and *M. c. immansuetus*.—24 (East and West China).
M. c. temminckii.—9 (Himalayas).
M. c. rileyi.—2 (N. Siam).
M. c. changensis.—5, including type (S. E. Siam).

The new form is named for Mr. J. H. Riley, of the Division of Birds, United States National Museum, in recognition of his studies of the birds of Siam.

Table Showing Variation in Size and Color of Bill.

1.	*M. c. caeruleus.* *M. c. immansuetus.*	Bill light; maxilla black; mandible usually black, occasionally dark horny-brown; in some specimens, irregular patches of yellow on maxilla, mandible, or both.
2.	*M. c. temminckii.* *M. c. rileyi*	Bill moderate; maxilla wholly or largely black, otherwise yellow; mandible yellow.
3.	*M. c. changensis.*	Bill heavy; maxilla yellow, with naral region and culmen black; mandible yellow.

Vol. 51, pp. 27–32 February 18, 1938

PROCEEDINGS
OF THE
BIOLOGICAL SOCIETY OF WASHINGTON

A NEW GENUS AND SPECIES OF PHLÆOTHRIPIDÆ (THYSANOPTERA) FROM PALMETTO.

BY J. DOUGLAS HOOD,
Cornell University

The types of this new species, from Florida, are in the author's collection.

ATRACTOTHRIPS, gen. nov.

(Ἄτρακτος, a spindle or arrow; θρίψ, a wood-worm—in allusion to the elongate form of the body.)

Head about twice as long as wide, prolonged in front of eyes, narrowed behind eyes and again just before base, the cheeks with about five pairs of strong lateral setigerous tubercles, the produced portion of head with a similar pair of lateral tubercles; postocular and remaining cephalic setæ small, all borne at the tips of tubercles, comprising (1) a pair between the median ocellus and the posterior ones, (2) a pair between the posterior ocelli, (3) a pair behind the posterior ocelli, (4) the postoculars, (5) an occipital pair about midway between posterior ocelli and base of head, and, in addition, several smaller dorso-lateral pairs; dorsal surface of head tuberculate throughout, not striate or reticulate. *Eyes* small, larger dorsally than ventrally, less than one-fifth the length of head, rather strongly protruding posteriorly, with several of the posterior facets enlarged and projecting beyond the general outline. *Ocelli* small, borne at the tip of distinct prominences and anterior in position, the median one overhanging, forwardly directed, and situated close to bases of antennæ, the posterior ones on a line with anterior margins of eyes. *Antennæ* eight-segmented, less than twice the length of the head, the first two segments broad, heavy, subequal in length, and with their setæ stout and arising from tubercles, the other segments slender, with small setæ and sense-cones, VIII not pedicellate. *Mouth-cone* broad, semicircularly rounded at tip; maxillary palpi long and stout. *Prothorax* less than half the length of head, flat, with a slight, overhanging, shelf-like production above anterior angles; setæ small and arising from tubercles, of which those supporting the epimerals, antero-angulars, and coxals are more conspicuous, the mid-laterals minute and arising close behind antero-angulars; pronotum sub-

reticulate anteriorly, tuberculate posteriorly. *Mesothorax* produced laterally at anterior angles and with a pair of conspicuous lateral setigerous tubercles just behind the processes. *Metathorax* rounded and somewhat swollen posteriorly, where it is broader than mesothorax. *Legs* rather short and stout, roughened with numerous tubercles of which those bearing setæ are largest; fore legs not enlarged, fore tarsi not toothed, in either sex. *Wings* very slender, with dark median vein extending nearly to tip in both pairs, the fore pair rather abruptly narrowed and somewhat bent forward beyond basal three-tenths, without accessory setæ and with the usual subbasal setæ wholly wanting. *Abdomen* long and slender, with segment IX short and X unusually long and slender, the latter segment much longer than head and prothorax together and without long clothing hairs; III–VII with one or two pairs of strongly projecting lateral setigerous tubercles near posterior angles.

Genotype: *Atractothrips bradleyi*, sp. nov.

This genus is one of the most distinct in the entire North American fauna. Though undoubtedly allied to such wholly Neotropical genera as *Actinothrips*, *Zactinothrips*, *Dasythrips*, and *Zeugmatothrips*, and clearly derived from a biocenter in the Neogaeic realm, its closest known relative appears rather to be the Malaysian genus *Holurothrips*. All of these genera have extremely long and slender tubes, produced heads, slender antennæ, unarmed fore tarsi, and, with the possible exception of *Holurothrips*, slender wings whose single vein is nearly complete. *Atractothrips*, however, has the second antennal segment as long as the first, instead of much shorter; the eighth is not narrowed at the base, but is conical and rather solidly connected with the seventh; the dorsal surface of the head and thorax is predominately tuberculate, instead of subreticulate or striate; the cephalic setæ all arise from distinct tubercles, of which those on the cheeks are large and conspicuous; the eyes are small, not at all even in outline, and with several larger facets laterally and posteriorly; and the anterior mesothoracic angles are produced in a peculiar manner.

Atractothrips bradleyi, sp. nov.

Female, forma macroptera.—Length about 4.1 mm. (fully distended, about 4.5 mm.). Color, by *reflected* light, straw yellow, with white internal "pigmentation" in head, thorax, abdomen, and legs, that in head more conspicuous between eyes, that in prothorax, fore coxæ, and fore and hind femora making these parts nearly white, that in abdomen largely absent from the area covered by the wings when the latter are at rest, and absent, too, from the attachments of the tergo-sternal muscles, that in tube limited to the median basal portion; front of head and the ocellar prominences dark brown, sides of head narrowly margined with dark brown, sides of pterothorax and of first and ninth abdominal segments nearly black, tube dark brown, blackish apically; antennæ brown in segments I and II and blackish brown in VII and VIII, the intermediate segments yellow, with their distal thirds darkened with brown or blackish brown; middle femora nearly black at middle but yellowish white at either end, the hind femora with a small blackish area on dorsal surface near base; all tibiæ nearly

white at either end (the fore pair more extensively so at base) and with the larger intermediate portion nearly black; all tarsi brownish yellow with black cups; wings washed with gray, the nearly complete median vein in both pairs blackish brown, the fringes brown.[1] Color, by *transmitted* light, somewhat darker, due in part to the relative opacity of the white "pigment," which is no longer visible as such; head somewhat darker and more yellowish than prothorax; all setæ on body, legs, and antennæ white, excepting those at tip of tube, which are brown.[2]

Head about 2.1 times as long as greatest width (which is almost invariably at basal fourth), the width across eyes nearly or quite as great, cheeks narrowing behind eyes, roundly broadening to basal fourth, and narrowing roundly again toward the somewhat broader basal collar; produced portion in front of eyes somewhat more than half as wide as head at basal fourth, its sides straight but very slightly converging toward base, its length nearly one-fifth the total length of head; entire surface of head roughened by numerous small tubercles which give the outline of the cheeks an evenly serrate appearance, other sculpture wanting; setæ clear white, truncate or rounded at tip, all arising from prominent tubercles, the dorso-lateral pair at middle of sides of cephalic process longest (63 μ), postoculars only 24 μ, postocellars 30 μ, longest on cheeks 43 μ. *Eyes* small, about 0.18 as long as head, strongly protruding posteriorly, dorsally somewhat larger than ventrally, measuring as follows in μ in one paratype: dorsal length 91, dorsal width 62, dorsal interval 121, ventral length 71, ventral width 54, ventral interval 137. *Ocelli* small, the median one about 16 μ in diameter, the posterior ones 20 μ in diameter, 83 μ apart, and about 70 μ from median ocellus. *Antennæ* about 1.9 times the length of head, segments I and II subequal in length and width, I with sides almost parallel, II goblet-shaped, markedly constricted just beyond base, its width at this level only 0.4 the greatest width near apex, the constricted portion with a strong dorsal carina; III–VI abruptly much narrower than I and II, their long, parallel-sided, slender pedicels constituting, respectively, about 0.6, 0.57, 0.5, and 0.4 of their length; VII and VIII rather firmly attached to each other, the former tapering evenly to base and to apex from a point beyond middle, the latter nearly conical; setæ on I and II stout, blunt, colorless, and arising from strong tubercles, the apical pair on I about 20 μ, those on II about 58 μ; setæ on distal segments fine and pointed; sense-cones very slender, almost indistinguishable from setæ. *Mouth-cone* heavy, broadly rounded, extending about 143 μ beyond posterior dorsal margin of head,

[1] The color given above is that of fully matured individuals. In teneral ones the browns and blackish browns are less intense, of course; but an interesting fact about their coloration is the persistence, for a time, of the bright crimson-red pigment which has been carried through the larval, prepupal, and pupal stadia and which now forms patches at the base of the head, along the middorsal line and at the sides of the three thoracic and the first abdominal segments, along the sides of the remaining abdominal segments (save only the tube), and in the legs beneath all the darkened areas.

[2] In life the winged females appear to have a broad, nearly black median streak along the dorsal surface of the abdomen, due to the overlying wings and the close confinement of their fringes in the usual way by retaining setae. Also, the ventriculus is invariably packed full of jet-black fungus spores, and this is always partially visible through the body wall, even before the wings are spread.

about attaining level of epimeral setæ; maxillary palpi long and stout, the second segment 77 μ long, 17 μ thick, and with a stout terminal sense-cone.

Prothorax along median line of pronotum about 0.42 the length of head, its width across coxæ (exclusive of tubercles) 2.3 times its length; all usual setæ present, supported by tubercles, clear white in color, rather stout, somewhat dilated at tip, and measuring as follows in μ: antero-marginals 16, antero-angulars 23, midlaterals 10, epimerals 33, postero-marginals 10; other setæ similar, all small, the largest pair (17 μ) being on the episternum near its anterior angle. *Legs* roughened with numerous tubercles and with the setæ colorless, blunt, and arising from large tubercles; fore coxæ each with two prominent postero-lateral setigerous tubercles, the seta of the anterior one about 51 μ, that of the posterior 49 μ; fore femora not swollen, fore tarsi unarmed. *Wings* long (1.42 mm.), quite slender beyond basal three-tenths, width of fore pair at middle about 0.086 mm.; fore wings without accessory setæ on posterior margin and without subbasal setæ.

Abdomen long and slender, broadest at segment III, tapering evenly to base of tube, its distal segments measuring approximately as follows in length (μ): VI 273, VII 266, VIII 238, IX 161, X 900, the last (the tube) about 1.75 times the length of head, nine times as long as its basal width, its sides tapering evenly to a very slight dilation near tip, the tip itself rather abruptly narrowed and about half as wide as base, the terminal setæ dark brown, pointed, and about 196 μ in length; all other abdominal setæ pale and short, the large lateral pair on VII, VIII, and IX arising from strongly projecting tubercles and measuring 67, 74, and 46 μ, respectively, the dorsal pair on IX 38 μ; III–VII each with a small setigerous tubercle just cephalad of the larger one; dorsal and ventral surfaces of abdomen rather evenly polygonally reticulate or subreticulate in the anterior portions of segments II–VII, the posterior portions of the terga minutely tuberculate, those of sterna nearly smooth; IX similarly subreticulate throughout, but more faintly along middle of dorsal surface, X (the tube) with the reticles fainter, elongate, and indistinct posteriorly.

Measurements of macropterous female (paratype, treated with NaOH), in mm.: Length about 4.12 (fully distended, 4.52); head, total median dorsal length 0.515, width across eyes 0.245, least width shortly behind eyes 0.202, greatest width across cheeks (exclusive of tubercles) 0.245, least width near base 0.224, width across basal collar 0.237, length of head in front of eyes 0.098, greatest width in front of eyes 0.140; prothorax, median length of pronotum 0.218, greatest width (inclusive of coxae but exclusive of coxal tubercles) 0.490; mesothorax, greatest width (across anterior angles) 0.476; metathorax, greatest width 0.515; abdomen, greatest width (at segment III, exclusive of tubercles) 0.549; tube (segment X, only), length 0.900, greatest subbasal width 0.098, least apical width 0.048.

Antennal segments:	1	2	3	4	5	6	7	8
Length (μ)	90	94	179	181	173	136	78	47
Width (μ)	58	57	33	36	35	33	30	18

Total length of antenna 0.978 mm.

Female, forma brachyptera.—Nearly identical with the long-winged form in size, color, and structure, excepting for the shorter wings, which vary greatly in size, even in the same individual, extending usually nearly to the first, rarely almost to the third, abdominal segment; eyes and ocelli almost as in the macropterous form.

Male (brachypterous).—Length about 3.3 mm. (fully distended, about 3.7 mm.). Color ordinarily a trifle paler than that of female, because of the presence of more light-reflecting substance in the fat-body; structure almost identical with that of brachypterous female, but ocelli often very small; wings extending about to middle of metathorax.

Measurements of male (paratype, treated with NaOH), in mm: Head, total median dorsal length 0.447, width across eyes 0.195, least width shortly behind eyes 0.181, greatest width across cheeks (exclusive of tubercles) 0.217, least width near base 0.202, width across basal collar 0.206, length of head in front of eyes 0.083, greatest width in front of eyes 0.119; eyes, dorsal length 0.070, dorsal width 0.047, dorsal interval 0.102, ventral length 0.047, ventral width 0.042, ventral interval 0.112; ocelli, diameter 0.011, interval between posterior ones 0.074, their distance from median ocellus 0.061; postocular setæ, length 0.020, interval 0.101, distance from eyes 0.030; postocellar setæ, length 0.024; lateral setæ on head-process, length 0.049; mouth-cone, length beyond dorsal margin of head 0.126; prothorax, median dorsal length of pronotum 0.182, greatest width (inclusive of coxæ but exclusive of coxal tubercles) 0.420; length of prothoracic setae: antero-marginals 0.013, antero-angulars 0.020, midlaterals 0.007, epirmerals 0.031, postero-marginals 0.008, each coxal pair 0.042; mesothorax, greatest width 0.358; metathorax, greatest width 0.360; abdomen, greatest width (at segment III, exclusive of tubercles) 0.388, lengths of abdominal segments: VI 0.245, VII 0.238, VIII 0.232, IX 0.148, X (tube) 0.686, this last with greatest subbasal width 0.081, least apical width 0.044, and length of terminal setæ 0.182; length of larger lateral pair of setæ on abdominal segment VII 0.050, VIII 0.053, IX 0.030, dorsal pair on IX 0.026.

Antennal segments:	1	2	3	4	5	6	7	8
Length (μ):	80	86	147	157	155	134	62	39
Width (μ):	49	50	30	31	32	30	27	17

Total length of antenna 0.860 mm.

FLORIDA: Clearwater, December 21, 1937, Dr. J. Chester Bradley and J. D. H., 40 ♀♀ (12 brachypterous), 22 ♂♂ (including holotype and allotype); Dunedin, Dec. 22, 1937, J. D. H., 1 ♀ (macropterous); St. Petersburg, Dec. 22, 1937, J. D. H., 12 ♀♀ (10 brachypterous), 8 ♂♂; Lake Fern, Dec. 23, 1937, J. D. H., 1 ♂; Homestead, Dec. 30, 1937, J. D. H., 2 ♀♀ (macropterous), 1 ♂; Bonita Springs, Dec. 30, 1937, J. D. H., 7 ♀♀ (brachypterous), 5 ♂♂. All specimens were taken from dead leaves of a low palmetto (*Sabal glabra* Sarg.).

That such a large and distinctive thrips as this could remain so long undiscovered in the State of Florida is no doubt to be explained largely by its restricted habitat. It apparently occurs only on the dead leaves of the

low-growing Dwarf Palmetto or Blue Palm, and only on those leaves that lie close to the ground and which, in dying, have become somewhat folded fan-wise to provide between the folds at the base of the leaf-blade the protection which the thrips prefers or requires. It was discovered by Dr. Bradley, after whom I have named it, near Clearwater, and subsequent collecting on following days extended its known distribution eastward to the Atlantic coast and southward nearly to the tip of Florida—the only parts of the State which were visited in the limited time available.

Its pale color and roughened dorsal surface make it very inconspicuous indeed on the dead leaves which it frequents, and almost certainly represent an adaptation of great protective value to the species. No highlights are reflected by the body surface, and the absence of major setæ from the dorsal and ventral surfaces of the flattened body permit it to reach better shelter and more food than would otherwise be available. The elevation of the posterior ocelli and their anterior position, thus permitting vision to the side, as well as the lateral position of the eyes, are likewise clearly adaptive.

The food of the species is the spores of a fungus which grows among the more humid folds of the dead leaves, usually on the lower surface; and the stomachs of the thrips are almost invariably filled with these black unicellular structures.

All individuals, with the exception of those which have recently emerged from the pupal exuviae, are covered with an accumulation of spores, tiny plant fragments, and other detritus from the environment, all held quite firmly to the insect's body by a thin grayish film of some organic substance. This can be picked off the specimens laboriously with a needle or bristle, with the certainty of removing a number of setæ in the process; but if, in mounting, the specimens are to be cleared in xylene, it will be found that the currying operation had better be postponed until the xylene is reached, when careful massage and some picking with a delicate camel's hair brush will clean the specimens perfectly.

In food habits, and to some extent in color, particularly in that of the legs, *Atractothrips bradleyi* bears a marked resemblance to the Panamanian *Zeugmatothrips priesneri* and the Costa Rican *Z. hoodi*.

Vol. 51, pp. 33–40 March 18, 1938

PROCEEDINGS

OF THE

BIOLOGICAL SOCIETY OF WASHINGTON

FERN MISCELLANY—IV.[1]

BY WILLIAM R. MAXON.

The following notes on tropical American ferns are additional to three similar instalments previously published under the same title.[2]

GLEICHENIACEAE.

Dicranopoteris gnidioides (Mett.) Maxon.

Gleichenia gnidioides Mett. Ann. Sci. Nat. V. Bot. **2** : 266. 1864.

Founded on Colombian specimens collected by Triana, "Prov. de Chocó, Acostadero, alt. 2400 metr." A remarkable species, in its minute oblique segments unlike any other, and apparently still known only from the original collection, of which a specimen on loan from the Herbario Nacional, Bogotá, has recently been examined.

CYATHEACEAE.

Alsophila lasiosora Mett.; Kuhn, Linnaea **36** : 157. 1869.

Founded on *Spruce* 4249 (not 4349, as stated), from Tarapoto, Peru, and represented also by beautifully prepared recent specimens from the same region in eastern Peru: Puerto Yessup, Dept. Junín, alt. 400 meters, in dense forest, July 1929, *Killip & Smith* 26374; Pichis Trail, Santa Rosa, Dept. Junín, alt. 625–900 meters, July 1929, *Killip & Smith* 26169. The identification is confirmed by comparison with portions of the type collection courteously forwarded from Kew. Apparently this is a rare or local species.

POLYPODIACEAE.

Elaphoglossum Lindeni (Bory) Moore.

This species, excluded from the flora of Jamaica by the writer in describing *E. nematorhizon* some time ago,[3] actually occurs in that island, as evidenced by two sheets of perfectly characteristic specimens in the Jenman Herbarium at the New York Botanical Garden. They were presumably

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

[2] Proc. Biol. Soc. Washington **43** : 81–88. 1930; **46** : 105–108. 1933; **46** : 139–145. 1933.

[3] Amer. Fern Journ. **22** : 11–14. 1932.

collected by Jenman, and bear his notation, "Just below the summit of Blue Mt. Peak." The sterile fronds range up to 20 cm. long, the largest blades measuring 10 cm. long and 3 cm. broad.

The amount of careful collecting still to be done even in a region so well explored as Jamaica is shown by the fact that this species has not been re-collected there in more than 50 years and that *E. nematorhizon* itself was not discovered until 1926. As previously stated, the relationship of *E. nematorhizon* is not with *E. Lindeni*, but with the South American *E. heteromorphum* (Kl.) Moore.

Polypodium Skutchii Maxon, sp. nov.

§ *Eupolypodium.* Faciei *P. strictissimo* (Hook.) Hieron. proximum, a quo differt: laminae parte sterili et parte fertili longitudine subaequalibus, segmentis sterilibus paucis, late et inaequaliter triangularibus, basi longe decurrentibus, apice remotis, rhachi obscura et laminae pagina setis brunneis subpersistentibus mediocriter praeditis.

Plants erect, solitary or clustered. Rhizome ascending (rarely branched), 1–1.5 cm. long, 1–2 mm. thick, freely paleaceous, the scales light brown, imbricate, reticulate, oblong-lanceolate, 2–2.5 mm. long, 0.4–0.6 mm. broad, subcordate at base, entire, bearing a long brown seta at acutish apex; cells in 10–14 series, narrowly oblong, with large lumina, the outer walls hyaline, the partition walls dark, sclerotic. Fronds numerous, erect, mostly 8–11 cm. long, the stipe short (1–3 cm.) or nearly wanting, light brownish, dull, scantily brown-setulose, terete at base, narrowly winged upward, the alar prominences passing gradually into reduced basal segments of the blade; blades narrowly linear, 2–3 mm. broad, the sterile lower half obliquely and dentately pinnatifid, the fertile apical half subentire or obscurely crenate, slightly broader than basal portion, tapering near apex, the tip about 1 mm. broad, acutish; sterile segments few (12–22), obliquely triangular, acutish or somewhat rounded, strongly inequilateral (midvein parallel to lower margin), 1–1.5 mm. long, 2–4 mm. broad at long-decurrent base, here rather broadly joined; rachis concealed, this and the thick leaf tissue of the blades sparingly brown-setulose throughout, the hairs with a pale inflated base, subpersistent, especially along rachis and margins of segments; sinuses open, 2–4 times as broad as segments, these appearing distant; veins simple; sori linear, borne on the arcuate basal half of the black veins, early confluent and forming a dense broad median line, this extending to 0.5 mm. from the margin at maturity; sporangia very numerous, dark cinnamomeous, glabrous.

Type in the U. S. National Herbarium, no. 1,540,125, collected at Buena Vista, above Tecpam, Department of Chimaltenango, Guatemala, at 3000 meters elevation, on mossy tree trunks, November–December, 1930, by Alexander F. Skutch (no. 96). Identical material collected subsequently at the same locality is represented by *Skutch* 431 and 774.

Polypodium Skutchii belongs to the group of *P. duale* Maxon, revised long ago by the writer,[4] and is most closely related to *P. strictissimum*

[4] Contr. U. S. Nat. Herb. **17** : 398–406. *pls. 11, 12, text figs. 8–10.* 1914.

(Hook.) Hieron., a rare South American species, described and illustrated by Hooker[5] (as *Xiphopteris Jamesoni* Hook.) on Ecuador specimens collected by Jameson. Hooker subsequently reduced *X. Jamesoni* to varietal rank under *Polypodium serrulatum* (i. e. *P. duale*) as var. *β strictissimum*, citing only the Quito plant of Jameson. The species name *Jamesoni* being untenable under *Polypodium*, Hieronymus properly used the name *strictissimum* for this South American species, and although he appears to have unduly extended the scope of the species by recognizing three constituent varieties Jameson's Quito plant as illustrated by Hooker will continue to stand as the type.

To his former discussion of *P. strictissimum*, which still is represented in herbaria by very scant material, the writer is able to add little of importance. In any case *P. Skutchii* is clearly distinct from *P. strictissimum* on the basis of the Quitensian type specimen, differing in its few, broadly triangular, long-decurrent segments, which appear far apart (as opposed to the far more numerous close-set, elongate, only slightly decurrent segments of *P. strictissimum*), and in its greatly elongate fertile tips, these nearly or quite as long as the sterile portion of the blades. In these respects it bears a close resemblance to the plant illustrated by Hooker in Garden Ferns, *plate 44*, as *Xiphopteris serrulata*. Although the source material is not indicated this illustration is cited without question by Hieronymus in synonymy under *P. strictissimum*, but this is certainly erroneous. The plant shown in plate 44 is either *P. Skutchii* or a very closely related species which is still undescribed.

Polypodium jungermannioides Kl. Linnaea **20**: 373. 1847.

Polypodium Sprucei Hook. var. *furcativenosa* Hieron. Bot. Jahrb. Engler **34** : 499. 1904.

Polypodium Sprucei Hook. var. *costaricense* Christ, Repert. Sp. Nov. Fedde **8** : 17. 1910.

This species was founded upon *Moritz* 312, from the region of Mérida, western Venezuela. It is a small plant, with numerous suberect, narrowly ligulate, entire or lightly repand, obtuse, long-setose fronds up to 6 or 8 (rarely 10) cm. long, these imbricately tufted upon a slender, elongate, suberect rhizome, which, as shown by an isotype in the British Museum, is absolutely devoid of scales. The absence of rhizome scales (a fact not mentioned by Klotzsch) is of importance, since it happens that in *Polypodium Sprucei* Hook.,[6] a plant of similar form and vestiture, an apical tuft of rhizome scales is present and is readily seen. Nevertheless Hieronymus, presumably because he had not seen true *P. Sprucei*, redescribed *P. jungermannioides* as *P. Sprucei* var. *furcativenosa* Hieron. This is perfectly clear from his description and comments and from an examination of several specimens of the type collection, *Lehmann* 654, from Colombia.

[5] Second Cent. Ferns *pl. 14*. 1860. (Not *Polypodium Jamesoni* Mett. 1883, nor Jenm. 1897.)

[6] Second Cent. Ferns. *pl. 10*. 1860. Founded on *Spruce* 4767, from Tarapoto, eastern Peru.

In essentials the Lehmann specimens agree well with the Moritz isotype, although the fronds of the latter are more nearly entire, a variable character; the forked veins are mentioned in the original description by Klotzsch.

In dealing with Costa Rican specimens which seem in no wise different from South American material of *P. jungermannioides*, Christ eventually fell into the same error as Hieronymus. There are at hand two excellent Werckle specimens correctly identified by Christ as *P. jungermannioides*, but later material (*Brade* 296) was described by him as *P. Sprucei* var. *costaricense* (var. nov.), as shown beyond doubt by an isotype specimen at the New York Botanical Garden. Actually, *P. jungermannioides* is fairly abundant and widely distributed in the interior mountain region of Costa Rica, and extends northward to Guatemala. The following specimens (excepting *Brade* 296) are in the U. S. National Herbarium:

Guatemala: Near Cobán, *Hatch & Wilson* 226.

Costa Rica: Volcán Barba, alt. 2200 meters, *Brade* 296 (type coll. of *P. Sprucei* var. *costaricense*); alt. 2600 meters, *M. Valerio* 54. Upper slopes of Volcán Poás, alt. 2500–2600 meters, *Pittier* 835; *Standley* 34842, 34908; *Stork* 2337. Santa Clara de Cartago, alt. 1950 meters, *Lankester* 900; *Maxon & Harvey* 8163. La Palma, Prov. San José, alt. 1600 meters, *Standley* 32904. La Fuente, above Peralta, alt. 1350 meters, *Lankester* 624. Las Nubes, Prov. San José, alt. 1500–1900 meters, *Standley* 38428, 38621. Region of Vara Blanca, between Poás and Barba volcanoes, alt. 1600–1950 meters, *Maxon & Harvey* 8360, 8395, 8411, 8437; *Skutch* 3376. Fraijanes, Prov. Alajuela, alt. 1500–1700 meters, *Standley* 47492, 47656. Cerro de Zurqui, Prov. Heredia, alt. 2000–2400 meters, *Standley* 50625. San Jerónimo, *Werckle* (*Jiménez* 570). Without locality Werckle (ex herb. Christ).

Panama: Near Camp I, Holcomb's Trail, above El Boquete, Prov. Chiriquí, alt. 1450–1650 meters, *Maxon* 5694.

Colombia: Cordillera de Pasto, alt. 2000 meters, *Lehmann* 654 (type coll. of *P. Sprucei* var. *furcativenosa*).

Polypodium yarumalense Hieron. Bot. Jahrb. Engler **34** : 499. 1904.

Having wrongly assumed *P. Sprucei* to be a plant with non-paleaceous rhizomes, as above stated, Hieronymus described an allied new species, *P. yarumalense*, based upon *Lehmann* 7390, from Colombia (near Yarumal, alt. 2000–2200 meters), in which the rhizome is obviously peleaceous and the veins are forked. In its paleaceous rhizome *P. yarumalense* agrees with *P. Sprucei;* but the latter, as figured and as shown by a nearly sterile portion of the type (*Spruce* 4746) received from Kew, is a very much smaller plant, with *simple* veins, and the two species are probably distinct. An excellent isotype of *P. yarumalense* is in the National Herbarium. Agreeing closely with this are excellent specimens at Kew collected in the mountains of Antioquia, Colombia, by Kalbreyer (no. 1752), and there are referred here tentatively the following additional specimens:

Panama: Near El Boquete, Prov. Chiriquí, alt. 1000–1500 meters, *Mrs. L. R. Cornman* 1202.

Hispaniola: Monción, Prov. Monte Cristi, Dominican Republic, alt. 1900 meters, *Ekman* 12819a. Loma La Vieja, Prov. de Vega, Dominican Republic, alt. 2075 meters, *Ekman* 14034a.

Polypodium Hombersleyi Maxon, Amer. Fern Journ. **20** : 1. 1930.

This peculiar species of *Eupolypodium*, described from Trinidad, has recently been discovered in the mountains of Costa Rica, a notable extension of range.

Costa Rica: Vicinity of El General, Prov. San José, alt. 1000 meters, *Skutch* 3015; alt. 1190 meters, *Skutch* 2831.

Like its very rare relative *P. Randalli* Maxon, of Jamaica, it is a small delicate epiphyte, growing among mosses on the trunks of forest trees.

Polypodium Maxonii C. Chr. Ind. Fil. 543. 1906.

Polypodium firmulum Maxon, Contr. U. S. Nat. Herb. **8** : 274. *pl. 61, f. 3.* 1903; not Baker, 1893.

Founded upon *Palmer* 448, from San Luis Potosí, Mexico. Apparently a very rare species, the only additional material seen being a specimen in the British Museum, collected in Honduras by Mrs. Skinner and received through Messrs. Veitch in July, 1884. Though small, the Honduras plant is otherwise characteristic, agreeing closely with the type in texture, venation, serration, and pubescence.

Polypodium petiolatum Davenp. Bot. Gaz. **19** : 394. 1894.

Listed erroneously by Christensen, in the Index Filicum, as a valid Mexican species, the type being *Pringle* 4001. Of this number, from "mossy oaks, Las Canoas, State of San Luis Potosí, Aug. 19, 1890," Davenport quotes Pringle as stating that only two plants were found. One of these, in the Pringle Herbarium, at the University of Vermont, has recently been examined by the writer and found to agree in every respect, including the casually goniophlebioid venation, with *P. fraternum* Schlecht. & Cham., of which a good series is at hand from Mexico and Guatemala. The second specimen, Davenport's actual type, in the Gray Herbarium, has not been seen.

Polypodium xiphopteridifolium Jenm. Gard. Chron. III. **18** : 612. 1895.

The type, in the Jenman Herbarium at the New York Botanical Garden, is an unnumbered Cuban specimen (without precise locality data) collected by Eggers, mixed with *Hymenophyllum*, and is precisely *P. funiculum* Fée, an abundant endemic species, illustrated and twice described by Fée. This specimen may be a part of *Eggers* 5104, from Monte Verde, Cuba, the only other Eggers specimen of *P. funiculum* seen by the writer or apparently by Christ, who lists[7] this number.

[7] Bot. Jahrb. Engler **24** : 128. 1897.

Polypodium arcanum Maxon, nom. nov.

Polypodium deltoideum Liebm. Dansk. Vid. Selsk. Skrift. V. **1** : 251. 1849; not Sw. 1788.

The present species, for which a new name is necessary, has been regarded as a synonym of *P. Catharinae* Langsd. & Fisch., of South America, to which it is not very closely related. It was founded on specimens from the mountains near Chinantla, Puebla, alt. 7000–8000 ft. Agreeing with type material received from Copenhagen are the following specimens in the U. S. National Herbarium, all from the state of Puebla: *Arsène* 2191, 10662; *Orcutt* 3991; *J. A. Purpus* 222. The alliance of *P. arcanum* is with *P. Eatoni* Baker, of Chiapas and Veracruz.

Polypodium Palmeri Maxon, Contr. U. S. Nat. Herb. **17** : 600. 1916.

Here may definitely be referred *Phlebodium nitidum* J. Sm.,[8] listed in Christensen's Index as a doubtful species. The type material, in John Smith's herbarium at the British Museum, consists of three fronds, unmistakable in character, annotated by Smith, "Hort. Kew, 1851. *Phlebodium nitidum* J. Sm." It bears the additional data, "Honduras; introduced in 1844 by Mrs. Col. Macdonald." This species, which ranges from Tamaulipas to Panama, is common in Honduras. Smith's species name would be untenable under *Polypodium.*

Adiantopsis chlorophylla (Sw.) Fée.

Widely distributed in South America, but until now apparently not reported from North America. In the Kew Herbarium, however, there is a specimen from Alotenango, Guatemala, *Salvin & Godman* 33, which may tentatively be so referred. This species is wanting from extreme northern South America, as well as from the Chiriquí-Costa Rica region, the present record being thus a wide extension of range; but the Guatemalan specimen differs less from some of the Paraguay material than the variable South American forms currently referred to this species do among themselves.

Pityrogramma fumarioides (Rosenst.) Maxon.

Gymnogramma fumarioides Rosenst. Mém. Soc. Neuchat. **5** : 54. *pl. 6, f. 10.* 1912.

This species, described and illustrated upon specimens collected by E. Mayor (no. 144) in the region of Medellín, Colombia, belongs to the genus *Pityrogramma,* section *Oligolepis* Domin, and is allied only to *P. Pearcei, P. schizophylla,* and *P. Eggersii.* It is very readily distinguished from the two last, which are West Indian,[9] but judging from the description of *P. Pearcei* and recent comment by Domin[10] it must be closely related to that Andean species, of which unfortunately no material is available for comparison. The specimen at hand lacks the extreme base of the stipe,

[8] Bot. Mag. **72,** Comp. 13. 1846. Not *Polypodium nitidum* Kaulf. 1824.

[9] Contr. U. S. Nat. Herb. **24** : 61, 62. 1922.

[10] Publ. Fac. Sci. Univ. Charles **88** : 9. 1928; Rozpr. Ceské Akad. II. **384** : 45, 46. 1929.

which is described by Rosenstock as sometimes whitish-ceraceous, but a few scales present are exactly those of *Pityrogramma*. The plant is one of extreme delicacy, and is essentially 5-pinnate, as described.

Athyrium macrocarpum Fée, Gen. Fil. 188. 1852.

Founded upon *Galeotti* 6555, from Oaxaca, and listed by Christensen as a doubtful species. It is synonymous with the later *Asplenium commutatum* Mett. (ex Kuhn, Linnaea **36** : 99. 1869), founded in part upon *Galeotti* 6555, but the name *macrocarpum* can not prevail under *Asplenium*, being invalidated by *Asplenium macrocarpum* Desv. 1827.

Apparently *A. commutatum* is not very uncommon in the mountains of Mexico and Guatemala. It was collected also on Chiriquí Volcano, Panama, at 2400 meters, in 1918, by E. P. Killip (no. 5441), and has recently been found rather commonly in Hispaniola by Ekman.

Struthiopteris loxensis (H. B. K.) Maxon.

Lomaria loxensis H. B. K. Nov. Gen. & Sp. **1** : 18. 1815.

This species has been discussed by Hieronymus,[11] who cites several synonyms and recognizes three forms, based on scale characters. It has not heretofore been transferred to *Struthiopteris*, however. Numerous recent specimens are at hand from Colombia, Ecuador, Peru, and Bolivia, at 3,000 to 4,000 meters elevation.

Struthiopteris stolonifera (Mett.) Broadhurst.

The characters and synonymy have been discussed by Miss Broadhurst,[12] who reports this species only from Mexico. The range is considerably extended by specimens recently collected in western Guatemala by Dr. A. F. Skutch: Santa Elena, Dept. Chimaltenango, alt. 2,400–2,700 meters, "very abundant in the cypress and broad-leaf forests," *Skutch* 87, 292.

Dennstaedtia bipinnata (Cav.) Maxon.

Dicksonia bipinnata Cav. Descr. Pl. 174. 1802.
Dicksonia adiantoides Humb. & Bonpl.; Willd. Sp. Pl. **5** : 488. 1810, excl. syn. Plum.
"*Dicksonia apiifolia*" Hook. Sp. Fil. **1** : 77. *pl. 26, C.* 1844; not Swartz, 1801.
Dennstaedtia adiantoides Moore, Ind. Fil. xcvii. 1857.

Willdenow's description of *Dicksonia adiantoides* is based upon three elements: A specimen collected near Caripe by Humboldt and Bonpland; *Dicksonia bipinnata* Cav.; and Plumier's description and illustration (*pl. 30*) of a Hispaniola plant. Of these the first has naturally been regarded as the type, and *Dennstaedtia adiantoides* (Humb. & Bonpl.) Moore is now well understood on this typification. The third element is the basis of a closely related but readily recognized species, of equally wide distribution,

[11] Hedwigia **47** : 240. 1908.
[12] Bull. Torrey Club **39** : 277–278. 1912.

properly known as *Dennstaedtia globulifera* (Poir.) Hieron.[13] Regarding the second element, *Dicksonia bipinnata*, Christensen's comment[14] in his valuable paper on the new ferns described by Cavanilles is as follows: "Described after a primary pinna received from Ventenat and probably from a cultivated plant. No locality quoted. Not seen. Willdenow, Sp. **5** : 488, made it a synonym of his *D. adiantoides*=*Denn. adiantoides* (W.) Moore, perhaps rightly, but if so the name *bipinnata* has the priority." The following notes are intended to show that the Ventenat type of *Dicksonia bipinnata* Cav. was probably from Puerto Rico, and that the two species are actually synonymous.

Willdenow cites three localities for *D. adiantoides*, viz. Caripe, Hispaniola, and Puerto Rico. As stated above, the first relates to *Dennstaedtia adiantoides* in the usual sense, the next to *D. globulifera*. The Puerto Rican reference is obviously to a Ventenat specimen in the Willdenow Herbarium labeled *D. adiantoides* (but locality not stated), of which a pinnule was kindly forwarded to the U. S. National Herbarium by Professor Diels many years ago. This may indeed be from a cultivated plant, as Christensen intimates was true of the Ventenat type specimen of *D. bipinnata*, but the probability is that Willdenow received it as part of Ventenat's freely distributed material from Puerto Rico. At any rate the specimen is correctly named, agrees well with Cavanilles' description of *Dicksonia bipinnata*, and in the writer's opinion is the basis upon which Willdenow included that species as a synonym, being almost certainly a part of the original collection; in which case Cavanilles' epithet should be adopted for the species currently known as *Dennstaedtia adiantoides*. The substitution of new epithets for little or no apparent reason used to be not infrequent, and very likely Willdenow regarded "*bipinnata*" as altogether inappropriate for a plant having tripinnate blades.

Dennstaedtia Kalbreyeri Maxon, nom. nov.

Dicksonia pubescens Baker, Journ. Bot. Brit. & For. **19** : 203. 1881; not Sw. 1809.
Dennstaedtia pubescens C. Chr. Ind. Fil. 218. 1905.

The type, at Kew, consists of two specimens collected in Antioquia, Colombia, by Kalbreyer (no. 1859), at an altitude of about 1950 meters. The need of a new species name is evident.

A distinctive species, known apparently only from the original collection. It is a plant of harsh herbaceous texture, the leaf-tissue beneath everywhere scabrous-pubescent with broad, pale, firmly attached, septate hairs. The rachises are similarly scabrous, but the hairs are darker, i. e. yellowish brown.

---

13 Cfr. Hieron. in Bot. Jahrb. Engler **34** : 455. 1904; also Maxon, Pter. Porto Rico 492. 1926.

14 Dansk. Bot. Ark. **93** : 26. 1937.

Vol. 51, pp. 41–42 March 18, 1938

PROCEEDINGS
OF THE
BIOLOGICAL SOCIETY OF WASHINGTON

DIAGNOSES OF NEW FROGS FROM BRAZIL.

BY DORIS M. COCHRAN,
United States National Museum.

Three new species of frogs, one belonging to a new genus of the family Leptodactylidae seem to warrant recognition. The full descriptions will appear later in a paper now being prepared.

Leptodactylus gaigeae, n. sp.

Diagnosis: Like *Leptodactylus marmoratus* (Steindachner) but smaller, with less prominent eyes, shorter femur, shorter fingers and different coloration. Named in honor of Mrs. Helen T. Gaige.

Type: An adult male, U. S. N. M. 96759 from Bonito in the Serra da Bocaina, near the boundary between Rio de Janeiro and São Paulo, collected on December 28, 1931, received from Dr. A. Lutz.

Paratype: U. S. N. M. 96760 with the same data.

Thoropa lutzi, n. sp.

Diagnosis: Like *Thoropa miliaris* (Spix) but much smaller; the snout nearly semicircular when seen from above; thumb spines very minute, in two patches on first but not appearing on second and third fingers as in *miliaris;* ventral surface immaculate. Named for Dr. Adolpho Lutz.

Type: An adult male, U. S. N. M. 97622 from Recreio dos Bandeirantes, Federal District, southwest of the city of Rio de Janeiro, collected by Bertha Lutz, Doris Cochran and Joaquim Venancio. Paratypes: U. S. N. M. 97623 with the same data; U. S. N. M. 97327–8 from Sumaré in the city of Rio de Janeiro collected on February 15, 1924, received from Dr. A. Lutz; U. S. N. M. 96297–8 from Tijuca in the city of Rio de Janeiro; U. S. N. M. 96422, an adult male, and 96423, tadpoles from Independencia near Petropolis, state of Rio de Janeiro.

CROSSODACTYLODES, n. gen.

Diagnosis: Outer metatarsals completely separated; sternum without a bony style; toes free; tips of toes and fingers dilated into regular disks which are not divided by a median groove, the terminal phalanx T-shaped;

vomerine "teeth" represented only by a more or less roughened ridge; tongue oval, narrow, free posteriorly; tympanum hidden; pupil transversely elliptic. Genotype: *C. pintoi.*

Crossodactylodes pintoi, n. sp.

Diagnosis: Characters of the genus. Named for Dr. Aliveira Pinto.

Type: U. S. N. M. 102606, an adult male from Macahé in the state of Rio de Janeiro, received from the Museu Paulista.

Paratypes: Mus. Paul. 104 and U. S. N. M. 102607–11, all with the same data as the type.

Vol. 51, pp. 43–46 March 18, 1938

PROCEEDINGS
OF THE
BIOLOGICAL SOCIETY OF WASHINGTON

NEW SNAKES OF THE GENERA CALAMARIA, BUNGARUS AND TRIMERESURUS FROM MOUNT KINABALU, NORTH BORNEO.

BY ARTHUR LOVERIDGE.

Recently Mr. J. A. Griswold, Jr., as a member of the Harvard Primate Expedition, visited Mount Kinabalu (13,455 feet), British North Borneo, where he made a very fine collection of mammals and birds. Incidental to this work, in which he was primarily interested, he gathered a remarkably representative collection of lower vertebrates.

Some idea of the completeness of the survey which he accomplished in the short space of two and a half months (June 9 to August 26, 1937), may be gathered from the fact that of the 35 species of snakes known from the mountain, and listed by Dr. Malcolm Smith (1931, Bull. Raffles Mus., Singapore, p. 32), Griswold secured 25, including such choice things as *Opisthotropis typica* (Mocquard) and *Oreocalamus hanitschi* (Boulenger).

In addition, however, he obtained six species as yet unrecorded from the mountain though four were known to occur in Borneo. These snakes are:

Amblycephalus vertebralis Boulenger (of Perak).
Elaphe melanura (Schlegel).
Dendrelaphis caudolineatus (Gray).
Dendrophis pictus (Gmelin).
Calamaria ? leucocephala Duméril & Bibron (damaged).

The sixth appears to be an undescribed montane race of a species known from Java, Sumatra, Nias and the Celebes, which I propose to name after its discoverer—

Calamaria lumbricoidea griswoldi, subsp. nov.

Type.—Museum of Comparative Zoölogy, No. 43580. An adult ♀ from Luidan River, near Bundutuan, Mount Kinabalu, British North Borneo, at an altitude *circa* 3,340 feet. Collected by J. A. Griswold, Jr., July 14, 1937.

Paratype.—Museum of Comparative Zoölogy, No. 43581. A gravid ♀ with same data as the type except that it was collected on July 23, 1937.

Diagnosis.—Closely related to *C. lumbricoidea* Boie, with a Javan example (M.C.Z. 25894) of which it has been compared. It definitely differs in the distance of the eye from the buccal border; fewer subcaudals (13, as against 16–23), though it must be remembered that both type and paratype are females; and strikingly in coloration.

Description.—Diameter of the eye *equal* to its distance from the mouth; rostral markedly broader than deep, visible from above; frontal slightly longer than broad, almost, though not, twice as broad as a supraocular, much shorter than a parietal; preocular 1; postocular 1; upper labials 5, the third and fourth entering the orbit, fifth much the largest; mental in contact with the anterior sublinguals, which are in contact with the first three infralabials; posterior sublinguals in contact with one another. Scales in 13 rows; ventrals 186 (192 in paratype); anal single; subcaudals 13 (12 in paratype but tip of tail slightly damaged) pairs; tip of tail pointed.

Coloration.—(In alcohol.) Above, head brown with a dark-edged light streak commencing posteriorly on each parietal and descending obliquely to the nape, a dark descending streak behind the eye, lower portion of upper labials white; body white, the central axis of each scale purplish black resulting in 11 (9 on nape) longitudinal lines on dorsum and tail; scales of lowest lateral row white, with or without a black mark. Below, uniformly white (pink or red in life), a dusky median line beneath the tail.

Measurements.—Type ♀. Head and body 481 (of gravid paratype 422) mm., tail 24 (of paratype 17) mm.

Bungarus flaviceps baluensis, subsp. nov.

Type.—Museum of Comparative Zoölogy, No. 43601. An adult ♂ from Kenokok River, near Kiau, Mount Kinabalu, British North Borneo, at an altitude *circa* 3,300 feet. Collected by J. A. Griswold, Jr., July 23, 1937.

Paratypes.—Museum of Comparative Zoölogy, No. 43602. An adult ♂ with the same data as the type except that it was collected on August 18, 1937. British Museum. A ♀ collected on Mount Kinabalu by A. Everett, Esq.

Diagnosis.—A montane race differing from typical *B. f. flaviceps* Reinhardt of Java in its striking coloration. Our lowland material of the typical form from Sumatra and Sarawak (topotypes of *formosus* Gray) possesses a well-defined light lateral line and yellow head and lack the handsome black and white annuli of the new race.

Description.—Midbody scale-rows 13; ventrals 218 (206–219 in paratypes); anal single; subcaudals 46 (42–45 in paratypes); upper labials 7, the third and fourth entering the orbit; preocular 1; postoculars 2; temporals 1 + 2.

Coloration.—Above, head and nape brown, anterior half of dorsum iridescent black, a cream colored vertebral line, one or two of the lowest lateral scale-rows white, each scale with a black centre, posterior half of dorsum and tail alternately banded with coral red and black, the six black annuli subdivided by from four to one pure white annuli, the lowest number

being on the tail. Below, anteriorly white, the ends of the ventrals black, posteriorly coral red interrupted by the annuli which are less sharply defined than on the dorsum, tip of tail coral red (black in ♂ paratype which, however, agrees with the rest of the description).

Measurements.—Type ♂. Head and body 1170 (1100 in paratype ♂) mm., tail 173 (160 in paratype ♂) mm.

Remarks.—The paratype ♀ is the individual referred to in 1896 by the late Dr. G. A. Boulenger in his "Catalogue of Snakes in the British Museum," *3*, p. 372.

Trimeresurus sumatranus malcolmi, subsp. nov.

Type.—Museum of Comparative Zoölogy. No. 43604. An adult ♂ from Sungii River, near Bundutuan, Mount Kinabalu, British North Borneo, at an altitude *circa* 3,000 feet. Collected by J. A. Griswold, Jr., July 20, 1937.

Paratypes.—Museum of Comparative Zoölogy, No. 43605. An adult ♀ from Kenokok River, near Kiau, Mount Kinabalu, *circa* 3,300 feet; and No. 43606. An adult ♀ from Kiau, *circa* 3,000 feet. Both collected by J. A. Griswold, Jr., on August 5 and 18, 1937, respectively.

Also a ♂ from Lumu Lumu, Mount Kinabalu, *circa* 5,500 feet. Collected by F. N. Chasen, Esq., of the Raffles Museum, Singapore.

Diagnosis.—A montane race differing from typical *T. s. sumatranus* (Raffles) of Sumatra (and the Sarawak lowlands, etc.) by its fewer midbody scale-rows (19 as against 21), fewer ventrals (168–174 as against 180–191), and constant absence of a white lateral line.

Description.—Midbody scale-rows 19; ventrals 170 (168–174 in paratypes); anal single; subcaudals 73 (61–64 in paratypes); upper labials 8 (8–9 in paratypes), separated from the orbit by a post-subocular; preoculars 3; postoculars plus subocular 3; temporals 2 + 2.

Coloration.—Above, black, tending to form indistinct transverse bands, each scale on head and back with a light green apical spot, the amount of green increasing towards the flanks where patches of wholly green scales occur; each scale on tail (except just behind the anus) with a red apical spot. Below, pale green, each ventral and subcaudal shield edged with black.

Measurements.—Type ♂. Head and body 870 mm., tail 190 mm. Exceeded by paratype ♂ from Lumu Lumu measuring 1220 (1025 + 195) mm. and paratype ♀ from Kenokok River measuring 1330 (1120 + 210) mm.

Remarks.—The paratype ♂ is the individual referred to in 1931 by Dr. Malcolm A. Smith in his report on "The Herpetology of Mt. Kinabalu, North Borneo." (Bull. Raffles Mus., Singapore, p. 29), a paper which has proved invaluable in working out Griswold's collection. This huge and handsome pit-viper is named in appreciation of Dr. Malcolm Smith's work for herpetology. I might add that Mr. Griswold secured a good series of Dr. Smith's recently described *T. chaseni* as well as what has been heretofore regarded as *gramineus* (Shaw), both of which would appear to be more abundant on Kinabalu than the race just described. The range of *T. gramineus* has recently been restricted to India.

Vol. 51, pp. 47–52 March 18, 1938

PROCEEDINGS
OF THE
BIOLOGICAL SOCIETY OF WASHINGTON

A NEW FORM OF CRYPTURELLUS NOCTIVAGUS.

BY JOHN T. ZIMMER.

Some time ago, Mr. H. B. Conover called my attention to certain specimens of a *Crypturellus* in the collections of the American Museum of Natural History from Mt. Duida, Venezuela. In view of the action by a number of recent authors in recognizing *C. erythropus* (Pelzeln) as specifically distinct from *C. noctivagus dissimilis* (Salvadori), the question arose as to whether the Duida birds might not belong to *erythropus;* certainly they could not be referred to *dissimilis.*

Pelzeln described *erythropus* from skins collected by Natterer in "Brasilia" which is determinable (with regard to the species in question) from Pelzeln's later writings as meaning the vicinity of Manaos and the neighborhood of São Joaquim on the Rio Branco. Unfortunately, I have no material from either locality. The original description agrees with specimens of *dissimilis* from Faro and Obidos, Brazil, and from British Guiana.

A letter to Dr. Hellmayr, who has examined the cotypes of *erythropus,* brought the interesting reply that the birds from Manaos, Obidos, and Guiana are inseparable, representing a single form which should bear the name *erythropus,* of which "*dissimilis*" must be considered a synonym. Since the detail has not been given attention heretofore, I propose Manaos as restricted type locality for *Tinamus erythropus* Pelzeln, 1870, Orn. Bras., p. 293.

With this evidence at hand, the Mt. Duida birds prove to belong to an undescribed form which I have placed with *erythropus* in the *noctivagus* group for reasons that are given on a later page.

Grateful acknowledgment is made to Mr. Conover for

calling the problem to my attention and to Dr. Hellmayr for his kind elucidation of the identity of the original *erythropus*. The new form may be known as follows.

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

Crypturellus noctivagus duidae, new subspecies.

Type.—from Mt. Duida ("Campamento del Medio"), Venezuela; altitude 350 feet. No. 272,144, American Museum of Natural History. Adult male collected January 19, 1929, by the Olalla brothers.

Diagnosis.—Immediately distinguishable from *C. noctivagus erythropus* of northeastern South America (Guianas to the north bank of the Amazon) by the dark (grayish olive in skins) feet, the clear rufous chest, without any grayish tinge, the much more intense rufous neck and head and, in the female sex, by the narrower and paler bars on a more blackish ground on the rump, upper tail-coverts, and outer surface of the wings.

Males separated from those of *C. n. strigulosus* of the south bank of the Amazon by rufous instead of blackish cap, brighter rufous hind neck, more prominently barred lower back, more broadly white throat, and rufous, instead of gray, breast and sides. Females differ from those of *strigulosus* by more blackish uropygium with narrower and more whitish bars, more narrowly barred outer surface of the wing, more broadly white throat, and rufous, instead of gray, breast and sides. The color of the top of the head and the back of the neck are very similar in the females of both forms.

Range.—Known only from Mt. Duida, Venezuela.

Description of type.—Back of head and neck rich light Bay; crown and forehead somewhat clouded with dusky gray, with fine rufous tips; upper mantle dark Auburn, with very faint dusky freckling; lower mantle slightly paler with indistinct terminal margins of dusky which become better defined on the rump where also there are poorly defined subterminal dark bars separated from the tips by interspaces of Bister; a few scattered subterminal dots of white on the lowermost uropygium expanded on the upper tail-coverts into narrow whitish bars fringed with Bister, while the black bars here are wider than the whitish ones. Lores and superciliary region lighter than the occiput without forming a very conspicuous stripe; auricular region much like the hind neck; malar region again paler, near Sanford's Brown × Burnt Sienna, shading into the color of the hind neck posteriorly. Chin white; throat white with narrow terminal margins of Sanford's Brown; lower throat largely Sanford's Brown × Burnt Sienna; chest Sanford's Brown, duller on the sides of the breast and passing into Light Pinkish Cinnamon on the lower breast and sides of the abdomen, enclosing a white median abdominal stripe of white; crissum like the sides of the belly; flanks darker, near Sayal Brown, anteriorly freckled with dusky, posteriorly broadly barred with black; under tail-coverts Cinnamon, with

a large black area at the base of the feathers extending somewhat distad along the shaft and with the margins and tips of the feathers crossed by blackish vermiculated bars. Wings Clove Brown; outer margins of secondaries freckled with Sepia, narrowly on outer feathers, more broadly on inner ones where the distal portion of the whole outer web becomes light brown, freckled with blackish and with occasional larger black blotches and whitish freckles or vermiculations; tertials with exposed portions of both webs similarly marked; greater and median upper wing-coverts like the tertials but with the black blotches broadened into irregular bars; lesser coverts more rufescent, approaching the color of the back; under wing-coverts sooty along the carpal margin; longer under primary-coverts gray, shorter ones whitish; secondary-coverts gray with whitish tips. Tail (entirely concealed) sooty brown with external margins marked by broad black and narrow pale bars. Maxilla (in dried skin) blackish; mandible yellowish; feet dull olive-gray. Wing, 173 mm.; tail, 45; exposed culmen, 26; culmen from base, 30; tarsus, 51.

Remarks.—The female is like the male on the under surface and on the hind neck but has the top of the head clearer rufous, with traces of exceedingly fine dark cross-bars; chest averaging a little paler rufous; mantle anteriorly with narrow blackish bars which increase in width on scapulars and middle back while the rufous interspaces become paler and narrower; on the rump, upper tail-coverts, upper wing-coverts, and exposed portions of the remiges the ground color becomes quite blackish, crossed by very narrow whitish or pale fulvous bars.

There is some individual variation in this form as in others of the species. One of the males is darker and much more uniform on the back and outer surface of the wings and has the chest paler and duller. Another male goes to the opposite extreme and shows a considerable development in the direction of the wing-pattern of male *erythropus*, although the rufous breast, neck, and back remain as in other *duidae*. Still another bird (possibly wrongly sexed?) has much the pattern of the adult females although the general color of the lower back is not quite so blackish. It also has the throat and chin entirely ochraceous-buffy.

Of three specimens sexed as females, two have the belly more broadly white than any of the males but the third is tinged with buff in that area. This third example has the chest deeply colored like the males; the other two have the pectoral region somewhat paler.

The general tone of the anterior upper parts in the female is very closely matched by the females of *strigulosus* of the south bank of the Amazon; posteriorly *duidae* is much blacker and more narrowly barred. The under parts differ more decidedly since *strigulosus* has the chest gray while *duidae* has it rufous. Nevertheless, a female of *strigulosus* from the right bank of the lower Rio Madeira has the pectoral region as much ochraceous as gray, being marked by ill-defined alternating grayish and ochraceous vermiculations, observable also in some *erythropus*. The dorsal color of the males of *strigulosus* is approached by the most uniformly colored males of *duidae* and the feet are dark in this sex of both forms as well as in the females of *duidae*. On the other hand, two of three females of *strigulosus* have the feet distinctly

paler and (in dried skins) brownish rather than dusky olive, though not so pale as in *erythropus*. The female with dark legs is the one, mentioned above, which has a decided ochraceous tinge on the under parts. A similar sexual difference in the color of the feet is observable in typical *noctivagus*. The distinctions between *erythropus* and *strigulosus* thus are so weakened that it appears to be no longer necessary to maintain specific separation. The relationship of *duidae* to *erythropus*, so far as present material demonstrates, appears to be by way of *strigulosus*.

On the other hand, I am unable to keep *erythropus* specifically distinct from the *cinnamomeus* group since *spencei* of northern Venezuela is intermediate between *idoneus* and *erythropus*, though closer to *erythropus*. True *cinnamomeus* also is too much like *noctivagus*, especially in the female sex, to warrant specific dissociation.

The females of *spencei* and *erythropus* are not distinguishable with certainty. The males of *spencei* are paler brown on the back and those of *erythropus* are darker, more like average *strigulosus*. Two Guianan males are intermediate,—one a little closer to *spencei* and the other closer to *erythropus*, although both have the white throat-patch reduced to obsolescence and have a stronger tinge of rufous on the hind-neck. It is just possible that a series of fresh skins would permit the recognition of "*dissimilis*" as a distinct Guianan form, although the differences noted are no more than are shown by individual variants of other subspecies.

A specimen (sexed as a male) from Maracaná, near Faro, Brazil, is markedly different from other Faro skins of *erythropus* as well as from any other bird I have seen. The upper surface has the pattern of ordinary female *erythropus* with a somewhat more strongly rufescent tone. On the under parts, the entire breast is intense deep Sanford's Brown, without a trace of gray, and the belly is near Apricot Buff, without white. The feet are light in color, still with a trace of the original red, although they have a slightly immature appearance, and a number of the under wing-coverts have cinnamomeous tips. Salvadori (1895, 'Cat. Birds Brit. Mus.,' XXVII, p. 535) describes a male from Manaos, presumably a cotype of *erythropus*, as being rufous on the breast, without gray; probably it is a specimen like the bird I have mentioned.

I am unable to match the type of *hellmayri* with any specimens of typical *strigulosus*. It is somewhat darker on the back (approaching the color of *boucardi*, and less extensively blackish on the top of the head, but the differences are not pronounced. The range of *strigulosus* extends westward to eastern Perú (as recorded in the list of specimens examined), with no differences of note, although the Peruvian birds may average very slightly deeper rufous on the hind neck. More information about *hellmayri* is greatly needed.

Specimens Examined.

C. n. noctivagus.—Brazil: (no exact locality), 1 ♂ (type); Bahia, 1 [♀]; Lamarao, Bahia, 1 ♀; Iguape, São Paulo, 2 ♂.

C. n. hellmayri.—Brazil: Humaythá, 1 ♂ (type).

C. n. strigulosus.—Brazil: Rio Tocantins, Baião, 1 " ♀ "; Rio Xingú,

Tapará, 1 [♂]; Rio Tapajoz, Tauary, 2 ♂; Igarapé Brabo, 1 ♂; Rio Amazonas, Villa Bella Imperatríz, 1 ♂, 1 ♀; Rio Madeira, Igarapé Auará, 1 ♀; Rosarinho, 1 [♀]. PERÚ: Río Ucayali, Lagarto, 5 ♂.

C. n. erythropus.—BRAZIL: Faro, 1 ♂, 1 ♀; Serro de Espelho, 1 ♂; Maracaná, 1 "♂"; Obidos, 1 ♀. BRITISH GUIANA: Quonga River, 2 ♂, 1 ♀; Demerara, 1 [♀].

C. n. spencei.—VENEZUELA: Los dos Ríos, Cumaná, 1 ♀; Cristóbal Colón, 2 ♂, 1 ♀; Ejido, 1 (?).

C. n. duidae.—VENEZUELA: Mt. Duida, "Campamento del Medio," 3 ♂ (incl. type); Playa del Río Base, 1 ♂, 1 ♀; Valle de los Monos, 1 ♂, 1 ♀; "Middle Camp," 1 ♂, 1 ♀.

C. n. idoneus.—COLOMBIA: Santa Marta, Bonda, 1 [♂].

C. n. cinnamomeus.—NICARAGUA: Tipitapa, 1 ♂; Volcán Viejo, 1 ♀; Matagalpa, 1 ♂.

Vol. 51, pp. 53-54 March 18, 1938

PROCEEDINGS
OF THE
BIOLOGICAL SOCIETY OF WASHINGTON

A NEW RACE OF BOB WHITE FROM THE CAUCA VALLEY, COLOMBIA.

BY H. B. CONOVER.

It has long been supposed that the race of Bob White, *Colinus cristatus leucotis* Gould inhabited both the Magdalena and Cauca Valleys of Colombia. During a recent investigation of the Colombian races of *Colinus*, undertaken by the author, it was discovered that the bird inhabiting the upper Cauca Valley differs greatly from that of the Magdalena. As Chapman (Bull. Am. Mus. Nat. Hist., *36*, p. 199, 1917) has restricted the type locality of *leucotis* to Honda, in the Magdalena Valley, the form inhabiting the Cauca region must be given a new name.

Colinus cristatus badius, new subspecies.

Type.—From El Tambo, Cauca, Colombia, El. 5100′; No. 12,445, adult male, in the Conover Collection, Field Museum of Natural History, Chicago; collected May 18, 1937, by Kjell von Sneidern.

Characters.—Males: Upperparts darker, with dark vermiculations coarser (especially on the mantle) than in any other known race, but closest in this respect to *panamensis*. Crown of head and crest perhaps averaging duskier, but there is great variation, a specimen from Caldas having these parts very light. Below, chest darker than *leucotis* or *littoralis* and much less rufous than *decoratus* or *panamensis*, the triangular area which separates the two white spots at the end of each feather being black with a small rufescent center, giving the appearance of a black and white chest dotted with rufous, instead of a rufous chest dotted with black and white, as in the two last named races; rufous of flanks more intense than in *leucotis* or *littoralis*, but duller and less conspicuous than in *decoratus* and *panamensis;* throat and superciliary stripe as in *leucotis*.

Females.—Upperparts much darker than in any other known race, the feathers being strongly barred and blotched with black, the brown interspaces very dark. Below, belly very faintly washed with buff; chest darker than in *leucotis* but with the same black and white appearance, lacking any rufous or brownish buff shading.

Description of type.—Forehead white; center of crown, including elongated crest feathers, dirty brownish white, bordered on each side by a black streak which is mottled with white; superciliary stripe bright chestnut rufous; lores white; sides of face bright rufous; ear coverts grayish white; throat chestnut rufous, becoming lighter on the chin; sides and back of neck black, heavily spotted with white; mantle vinaceous russet finely vermiculated with blackish brown; rest of upperparts, olivaceous gray blotched and vermiculated with blackish brown, the upper wing coverts being lightly spotted with white, and the inner secondaries and tertials edged with the same color; tail olivaceous gray, vermiculated with blackish brown; primaries brown; underwing coverts brown, tipped with white; chest black, heavily spotted with white, and with a small russet blotch at the tip of each feather; flanks russet, spotted with white, and blotched with black; belly white, barred with black, the center rufous buff; undertail coverts black, each feather with large white spots, some of which are washed with buff; iris dark brown; legs gray. Wing (flat) 102; culmen (exposed) 13; tarsus 27; middle toe (without claw) 26 mm.

Range.—The upper Cauca Valley from the Rio Patio at least to Medellin.

Remarks.—Eight of the series of *badius* from El Tambo were collected in the month of May, as were five specimens of *leucotis* from El Alto de la Paz, Cundinamarca. All are in fresh plumage, so that the lighter coloring of the latter birds can not be due to fading. Moreover, there is no appreciable difference between these specimens and those from other localities in the Magdalena Valley taken in other months. While only three specimens from north of Popayan in the Cauca Valley were available, these seem referable to the new race. Somewhere north of Medellin *badius* probably intergrades with *decoratus*.

For the loan of material used in this investigation I wish to express my gratitude to Mr. R. M. de Schauensee of the Academy of Natural Sciences of Philadelphia, to Mr. W. E. Clyde Todd of the Carnegie Museum, Pittsburgh, to Mr. A. J. van Rossem of the California Institute of Technology, Pasadena, and to Mr. J. T. Zimmer of the American Museum of Natural History, New York.

Specimens Examined.

Colinus c. leucotis.—17: Colombia (El Alto de la Paz, Cundinamarca, 5; Honda, 5; El Eden, E. Quindio Andes, 1; Chicoral, Coello River, Tolima, 2; Anolaima, 1; Aguachica, Magdalena, 1; Fusugasuga, 1; Pena Blanca, Santander, 1).

Colinus c. littoralis.—14: Colombia, Santa Marta (Mamatoco, 8 (including type); Bonda, 3; Cacagualito, 1; Rio Frio, 2).

Colinus c. decoratus.—10: Colombia (Calamar, Bolivar, 8 (including type); Fundacion, Santa Marta, 1; Santa Marta, 1).

Colinus c. badius.—14: Colombia (El Tambo, Cauca, 10; Popayan, Cauca, 1; Cali, Cauca, 1; Caldas, Cauca, 1; Medillen, 1).

Colinus c. panamensis.—11: Panama (Aguadulce, Cocle, 5 (including type); La Marea, Veraguas, 2; La Colorada, Santiago, Veraguas, 1; Santa Fe, Veraguas, 1; El Frances, Chiriqui, 2).

Vol. 51, pp. 55–62 March 18, 1938

PROCEEDINGS
OF THE
BIOLOGICAL SOCIETY OF WASHINGTON

SIX NEW RODENTS FROM COAHUILA AND TEXAS AND NOTES ON THE STATUS OF SEVERAL DESCRIBED FORMS.

BY E. A. GOLDMAN.

In September, 1937, a party with Stanley P. Young of the Biological Survey, and Tappan Gregory of the Chicago Academy of Sciences in charge, visited the Carmen Mountains in northern Coahuila, Mexico. The main objective of the expedition was wildlife photography. These men succeeded in luring mountain lions into taking their own photographs in their native habitat for the first time so far as is known. A few mammals were collected, among them a chipmunk (*Eutamias*), a pocket gopher (*Thomomys*), and a woodrat (*Neotoma*), which are described as new. One of these is named for the collector, R. S. Sturgis, a member of the expedition.

Status of *Thomomys lachugilla* Bailey.

In connection with determining the Carmen Mountains pocket gopher it was necessary to review the material now available from neighboring territory, including the "Big Bend" region of Texas. This led to further consideration of the status of *Thomomys lachugilla* Bailey, and the reallocation of a few specimens. Study of the range of individual variation in topotypes of *lachugilla* and of *Thomomys bottae texensis* Bailey reveals characters showing very close alliance, and that seem to warrant the assumption of intergradation. Geographic races hitherto assigned specifically to *T. lachugilla* should, therefore, stand as follows:

Thomomys bottae lachugilla Bailey.....El Paso, Texas.
Thomomys bottae limitaris Goldman.....Boquillas, Texas.
Thomomys bottae confinalis Goldman.....Rock Springs, Texas.

DESCRIPTIONS OF NEW SUBSPECIES.

Eutamias dorsalis carminis, subsp. nov.

CARMEN MOUNTAINS CHIPMUNK.

Type.—From Carmen Mountains, Coahuila, Mexico (altitude 7,400 feet). No. 263378, ♂ young, skin and skull, U. S. National Museum (Biological Survey collection); collected by R. S. Sturgis, September 20, 1937. Original number 73.

Distribution.—Known only from the type locality in the high mountains of northern Coahuila.

General characters.—A dull colored subspecies, with light dorsal stripes obsolescent. Similar to *Eutamias dorsalis dorsalis* of New Mexico, but general color grayer, owing to a reduction of the buffy or tawny element, except along under side of tail; light dorsal stripes less distinct; facial stripes about as in *dorsalis;* skull more slender.

Color.—*Type* (fresh pelage): Top of head and upper parts in general (excluding stripes) finely mixed brown and white giving a grizzled effect, the white thinning out, leaving the brownish tone predominant on lower part of rump, forearms and thighs; dark facial stripes black, bordered by tawny; light facial stripes and postauricular patches grayish white; outer surfaces of ears blackish, edged with tawny anteriorly, becoming grayish white abruptly toward posterior margins; inner surfaces of ears clothed with a mixture of black and tawny hairs; median dorsal black stripe present as usual in the species; two pairs of grayish white dorsal stripes faintly indicated; two pairs of dark dorsal stripes paralleling light dorsal stripes almost imperceptible; lower part of flanks suffused with "ochraceous tawny" (Ridgway, 1912); under parts dull grayish; feet "cinnamon buff"; tail gray mixed with black above, deep tawny along the broad median line below, this color giving way abruptly to a deep black submarginal zone; tail edged with gray throughout its length.

Skull.—Closely resembling that of *dorsalis,* but more slender than usual in that form; dentition rather light.

Measurements.—*Type:* Total length, 193 mm.; tail vertebrae, 77; hind foot, 32. Skull (type): Greatest length, 33.9; zygomatic breadth, 18.8; breadth of braincase (at constriction between zygomata and auditory bullae), 16.5; interorbital breadth, 8.1; length of nasals, 10; maxillary toothrow, 5.4.

Remarks.—The discovery of this chipmunk in an isolated high mountain locality in Coahuila extends the known range of the species far to the east. The single specimen available indicates close relationship to typical *dorsalis.* No comparison with *Eutamias bulleri solivagus,* the only other chipmunk known to occur in Coahuila, is required.

Thomomys sturgisi, sp. nov.

CARMEN MOUNTAINS POCKET GOPHER.

Type.—From Carmen Mountains, Coahuila, Mexico (altitude 6,000 feet). No. 263376, ♀ adult, skin and skull, U. S. National Museum

(Biological Survey collection); collected by R. S. Sturgis, September 21, 1937. Original number 74.

Distribution.—Known only from the type locality in the high mountains of northern Coahuila.

General characters.—A small, dark-brownish, high mountain species. Allied to *Thomomys bottae limitaris* of the Big Bend region of Texas, but much darker, tail shorter, and skull slenderer. Similar in size to *Thomomys umbrinus perditus* of northern Nuevo Leon, but much darker and not nearly related.

Color.—Type (acquiring fresh pelage): Upper parts near "cinnamon" (Ridgway, 1912), purest on sides, forearms and thighs, heavily mixed with black which predominates on head and over back; under parts overlaid with pinkish buff; muzzle black; ears black; feet white; tail brownish above, white below.

Skull.—Similar in size to that of *limitaris*, but more slender; rostrum and nasals narrower; interorbital region more constricted; palate narrower; upper incisors narrower, thinner, more strongly recurved. Compared with that of *perditus*, the skull is similar in size, but narrower; nasals longer; zygomata narrower; rostrum deeper anteriorly; nasals strongly recurved instead of strongly procumbent.

Measurements.—Type: Total length, 180 mm.; tail vertebrae, 50; hind foot, 26. A rather young male topotype: 168; 49; 23. *Skull* (type): Occipitonasal length, 34; zygomatic breadth, 20.3; breadth across squamosals (over mastoid), 17; interorbital constriction, 6.1; length of nasals, 11.8; maxillary toothrow (alveoli), 7.2.

Remarks.—While *Thomomys sturgisi* is allied to Texas forms of the *Thomomys bottae* group it exhibits well-marked differences, and the general evidence indicates that there may be no intergradation. Its occurrence on the opposite side of the Rio Grande from the range of the nearest known representative of *bottae* suggests that the river may be a barrier.

Specimens examined.—Two, from the type locality.

Thomomys bottae pervarius, subsp. nov.

MARFA POCKET GOPHER.

Type.—From Lloyd Ranch, 35 miles south of Marfa, Presidio County, Texas (altitude 4,200 feet). No. 18201/25105, ♂ young adult, skin and skull, U. S. National Museum (Biological Survey collection); collected by Vernon Bailey, January 20, 1890. Original number 900.

Distribution.—Known only from the type locality.

General characters.—A light colored, medium-sized subspecies; color about as in *Thomomys bottae lachugilla* of extreme western Texas, but skull decidedly broader, more angular. Similar in general to *Thomomys bottae limitaris* of Boquillas, Brewster County, Texas, but much larger; under parts "pale pinkish buff" (Ridgway, 1912), instead of white. Somewhat similar to *Thomomys bottae texensis* of the Davis Mountains in cranial characters, but color much paler, the under parts pale pinkish buff instead of "pinkish cinnamon."

Color.—Type (winter pelage): Upper parts near "cinnamon buff" (Ridgway), moderately mixed with black on head and middle of back, passing gradually into "pinkish buff" along sides, on forearms, and thighs; under parts well overlaid with "pale pinkish buff"; ears black, except anterior base, which is invaded by buffy hairs; postauricular black areas small; feet white; tail light brownish above, dull whitish below.

Skull.—Similar in general to that of *lachugilla*, but broader, more angular; braincase broader; zygomata more widely and squarely spreading, the antero-external angles more prominent; rostrum relatively narrower; molariform teeth relatively smaller; upper incisors less recurved. Differing from that of *limitaris* mainly in considerably larger size. Compared with *texensis* the braincase is broader; zygomata more widely and squarely spreading; auditory bullae larger; dentition similar.

Measurements.—Type: Total length, 217 mm.; tail vertebrae, 70; hind foot, 27.5. An adult female topotype: 197; 66; 27.5. *Skull* (type [♂] and an adult female topotype): Occipitonasal length, 36.4, 34.1; zygomatic breadth, 23.3, 20.8; breadth across squamosals (over mastoids), 19.6, 18.1; width of rostrum (at constriction near zygomata), 7.3, 6.8; interorbital constriction, 7, 6.7; length of nasals, 13, 11.9; maxillary toothrow (alveoli), 7.3, 6.8.

Remarks.—The present form is based on two specimens formerly assigned to *lachugilla*, but which prove to exhibit a departure in cranial characters as pointed out. An approach in cranial details to *Thomomys bottae texensis*, which contrasts strongly in color, is also apparent.

Thomomys baileyi spatiosus, subsp. nov.

ALPINE POCKET GOPHER.

Type.—From Alpine, Brewster County, Texas (altitude about 4,500 feet). No. 100427, ♂ adult, skin and skull, U. S. National Museum (Biological Survey collection); collected by Vernon Bailey, May 26, 1900. Original number 7368.

Distribution.—Known only from the general region of the type locality.

General characters.—A dark, brownish buff subspecies of medium size. Similar in general to *Thomomys baileyi baileyi* of Sierra Blanca, western Texas, but color darker; cranial characters, especially the longer rostrum, distinctive. Somewhat similar to *Thomomys baileyi nelsoni* of Chihuahua, but ground color of upper parts near "cinnamon buff" (Ridgway, 1912) instead of mikado brown, and skull with much heavier rostrum.

Color.—Type (acquiring fresh pelage): Upper parts near "cinnamon" (Ridgway) moderately and evenly mixed with black, giving a dark general tone, becoming "cinnamon buff" along sides, on forearms, and thighs; under parts overlaid with "pinkish buff"; muzzle blackish; ears encircled by black; feet white; tail light brown above, grayish below, becoming white at extreme tip.

Skull.—Similar in general to that of typical *baileyi*, but vault of cranium higher; rostrum and nasals broader and longer; nasals more depressed between premaxillae, producing a concavity of upper surface in transverse

section across base of rostrum, the posterior ends of nasals more squarely truncate; auditory bullae slightly smaller; molariform teeth similar, but rather light; upper incisors less strongly procumbent. Compared with that of *nelsoni* the skull is less flattened; supraoccipital region bulging farther posteriorly over foramen magnum; rostrum much longer and broader; nasals longer and broader, less tapering or wedge-shaped posteriorly; dentition similar, but upper incisors more decurved.

Measurements.—Type: Total length, 210 mm.; tail vertebrae, 63; hind foot, 27. *Skull* (type): Occipitonasal length, 38.9; zygomatic breadth, 25.4; breadth across squamosals (over mastoids), 20.7; width of rostrum (at constriction near zygomata), 7.7; interorbital constriction, 7.1; length of nasals, 15.4; maxillary toothrow (alveoli), 7.5.

Remarks.—T. b. spatiosus is based on specimens that had been referred to *Thomomys lachugilla* (= *Thomomys bottae lachugilla*), but prove to represent an eastern extension of the known range of *T. baileyi*. The cranial characters presented appear to be well beyond the limits of individual variation in typical *baileyi*, the form with which it requires closest comparison.

Specimens examined.—Four, all from Texas, as follows: Alpine (type locality), 1; Paisano, 1 (skull only); Presidio County, 2 (2 skins, 1 skull, without exact locality).

Thomomys umbrinus analogus, subsp. nov.

SIERRA GUADALUPE POCKET GOPHER.

Type.—From Sierra Guadalupe, southeastern Coahuila, Mexico. No. 116994, ♂ adult, skin and skull, U. S. National Museum (Biological Survey collection); collected by Nelson and Goldman, April 25, 1902. Original number 15117.

Distribution.—High mountains and desert plains of southeastern Coahuila.

General characters.—Closely allied to *Thomomys umbrinus perditus* of northern Nuevo Leon but darker, and cranial details, especially the broad nasals, distinctive. Somewhat similar to *Thomomys umbrinus potosinus* of San Luis Potosi, and *Thomomys umbrinus goldmani* of Durango, but contrasting strongly in pinkish buff instead of mikado brownish ground color of upper parts; skull more elongated than in either.

Color.—Type: Upper parts near "pinkish buff" (Ridgway, 1912), purest along sides, rather heavily mixed with black on top of head and over back; outer sides of forearms and thighs about like sides; under parts in general overlaid with "pale pinkish buff," varying to nearly pure white on inguinal region; muzzle blackish; ears and small postauricular spots black; feet white; tail light brownish above on basal two-thirds, whitish below, and whitish all around on terminal third.

Skull.—Very similar to that of *perditus*, but nasals decidedly broader, less wedge-shaped posteriorly; interparietal larger; auditory bullae slightly smaller, less rounded and inflated. Similar in size to that of *potosinus*, but braincase more elongated; interorbital region less constricted; zygomata

narrower, less strongly bowed outward posteriorly; nasals broader, less wedge-shaped posteriorly; interparietal larger; auditory bullae larger; upper incisors broader, more decurved. Compared with *goldmani* the nasals are broader, less wedge-shaped posteriorly; zygomata less squarely spreading, the sides less nearly parallel; interparietal larger; bullae larger, less flattened, bulging farther below plane of basioccipital; incisors broader.

Measurements.—Type: Total length, 201 mm.; tail vertebrae, 58; hind foot, 26. Two adult male topotypes: 190, 178; 68, 52; 28, 26. An adult female topotype: 205; 64; 28. *Skull* (type): Occipitonasal length, 35.4; zygomatic breadth, 22.4; breadth across squamosals (over mastoids), 17.2; interorbital constriction, 7; length of nasals, 12.4; maxillary toothrow (alveoli), 7.2.

Remarks.—This high mountain form requires no very close comparison with any of the other subspecies of *Thomomys umbrinus* except *perditus* of the plains region of northern Nuevo Leon. It differs from *perditus* only slightly in color, but the cranial features are fairly well marked.

Specimens examined.—Total number, 10, all from Coahuila, as follows: Carneros, 4; Jaral, 1; Sierra Encarnacion, 1; Sierra Guadalupe (type locality), 4.

Neotoma mexicana inornata, subsp. nov.

CARMEN MOUNTAINS WOOD RAT.

Type.—From Carmen Mountains, Coahuila, Mexico (altitude 6,100 feet). No. 263386, ♂ adult, skin and skull, U. S. National Museum (Biological Survey collection), collected by R. S. Sturgis, September 22, 1937. Original number 79.

Distribution.—Known only from the type locality.

General characters.—A dark, high mountain subspecies, similar to *Neotoma mexicana mexicana* of Chihuahua, but decidedly darker, the ground color of upper parts vinaceous buffy instead of pinkish buffy, and more profusely mixed with black; skull slightly different. Somewhat like *Neotoma navus* of the mountains of southern Coahuila but darker, the ground color of upper parts vinaceous buffy instead of light ochraceous buffy; cranial features, especially the concave instead of convex lateral margins of frontals, suggesting specific distinction.

Color.—Type (fresh pelage): Upper parts near "vinaceous buff" (Ridgway, 1912), purest along sides, heavily mixed with black on top of head and over back; under parts overlaid with white, the fur basally slaty gray, except small areas on throat and inguinal region which are pure white; muzzle blackish; outer sides of forearms and thighs rather distinctly dusky, the dark under color showing through; ears dark brownish; upper surfaces of wrists and ankles blackish; feet white; tail sharply bicolor, black above, white below.

Skull.—Very similar to that of *mexicana*, but palate with a well-developed posterior median projection (usually absent in *mexicana*). Compared with that of *N. navus* the skull is broader; lateral margins of frontals concave, as usual in forms of *mexicana*, instead of convex and distinctly projecting

as supraorbital shelves; anterior palatine foramina narrower; palate with a posterior median projection (posterior border of palate evenly concave in *navus*).

Measurements.—Type: Total length, 336 mm.; tail vertebrae, 156; hind foot, 38. Two adult topotypes: 339, 309; 156, 140; 35, 35. *Skull* (type): Greatest length, 42.7; condylobasal length, 39.8; zygomatic breadth, 22; interorbital breadth, 5.2; length of nasals, 16.2; length of anterior palatine foramina, 8.5; length of palatal bridge, 7.7; maxillary toothrow (alveoli), 8.7.

Remarks.—In cranial characters this subspecies closely approaches typical *mexicana*, but the color is quite distinctive. It is surprisingly unlike *N. navus*, a near geographic southern neighbor, also a member of the *mexicana* group.

Vol. 51, pp. 63–64 March 18, 1938

PROCEEDINGS
OF THE
BIOLOGICAL SOCIETY OF WASHINGTON

GENERAL NOTES.

A SUBSTITUTE NAME FOR FELIS CONCOLOR YOUNGI.

To Mrs. Arthur J. Poole I am indebted for bringing to my attention the name *Felis youngi* Pei (Palaeontologia Sinica, ser. C., vol. 8, fasc. 1, p. 133, May, 1934). This name, for a fossil species from the Lower Pleistocene of China, preoccupies *Felis concolor youngi* Goldman (Proc. Biol. Soc. Washington, vol. 49, p. 137, August 22, 1936) for the puma of southern Texas. The Texas animal was named by me for Stanley P. Young, and is here rechristened *Felis concolor stanleyana.* —E. A. Goldman.

Vol. 51, pp. 65–66 March 18, 1938

PROCEEDINGS
OF THE
BIOLOGICAL SOCIETY OF WASHINGTON

A NEW CHINESE BLENNY.

BY ALBERT W. C. T. HERRE.
Stanford University, California.

The blennies of the Chinese coast are very imperfectly known. The tidepools and flats, and islets which dot the shore everywhere, have never been explored and as I have indicated elsewhere a rich harvest awaits collectors and students of Chinese marine fishes.

Dr. Y. T. Chu in his Index Piscium Sinensium lists three species of *Blennius* (two of them doubtful), four species of *Petroscirtes*, and three species of *Salarias*. To this is to be added a fifth species of *Petroscirtes* described by me from the mud flats near Macao. I have no doubt that Hainan alone has three times as many blennies as are thus far recorded from Chinese waters. It is self-evident also that numerous species of Japanese blennies must occur along the northern coasts of China, across the narrow Yellow Sea from Japan.

There are several reasons for this lack of knowledge of Chinese blennies, not the least being the difficulty of collecting most of the shore-dwelling species.

Salarias lighti Herre, new species.

Dorsal XII–15, almost completely divided; anal I–15 or II–16; no canines; the long pointed orbital tentacle is 1.5 times the eye; there is a minute tentacle on the nape and a short, broad, palmately divided nasal tentacle.

The depth is 4 to 4.4 times, the head 3.9 to 4.2, the caudal 4.65 to 4.9 times in the length. The eye is 4.3 to 4.5, the snout 2.4 times in the head; the interorbital is 3.75 times in the eye. The head and trunk are broad, moderately, the tail strongly compressed; the snout is nearly vertical, the eye as far forward as possible; the large pectoral extends to a vertical from the anal origin, 3.4 to 3.8 in the length. The lateral line extends to a

vertical from the dorsal notch. The dorsal and anal are entirely free, ending some distance before the caudal.

The color after 15 years in alcohol is uniform dull brown, with 6 pairs of blackish brown spots on the dorsal base, and traces of dark brown cross bars extending downward from them; the dorsal is brown with a blackish spot at the top between the first and second spines and traces of bars ascending obliquely backward on the second dorsal; the anal is brown with traces of a very dark submarginal band.

Two specimens received from Dr. S. F. Light, collected at Dodd Island, Amoy, China, in 1923. The type is in the zoological museum of Stanford University, the paratype in the Bureau of Science, Manila, P. I.

A Key to the Chinese Species of Salarias.

A. Dorsal not notched, XII–XIII–19–22; anal II–22 or 1–23; minute tentacles on nape and nostril; small canine in lower jaw; several rows of elongate brown-edged pearl or white spots on body, smaller and circular on head; soft dorsal with 2, caudal with 4 rows of white spots..... *S. nitidus*

AA. Dorsal notched; no canines.

B. Dorsal XII–15; anal I–15 or II–16; no canines; orbital tentacle simple, pointed, 1.5 times eye; nasal tentacle short, broad, divided; dorsal not attached to caudal..... *S. lighti*

BB. Dorsal and anal with 19 rays or more; dorsal attached to caudal.

C. A crest on head.

D. Brownish with bluish-white dots, most prominent posteriorly; bluish-white lines rising obliquely backward on soft dorsal, lengthwise between rays on caudal; anal black with 3 rows of bluish dots between rays; dorsal XII–20–21; anal 22–24; small simple orbital tentacle, a fringed one on the nostril..... *S. bellus*

DD. Dorsal XIII (rarely XIV) 19–21; anal I–20–22; a small simple orbital tentacle; uniform dark brown or brown with darker cross bars; dorsal with horizontal lines anteriorly and dusky oblique lines posteriorly; anal brown with white margin and 2 rows bluish spots, or uniform in color with body; a diagonal dark bar behind eye, often disappearing..... Males of *S. edentulus*

CC. No crest on head; dorsal and anal formula and tentacles as in DD; brown with faint darker cross-bars and many reddish to dark brown spots or dots all over body, dorsals, caudal, and pectorals..... Females of *S. edentulus*

Vol. 51, pp. 67–68 March 18, 1938

PROCEEDINGS

OF THE

BIOLOGICAL SOCIETY OF WASHINGTON

A NEW WEASEL FROM BOLIVIA AND PERU.[1]

BY E. RAYMOND HALL.

American weasels of the subgenus *Mustela* so far as known reach their southern limit of occurrence in the vicinity of Lake Titicaca. Examination of additional specimens from that region and study of more adequate material from the territory, immediately to the northward, reveal the existence of an unnamed race of weasel, in southern Peru and northern Bolivia, which may be known as:

Mustela frenata boliviensis, new subspecies.

Type.—Male, adult, skull and skin; no. 72587, Amer. Mus. Nat. Hist.; Nequejahuira, 8000 ft., Bolivia; May 19, 1926; collected by G. H. H. Tate; original no. 4135.

Range.—Andes from Limbani, Peru, southeastward to Nequejahuira, Bolivia.

Diagnosis.—Size small (see measurements). Color: Dark, upperparts near (n) mars brown (of Ridgway: Color Standards and Color Nomenclature: 1912), darker on head; tip of tail black; underparts cream colored and tinged with ochraceous-buff; light color of underparts much restricted, at narrowest point amounting to only 15 (11–19) per cent of greatest width of color of upperparts, and extended distally on hind limbs only to knees; upper lips dark colored all around, and spot at each angle of mouth usually confluent with color of upperparts; light-colored facial markings absent; skull, and especially teeth, small; tympanic bullae relatively uninflated, and projecting only slightly ventrally to squamosal; squamosal anterior to bulla straight or slightly convex ventrally.

Comparison.—From *Mustela frenata macrura* Taczanowski, *boliviensis* differs chiefly in smaller size; depending on the part of the range of *macrura* from which specimens are selected for comparison, *boliviensis* is in external linear dimensions 5 to 22 per cent smaller, teeth 7 to 11 per cent smaller in linear measurements and with a skull only one-half to three-fourths as heavy by actual weight. From *Mustela frenata agilis* Tschudi (for names

[1] Contribution from the Museum of Vertebrate Zoology, University of California.

and ranges of South American weasels see Hall, Carnegie Instit. Washington Publ. no. 473, pp. 101–111, 1936) *boliviensis* differs chiefly in darker color (*agilis* is near (16″j) tawny olive or even cinnamon above) and greater restriction of the light color of the underparts.

Remarks.—The type locality, Nequejahuira, Bolivia, near 16° 20′ S. and 67° 53′ W., is the southernmost record station for an American *Mustela* known to me. That the distinguishing characters of small size and dark color are maintained over a considerable area is shown by the specimens from Limbani, Peru, some 150 miles to the north and near 100 miles west of Nequejahuira. Specimens from Peruvian localities still farther westward and slightly to the northward, namely, Ollantaytambo, Ochabamba and Anta, though referable to *M. f. macrura*, in their reduced size and darker color suggest intergradation between *macrura* and *boliviensis*.

Measurements.—The type measures: Total length, 383; length of tail, 140; length of hind foot, 43. Corresponding measurements of two young males from Limbani, Peru, are: 368 and 340, 132 and 115, 44 and 41. Cranial measurements of the type: Basilar length of Hensel, 41.6; length of tooth rows, 15.3; breadth of rostrum, 12.2; interorbital breadth, 10.0; orbitonasal length, 14.7; mastoidal breadth, 22.2; zygomatic breadth, 25.0; length of tympanic bulla, 13.4; breadth of bulla, 7.4; depth of bulla, 2.2; length of M_1, 5.3; lateral length of P^4, 5.0; medial length of P^4, 5.2; breadth of M^1, 4.4; length of inner moiety of M^1, 2.2; depth of skull at anterior margin of basioccipital, 14.8; depth of skull at posterior border of last upper molars, 12.4.

Specimens examined.—Total number, 3, as follows: **Peru,** Carabaya, Limbani, 9500 ft., 2 (one in U. S. Nat. Mus., and one in Berlin Zool. Mus.); **Bolivia,** Nequejahuira, 8000 ft., 1.

Vol. 51, pp. 69–72 May 19, 1938.

PROCEEDINGS
OF THE
BIOLOGICAL SOCIETY OF WASHINGTON

NEW RACES IN THE GENERA OF VIREO AND BUARREMON FROM SINALOA.

BY ROBERT T. MOORE,
California Institute of Technology.

Two new races have appeared in the collections from Sinaloa and are herewith described.

For the loan of critical specimens, my acknowledgments are gratefully made to Mr. John T. Zimmer and the American Museum of Natural History, to Dr. Herbert Friedmann and the Smithsonian Institution, to Dr. Harry C. Oberholser and the Biological Survey, and to Mr. James L. Peters and the Museum of Comparative Zoology.

Vireo pallens paluster, subsp. nov.

SINALOA MANGROVE VIREO.

Type.—Male adult in full breeding condition; number 8445, collection of Robert T. Moore; Isla Las Tunas, on the gulf coast of northwestern Sinaloa, Mexico; May 9, 1934; collected by Chester C. Lamb.

Subspecific characters.—Differs from *Vireo pallens ochraceus* Salvin of western Guatemala in being duller, more brownish yellow below, grayer (less greenish) above; bill heavier, longer and deeper.

From the forms on the east coast of Central America, *paluster* differs unmistakably in its larger size. With *pallens pallens*, whose range is south of that of *ochraceus*, there can be no confusion, because the underparts of *paluster* are Naples Yellow,[1] not dull white as in *p. pallens*.

Range.—Mangrove swamps of the coast of Sinaloa, from about latitude 25° south to Mazatlan and probably as far as Nayarit. A single specimen from San Blas in the British Museum has not been compared, but presumably belongs to the new race.

Specimens examined.—*V. p. paluster*, Sinaloa, 1♂ (Type), 1♀ Isla Las Tunas, 1♂ Mazatlan. *V. p. ochraceus*, Guatemala, 6♂, 2♀ San Jose, 1♀ Ocos. *V. p. semiflavus*, British Honduras, 1♂ Yecacos Lagoon, 1♂ Manatee District; Mexico, 5♂ Jama, Campeche.

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

Remarks.—Ridgway (Birds of N. & M. Am., Pt. 3, p. 193, footnote d), noticed the larger size of the bill of the single specimen from Mazatlan, taken by A. J. Grayson on June 16, 1862. The two specimens of the Moore collection show this character more markedly, in fact, the bill is not only larger but of different proportions, being deeper than it is longer than true *ochraceus*.

AVERAGE MEASUREMENTS OF *Vireo pallens paluster* AND *V. p. ochraceus*.

MALES.	WING.	TAIL.	EXPOSED CULMEN.	DEPTH CULMEN.
1 ad. (Type) Sinaloa, *paluster*	59.0	46.4	11.7	4.5
6 sp. Guatemala, *ochraceus*	57.7	43.9	10.25	3.9
FEMALES.				
1 ad. Sinaloa, *paluster*	56.8	45.7	11.1	4.3
3 ads. Guatemala, *ochraceus*	56.7	42.4	10.0	3.9

In the above measurements the exposed culmen is measured from the point where the tips of the feathers of the forehead fail to hide the culmen.

Buarremon virenticeps verecundus, subsp. nov.

DUSKY BUARREMON.

Type.—Male adult; number 12382, collection of Robert T. Moore; Rancho Batel, 5 miles due north of Santa Lucia, S. E. Sinaloa, Mexico; altitude 5650 feet; Nov. 15, 1934; collected by Chester C. Lamb.

Subspecific characters.—Differs from *Buarremon virenticeps* Bonaparte of southcentral Mexico in having the gray of sides darker and much more extensive, largely replacing the Olive-Green on the flanks and extending across the breast, almost to the exclusion of the white; white of median underparts much more restricted; undertail coverts darker green; size smaller, particularly bill; tail relatively shorter, being approximately equal to wing instead of from eight to ten per cent longer.

Range.—Rancho Batel in the Transition Zone at the top of the mountain range forming the boundary line between southeastern Sinaloa and Durango.

It is apparently a very rare bird in Sinaloa, as neither Chester C. Lamb nor the author has secured any other specimens in four years of collecting in Sinaloa.

Specimens examined.—*B. v. verecundus*, Sinaloa, 1 ♂, 1 ♀ Rancho Batel. *B. v. virenticeps*, Mexico, 2 ♂ Desierto de Leones, 1 ♂, 1 ♀ Temascaltepec, 1 ♀ La Venta. *B. assimilis assimilis*, Ecuador, 1 ♂ Alas Pungo, 1 ♀ Papallacta, 1 im. ♀ Cuyuja, 1 ♂, 1 ♀ Cuenca.

Remarks.—This seems to be the first record of the species *virenticeps* or the genus *Buarremon* in northwestern Mexico, the nearest approach hitherto being apparently a record from San Sebastian, Jalisco, referred to by Ridgway. J. H. Batty, during nearly a year of collecting in the State of Durango and another year in Sinaloa not far from the type locality, did not secure a single specimen.

The characters of the species *virenticeps* are very close to *assimilis*. The only real difference between the two is that the gray of the central median stripe on the head in *assimilis* is replaced by Olive-Green in *virenticeps*.

As *verecundus* is a high mountain form and none of the early collectors entered the mountains of Sinaloa, it is almost certain that Bonaparte's Type of *virenticeps* came from southcentral Mexico. I therefore designate the type locality as Desierto de Leones, near Mexico City, Mexico, as being a probable area from which the Type could have been secured.

The great difference in the length of the tail would be still greater, were it not for the fact that the Rancho Batel birds are in fresh plumage, whereas the southcentral Mexican birds have both wings and tail badly worn.

AVERAGE MEASUREMENTS OF *Buarremon virenticeps verecundus* AND *B. v. virenticeps*.

	WING.	TAIL.	EXPOSED CULMEN.
MALES.			
1 ad. (Type) Sinaloa, *verecundus*	83.1	83.0	14.3
3 ads. Mexico, *virenticeps*	84.1	93.3	15.9
FEMALES.			
1 ad. Sinaloa, *verecundus*	77.4	80.7	15.3
2 ads. Mexico, *virenticeps*	81.2	83.4	15.7

Vol. 51, pp. 73–74 May 19, 1938

PROCEEDINGS

OF THE

BIOLOGICAL SOCIETY OF WASHINGTON

THE RACES OF *OREOPELEIA MYSTACEA* (TEMMINCK).

BY STUART T. DANFORTH.

In a series of fourteen Bridled Quail Doves from six islands in my collection, mostly obtained on an extended collecting trip to the Lesser Antilles in 1937, there are three specimens from Saba. Apparently only two specimens (one of them the type of *Geotrygon sabae* Riley) had previously been obtained there. I find that my three birds from there differ in nowise from specimens from the islands of St. Kitts to St. Lucia. Riley evidently described an immature bird in the mistaken idea that it was an adult, since I have a male from Montserrat and a female from Guadeloupe which agree very closely with his description, especially in having the suborbital stripe, chin and upper throat buff instead of white, and in the darker color of the under parts. Therefore *Geotrygon sabae* should be regarded as a synonym of *Oreopeleia m. mystacea.*

On the other hand I find that a series of five specimens collected in St. Croix by Mr. Harry A. Beatty show constant differences from the birds of the Lesser Antilles, and I take pleasure in naming them in honor of their collector as

Oreopeleia mystacea beattyi, subsp. nov.

Subspecific characters.—All measurements average smaller than in *O. m. mystacea;* the white of the suborbital stripe, chin and upper throat is of a purer white (less tinged with buffy) than in typical *mystacea;* the under parts are lighter, and the brown of the pileum is of a lighter shade (light drab to drab instead of dark hair brown to chaetura drab).

Type.—No. 2996, Coll. of S. T. Danforth, adult male, collected at Prosperity Garden, St. Croix, Virgin Islands, February 20, 1938, by Harry A. Beatty.

Measurements of type.—Wing 162.5; tail 88.2; culmen from base 27.0; tarsus 32.0 mm.

Remarks.—Three males of *O. m. beattyi* measure: Wing 159.9–162.5 (161.4); tail 85.3–90 (87.8); culmen from base 26.5–28.2 (27.2); tarsus 32–32.9 (32.6). Ridgway[1] reports even smaller measurements of an adult male from St. Croix, viz., wing 156.6; tail 87; tarsus 33. Two females measure: wing 155.5–158.6 (157); tail 82.2 (one); culmen from base 27.4–29.5 (28.4); tarsus 30.1–31.0 (30.5).

Corresponding measurements of *O. m. mystacea* are: Six males, wing 158.6–172.6 (165.1); [if an abnormally small and possibly defective male from Montserrat is not considered these measurements read, wing 163–172.6 (166.6)]; tail 88–96 (90.6); culmen from base 27–28.3 (27.8); tarsus 32.3–35 (33.2). Three females, wing 160.6–161 (160.8); tail 79.3–87.8 (84.4); culmen from base 28.6–29.7 (29.3); tarsus 31.8–34 (33).

By islands the measurements of specimens of *O. m. mystacea* are as follows: *Males*—2, Saba, wing 163–172.6; tail 89–94; culmen from base 28.3–28.3; tarsus 32.3–32.5. 1, St. Kitts, wing 168.1; tail 96; culmen from base 28.1; tarsus 35.0. 2, Montserrat, wing 158.6–164.8; tail 88–88.3; culmen from base 27–27.2; tarsus 32.4–34.7. 1, St. Lucia, wing 163.2; tail 88.5; culmen from base 27.8; tarsus 32.4. *Females.*—1, Saba, wing 160.8; tail 79.3; culmen from base 29.7; tarsus 34. 1, Montserrat, wing 160.6; tail 86; culmen from base 28.6; tarsus 31.8. 1, Guadeloupe, wing 161; tail 87.8; culmen from base 29.7; tarsus 33.2.

Distribution.—Island of St. Croix, Virgin Islands.

Material examined.—*O. m. beattyi:* St. Croix, 5; *O. m. mystaces:* Saba, 3; St. Kitts, 1; Montserrat, 3; Guadeloupe, 1; St. Lucia, 1.

[1] U. S. Nat. Mus. Bull. 50, VII, 1916, p. 474.

Vol. 51, pp. 75–78 May 19, 1938

PROCEEDINGS
OF THE
BIOLOGICAL SOCIETY OF WASHINGTON

NOTES ON THE GENUS SARACHA.[1]

BY C. V. MORTON.

The small plant genus *Saracha*, of the family Solanaceae, was originally founded by Ruiz and Pavon.[2] No species is described, but their plate illustrates *Saracha punctata* Ruiz & Pavon, the first species described in their later account of the genus.[3] By the rules, therefore, *S. punctata* should be considered as the generic type. Later, Miers[4] recognized that two genera were involved in the *Saracha* of Ruiz and Pavon, but erroneously applied the name to the other four species and gave *S. punctata* the new name *Poecilochroma*. This nomenclature has persisted until the present time, and Macbride[5] urges that it be continued by conserving the name *Saracha* Ruiz & Pavon, emend. Miers. This should perhaps be done, although since both genera are relatively unimportant, no great confusion would result from changes of name.

A rather large number of species of *Saracha* have been proposed, chiefly by Miers and Bitter. Because these have mostly been known from single collections, the identification of specimens has become a difficult matter. In fact, even the generic limits are none too sure. In Peru, especially, the genus verges on the one hand toward *Poecilochroma* and on the other to *Hebecladus*. In North America, however, it is easily recognized by the combination of axillary umbellate inflorescence, rotate corolla, and saucer-shaped accrescent calyx.

During the last nine years the author has worked intermittently on the genus, attempting to distinguish the described

[1] Published by permission of the Secretary of the Smithsonian Institution.
[2] Prodr. Fl. Peruv. 31. *pl. 34*. 1794.
[3] Fl. Peruv. 2:42. 1799.
[4] Hook, Lond. Journ. Bot. 7:354. 1848.
[5] Field Mus. Publ. Bot. 8:110. 1930.

species and to verify the work of Bitter[6] who proposed five sections, viz. *Macrosaracha*, *Adenosaracha*, *Psilandrosaracha*, *Heterosaracha*, and *Eusaracha*. One of the chief points stressed by him is the presence or absence of minute sclerotic grains among the seeds of the berry, but the value of this character is highly doubtful. The origin and significance of these grains are still unknown. In two specimens of *S. procumbens* otherwise identical they may be present in one and absent in the other. Thus it would seem that *Adenosaracha*, the section characterized by the presence of these grains, may not be maintained. *Saracha nitida* Bitt., the only species of the section *Psilandrosaracha*, is characterized by having the filaments and the annular glandular ring within the corolla completely glabrous. This distinction is certainly not a sectional character in this genus, and is in fact only doubtfully a good species character. *Saracha procumbens* var. *repando-dentata* Dunal is similarly glabrous, except for microscopic papillae. The section *Heterosaracha*, founded on *S. amphitricha* Bitt. which I have not seen, seems to rest on an equally insecure basis. On the other hand *Macrosaracha*, the species of which are confined to Peru and Bolivia, is well distinguished by its much larger, campanulate rather than rotate corollas. It is this section that shows the transition to *Poecilochroma* and *Hebecladus*.

Two species of North America are easily recognized: *Saracha antillana* Krug & Urban, of Jamaica and Hispaniola (of which *S. domingensis* Bitt. is a synonym), and *S. grandiflora* Rob. & Greenm., of Michoacan, Mexico. The latter is apparently either very rare or of restricted distribution, for it is thus far known only from the type specimen. Most of the others are, I believe, forms of the widespread and common *Saracha procumbens* (Cav.) R. & P., which is, after all, not so variable as the number of described species would indicate. The Mexican and Central American plants have usually been named *Saracha jaltomata* Schlecht. Some of the other synonyms are: *Atropa Rothii* Poir., *Saracha allogona* (Bernh.) Schlecht., *S. umbellata* Dons, *S. edulis* (Schlecht.) Thellung, *S. glabrata* Miers, *S. laxa* Miers, *S. diffusa* Miers, *S. Miersii* Dunal, *S. conspersa* Miers, and *S. chihuahuensis* Bitt. *Saracha procumbens* reaches the

[6]George Bitter, Zur Gliederung der Gattung *Saracha* und zur Kenntnis einiger ihrer bemerkenswerten Arten. Repert Sp. Nov. Fedde, vols. 17–20.

United States in southern Arizona, but the form described from there (*S. sessilis* Greene) does not differ in any important respect from Mexican material. The following variety may be recognized:

Saracha procumbens var. **pilosula** Morton, var. nov.

A var. typica caulibus foliisque ubique molliter pilosulis, foliis basi longe decurrentibus, petiolo fere nullo differt.

Type in the U. S. National Herbarium, no. 1,207,342, collected at Orizaba, Veracruz, Mexico, altitude 1660 meters, Aug. 10, 1924, by George L. Fisher (no. 257). A duplicate type is at the Field Museum.

The new species described below brings the total of North American species to four. A good many more are found in Andean South America, but not so many as are described. The material at my disposal from the latter region is not adequate for a comprehensive treatment of the genus. It seems likely, however, that at least *S. contorta* R. & P. and *S. caracasana* Bitt. are synonyms of *S. procumbens*.

My study of this genus has been much facilitated by the loan of specimens from the Gray Herbarium of Harvard University, the Field Museum of Natural History, the New York Botanical Garden, and the Missouri Botanical Garden. I have also been greatly aided by the photographs of the types of species described by Miers, kindly made for me at Kew by Dr. William R. Maxon.

Saracha confinis Morton, sp. nov.

Herba perennis depressa, basi ramosa, radice fusiformi, caulibus vix ramosis, usque ad 17 cm. longis, puberulis; folia parva rhombea, usque ad 2 cm. longa et 1.3 cm. lata, basi angustata, petiolo subnullo, apice acuta, ubique puberula, pilis hyalinis flaccidis septatis eglandulosis; inflorescentia axillaris umbellata biflora, pedunculo communi usque ad 12 mm. longo, puberulo, pedicellis 10–20 mm. longis, puberulis; calyx 4 mm. longus, pilosulus, rotatus, accrescens, demum fere 10 mm. longus; corolla rotata, ca. 6.5 mm. longa, virescenti-alba; filamenta aequalia, ca. 3 mm. longa, 1 mm. supra basin corollae inserta, deorsum perspicue pilosa; ovarium et stylus glabri; bacca (immatura) ca. 9 mm. diam.

Type in the U. S. National Herbarium, no. 1,586,075, collected on a roadside bank at Santa Elena, above Tecpam, Dept. Chimaltenango, Guatemala, altitude about 2500 meters, July 18, 1933, by Alexander F. Skutch (no. 447).

Saracha confinis differs from its nearest relative, *S. procumbens*, in its very much smaller size (the stems being less than 20 cm. in length), its minute rhombic leaves, and its two-flowered umbels. The filaments are much more strongly pubescent than is usual in *S. procumbens*.

Vol. 51, pp. 79–86 May 19, 1938

PROCEEDINGS

OF THE

BIOLOGICAL SOCIETY OF WASHINGTON

THE NOMENCLATURE AND TAXONOMY OF THE GENERA OF THE SCARABAEID SUBFAMILY GLAPHYRINAE.

BY EDWARD A. CHAPIN.[1]

In rearranging the collections of Glaphyrinae of the United States National Museum it has been necessary to gather the information included in this paper. The questions concerning the nomenclature of the group are dealt with in the first part and the zoological considerations in the second.

Part 1. Nomenclature.

The generic names which have been applied to the various suggested groupings of this subfamily are given below in chronological order.

1. Glaphyrus Latreille.

1802. Hist. Nat. Crust. et Ins., vol. 3, p. 150.

Species included: *Melolontha serratulae* Fabricius 1792.

Genotype: *Melolontha serratulae* Fabr. 1792. Monobasic.

Remarks: This genus is usually dated from Latreille 1807, but in the 1802 work cited above a sufficient diagnosis is given and a species is cited. As the genus is monobasic, the type is automatically fixed. The designation of *Melolontha cardui* Fabricius 1787 as genotype (Latreille, 1810, Considérations générales, etc.) is invalid and has no binding effect. Name valid and in current use in its original sense.

2. Amphicoma Latreille.

1807. Gen. Crust. et Ins., vol. 2, p. 118.

Species included: *Melolontha melis* Fabricius 1792 (with description), [*Melolontha*] *cyanipennis* [Fabricius 1801], [*Melolontha*] *hirta* [Fabricius 1792], [*Melolontha*] *vulpes* [Fabricius 1792], [*Melolontha*] *bombylius* [Fabricius 1787], [*Melolontha*] *vittata* [Fabricius 1775], (these five by specific name only), *Melolontha abdominalis* Fabricius 1781 (with description).

[1]Published with permission of the Secretary of the Smithsonian Institution.

Genotype: *Melolontha abdominalis* Fabr. 1781. Subsequent designation of Latreille 1810.

Remarks: The type of this genus was fixed by Latreille in 1810, Considérations générales, etc., and since the species was originally included in the genus and no type having previously been designated, the acceptance of this type fixation is obligatory under the International Code. Name valid but in current use in other than its nomenclaturally correct use.

3. Anthypna Eschscholtz.

1818. Mem. Acad. Imp. Sci. St. Petersburg, vol. 6, p. 472.

Species included: *Melolontha ursus* Fabricius 1775, *Melolontha bombyliformis* Fabricius 1801 [=*bombyliformis* Pallas 1781], *Melolontha arctos* Herbst 1790 [=*arctos* Pallas 1781], *Melolontha lynx* Fabricius 1776, *Melolontha crinita* Fabricius 1776, *Melolontha cyanipennis* Fabricius 1801, *Melolontha hirta* Fabricius 1792, *Melolontha vulpes* Fabricius 1792.

Genotype: *Melolontha cyanipennis* Fabricius 1801. Present designation.

Remarks: The first, fourth and fifth species listed above belong in the genus *Anisonyx* Latr. 1807 of the Melolonthinae. If any one of these is picked as type, the name will leave the Glaphyrinae and fall as a synonym of *Anisonyx* Latr. On the other hand, if any one of the remaining names is selected, the name stays in the Glaphyrinae and becomes synonymous with *Amphicoma* Latr. 1829, but not with *Amphicoma* Latr. 1807. There is no possible way under the International Code to maintain the name in its present sense. It seems best, all things considered, to keep the name in the Glaphyrinae and for that reason the writer selects the sixth of the contained species as genotype. With Latreille's 1810 type fixation for *Amphicoma*, Eschscholtz was entirely justified in proposing a new name for the then nameless portion of *Amphicoma* Latr. 1807, and if Latreille had not vacillated in his use of the name *Amphicoma*, there would be no conflict between the correct and the current usage of these names to-day. Name valid but in current use in other than its nomenclaturally correct use.

4. Cratoscelis Erichson.

1835. Arch. f. Naturg., vol. 1, part 1, p. 267.

Species included: *Cratoscelis vulpina* Erichson, n. sp., *Cratoscelis discolor* Erichson, n. sp.

Genotype: *Cratoscelis vulpina* Erichson 1835. Present designation.

Remarks: Unfortunately, the name *Cratoscelis* was published in connection with a figure and word description the preceding year (1834. Ann. Soc. Ent. France, vol. 3, p. 361, pl. 7, figs. 3–4) by Lucas. Name invalid, see *Arctodium* Burmeister 1844.

5. *Lichnia* Erichson.

1835. Arch. f. Naturg., vol. 1, part 1, p. 269.

Species included: *Lichnia limbata* Erichson, n. sp.

Genotype: *Lichnia limbata* Erichson 1835. Monobasic.

Remarks: Name valid and in current use in its original sense.

6. *Pachymerus* Faldermann.

1835. Mem. Soc. Nat. Moscou, vol. 4, p. 281.

Species included: *Pachymerus micans* Faldermann, n. sp., *Scarabaeus oxypterus* Pallas 1771.

Genotype: *Pachymerus micans* Faldermann 1835. Present designation.

Remarks: This name is preoccupied by *Pachymerus* Thunberg 1805 and hence is invalid in this sense. Furthermore, both of the included species belong in the older genus *Glaphyrus* Latr. 1802. Name invalid, see *Glaphyrus* Latr. 1802.

7. Arctodium Burmeister.

1844. Handb. d. Ent., vol. 4, part 1, p. 9.

Species included: Those belonging to *Cratoscelis* Erichson 1835, to wit, *Cratoscelis vulpina* Erichson 1835, *Cratoscelis discolor* Erichson 1835.

Genotype: *Cratoscelis vulpina* Erichs. 1835. By substitution.

Remarks: Although proposed by Dejean in his 1833 Catalogue, it remained for Burmeister to validate the name by connecting it with a described species. It is the only available substitute for *Cratoscelis* Erichson 1835 nec *Cratoscelis* Lucas 1834. Name valid and should replace *Cratoscelis* Erichs.

8. Lichnanthe Burmeister.

1844. Handb. d. Ent., vol. 4, part 1, p. 26.

Species included: *Amphicoma vulpina* Hentz 1826.

Genotype: *Amphicoma vulpina* Hentz 1826. Monobasic.

Remarks: Name valid nomenclaturally and available for use.

9. Psilodema Blanchard.

1845. Hist. d. Ins., vol. 1, p. 211, 235.

Species included: *Melolontha melis* Fabricius 1792.

Genotype: *Melolontha melis* Fabr. 1792. Monobasic.

Remarks: Isogenotypic, through synonymy, with *Anthypna* Eschz. 1818. Name invalid, see *Anthypna* Eschz. 1818.

10. Dasychaeta Erichson.

1847. Arch. f. Naturg., vol. 13, part 1, p. 104.

Species included: *Dasychaeta lateralis* Erichson, n. sp.

Genotype: *Dasychaeta lateralis* Erichs. 1847. Monobasic.

Remarks: Name valid and in current use in its original sense.

11. Eulasia Truqui.

1848. Studi entomologici, vol. 1, part 1, p. 16.

Species included: *Amphicoma papaveris* Sturm. 1843, *Melolontha vittata* Fabricius 1775, *Amphicoma goudoti* Castelnau 1840, *Amphicoma lasserrei* Gemar 1834, *Melolontha bombylius* Fabricius 1787, *Eulasia genei* Truqui, n. sp., *Eulasia pretiosa* Truqui, n. sp., *Scarabaeus arctos* Pallas 1781, *Scarabaeus bombyliformis* Pallas 1781, *Amphicoma bicolor* Waltl. 1838, *Eulasia hyrax* Truqui, n. sp., *Melolontha vulpes* Fabricius 1792, *Scarabaeus syriacus* Linne. 1758.

Genotype: *Amphicoma papaveris* Sturm. 1843. Present designation.

Remarks: In subdividing the genus *Amphicoma* of authors (nec *Amphicoma* Latreille 1807), Truqui correctly assigned the name to those species with simple mandibles. For the species with dentate mandibles he proposed the new name Eulasia. Name valid and in use in its original sense though reduced to subgeneric rank.

12. Pygopleurus Motschulsky.

1859. Etudes ent., part 8, p. 162.

Species included: *Scarabaeus syriacus* Linne. 1758, *Melolontha vulpes* Fabricius 1792.

Genotype: *Melolontha vulpes* Fabricius 1792. Present designation.

Remarks: Motschulsky suggests the division of *Amphicoma* Latr. 1829 into four genera. The species referred to *Pygopleurus* fall into the second section of Truqui's genus *Eulasia,* having tridentate mandibles. An additional character not mentioned by Motschulsky is found in the shape of the scutellum. Name valid and in current use as a subgenus of *Amphicoma* Latr. 1829.

13. Trichopleurus Motschulsky.

1859. Etudes ent., part 8, p. 162.

Species included: *Melolontha bombylius* Fabricius 1787.

Genotype: *Melolontha bombylius* Fabr. 1787. Monobasic.

Remarks: Nomenclaturally valid but zoologically hardly distinct from *Eulasia* Truqui 1848.

14. Dasydera Leconte.

1861. Proc. Acad. Nat. Sci. Philadelphia, p. 345.

Species included: *Dasydera ursina* Leconte, n. sp.

Genotype: *Dasydera ursina* Lec. 1861. Monobasic.

Remarks: Nomenclaturally valid but zoologically hardly distinct from Lichnanthe Burm. 1844.

15. Toxocerus Fairmaire.

1891. C. R. Soc. ent. Belgique, vol. 35, p. vii.

Species included: *Toxocerus rothschildi* Fairmaire, n. sp.

Genotype: *Toxocerus rothschildi* Fairm. 1891. Monobasic.

Remarks: This genus was differentiated from *Anthypna* auct. by the much greater development of the antennal club. Since its description more species have come to light which tend to bridge the gap between the types. Name nomenclaturally valid but zoologically hardly distinct from *Amphicoma* Latr. 1807 (=*Anthypna* auct. nec Eschz.).

16. Arrhephora Fairmaire.

1891. C. R. Soc. ent. Belgique, vol. 35, p. viii.

Species included: *Arrhephora chalcochrysea* Fairmaire, n. sp. *Arrhephora dolorosa* Fairm., n. sp., *Arrhephora corinthia* Fairm., n. sp.

Genotype: *Arrhephora chalcochrysea* Fairm. 1891. Present designation.

Remarks: With additional material before him, Fairmaire suppressed this genus as a synonym of *Toxocerus*. Name valid nomenclaturally but zoologically hardly distinct from *Amphicoma* Latr. 1807 (=*Anthypna* auct. nec Eschz.).

17. Hemiglaphyrus Champenois.

1903. L'Abeille, vol. 30, p. 145.

Species included: *Glaphyrus caucasicus* Kraatz 1882, *Glaphyrus modestus* Kiesenwetter 1858.

Genotype: *Glaphyrus caucasicus* Kraatz 1882. Present designation.

Remarks: Name valid and in current use as a subgenus of *Glaphyrus* Latr. 1802.

18. Solskiola Semenov.

1903. Revue Russe d'Ent., vol. 3, p. 391.

Species included: *Amphicoma analis* Solsky 1876.

Genotype: *Amphicoma analis* Solsky 1876. Monobasic.

Remarks: Name valid and in current use as a subgenus of *Anthypna* Eschz. 1818 (=Amphicoma Latr. 1829 et auct.).

19. Eoglaphyrus Semenov.

1926. Revue Russe d'Ent., vol. 20, p. 51.

Species included: *Glaphyrus turkestanicus* Sem. 1889 (=*Glaphyrus sogdianus* Sem. 1892), *Glaphyrus turkestanicus* bicolore Sem. (new name for *sogdiana* Champ., Rttr.).

Genotype: *Glaphyrus turkestanicus* Sem. 1889. Present designation.

Remarks: Name valid and in current use as a subgenus of Glaphyrus Latr. 1802.

The following is a summary of the valid names in the Glaphyrinae, with synonymy:

1. Genus Lichnia Erichson 1835.
   No subgenera; no synonyms.
2. Genus Arctodium Burmeister 1844.
   No subgenera; synonym Cratoscelis Erichson 1835, not Lucas 1834.
3. Genus Dasychaeta Erichson 1847.
   No subgenera; no synonyms.
4. Genus Glaphyrus Latreille 1802.
   Subgenus Glaphyrus s. str.; synonym Pachymerus Faldermann 1835.
   Subgenus Hemiglaphyrus Champenois 1903; no synonyms.
   Subgenus Eoglaphyrus Semenov 1926; no synonyms.
5. Genus Anthypna Eschscholtz 1818.
   Subgenus Anthypna s. str.; synonym Amphicoma Latreille 1829, not Latreille 1807, Psilodema Blanchard 1845.
   Subgenus Eulasia Truqui 1848; synonym Trichopleurus Motschulsky 1859.
   Subgenus Pygopleurus Motschulsky 1859; no synonyms.
   Subgenus Solskiola Semenov 1903; no synonyms.
6. Genus Amphicoma Latreille 1807.
   No subgenera; synonyms Anthypna Latreille 1829, not Eschscholtz 1818, Toxocerus Fairmaire 1891, Arrhephora Fairmaire 1891.

Part 2. Taxonomy.

Subfamily Glaphyrinae.

Diagnosis: Scarabaeidae with seven (Lichnini) or eight (Glaphrini) pairs of functional abdominal[1] spiracles, the eighth pair, when present, situated on the pygidium; with nine-segmented (Lichnini) or ten-segmented (Glaphyrini) antennae, the last three segments enlarged to form an ovate or elongate club; with well developed corneous mandibles which, with the labrum, are horizontally extended; abdominal sternites ankylosed (Lichnini) or free (Glaphyrini); abdomen not (Lichnini) or strongly (Glaphyrini) inflated, body generally pilose.

From the above it may be seen that the South American components of the subfamily (Lichnini) are quite different from the group of genera native to the northern hemisphere (Glaphyrini). It would not be unreasonable to consider that the two groups are both of subfamily rank. Since, however, the two seem to be more closely related to one another than to any other of the numerous subfamilies, little would be gained by their separation.

Through the Glaphyrini, the subfamily appears to be most closely related to the Hybosorinae. In certain of the species of *Glaphyrus* Latr. the antennal structure typical of the Hybosorinae is found and the presence of a pair of functional spiracles on the pygidium in both groups seems significant. In fact, the only character that the writer can find by which the Glaphyrini can be separated from all of the Hybosorinae, other than that of pilosity which is relative, is in the inflated abdomen with free sternites. On the other hand, the Lichnini are separable from both groups by the nine-segmented antennae. The Lichnini appear most closely related to the Glaphyrini through *Amphicoma* Latr.

Key to the Genera and Subgenera of Glaphyrinae.

1. Antennae nine-segmented (Tribe Lichnini)..... 2
   Antennae ten-segmented (Tribe Glaphyrini)..... 4
2. Eyes not completely divided by canthus; maxilla short..... *Dasychaeta* Er.
   Eyes completely divided by canthus..... 3
3. Maxilla elongate, filiform, about half as long as entire body..... *Lichnia* Er.
   Maxilla not much longer than maxillary palpus..*Arctodium* Burm.
4. Segments of anterior tarsus of male pectinate..... 5
   Segments of anterior tarsus of male not pectinate..... 8
5. Anterior tibia of male armed on inner margin before apex with a long perpendicular spine..... *Solskiola* Sem.
   Anterior tibia of male not so armed..... 6

[1] Arrow (1909, Trans. Ent. Soc. London, p. 481) considers the first and largest of the series of spiracles as belonging to the metathorax. The writer prefers to consider it as the first abdominal for the following reasons: (1) the metathoracic spiracle in coleopterous larvae is always, as far as he can ascertain, rudimentary and should not logically be followed in the imago by a fully functional spiracle and (2) there is otherwise no spiracle to correspond with the first abdominal segment.

6 Mandibles depressed, simple, evenly curved externally and apically ..... *Anthypna* Esch.
Mandibles depressed, bifid or trifid along inner apical margin 7
7. Scutellum elongage-triangular ..... *Pygopleurus* Mots.
Scutellum short, rounded behind ..... *Eulasia* Truqui
8. Mandibles compressed, apically bifid; each segment of anterior tarsus of male edged with row of stiff spines 9
Mandibles depressed, evenly curved, the external margin sometimes strongly elevated 11
9. All segments of antennal club equally developed, free ..... *Hemiglaphyrus* Champ.
Basal segment of antennal club cupuliform, receiving the other club segments within its cavity 10
10. Epipleural margin of elytron sharp, cariniform ..... *Eoglaphyrus* Sem.
Epipleural margin of elytron costiform ..... *Glaphyrus* Latr.
11. External margin of mandible not strongly elevated, mandible obliquely carinate dorsally; first four segments of anterior tarsus of male lamellate internally ..... *Amphicoma* Latr.
External margin of mandible strongly elevated, mandible not carinate dorsally; anterior tarsus of male not modified ..... *Lichnanthe* Burm.

Lichnini, new tribe.

Diagnosis: Glaphyrinae with filiform, plumose maxillae which are sometimes very elongate, with nine-segmented antennae, with seven pairs of functional abdominal spiracles and with the abdominal sternites ankylosed.

Distribution: South America (Peru and Chile).

Of the three genera which compose this tribe, two are available to the writer for study. These are readily separated, but by characters which seem upon study to be rather trivial. The discovery of additional species in the future may give reason for merging them. The third genus, *Dasychaeta* Er., unknown to me except by description, offers one character which suggests that the genus may be a connecting link between the Lichnini and the Glaphyrini. This is the incomplete division of the eye by the canthus.

Glaphyrini, new tribe.

Diagnosis: Glaphyrinae with truncate maxillae, with ten-segmented antennae, with eight pairs of functional spiracles, with the abdomen inflated and with free sternites.

Distribution: southern portion of the northern hemisphere.

This tribe embraces four genera, each of which has in the past been subdivided. Two of these are palaearctic in range, one is both palaearctic and oriental and one purely nearctic.

Glaphyrus Latr.—This genus is here considered as made up of three groups of subgeneric rank. *Hemiglaphyrus* Champenois might quite legitimately be raised to full generic status as the characters suggested

indicate a transitional form in the direction of *Amphicoma* Latr. *Eoglaphyrus* Semenov appears to be less well grounded, only one of the mentioned characters serving to set it off from the rest of the genus and this character not one of great weight. However, without study of the actual type species the writer accepts Semenov's conclusion.

Anthypna Esch.—Four groups of subgeneric rank are here accepted as composing this genus. *Pygopleurus* Motschulsky and *Eulasia* Truqui are distinct from each other and from *Anthypna* s. str. in both sexes and appear to be well grounded. *Solskiola* Semenov is based on a single character found only in the male sex of a single species. Without a knowledge of the structure of the mandible, one is at a loss to assign it to its proper subgenus and it is hence left as described. It is probably an Eulasia.

Amphicoma Latr.—The outstanding characters of this genus are the dorsally carinate mandibles and the modifications of the anterior tarsi and intermediate tibiae of the males. Four species of *Toxocerus* Fairm. are before the writer, as well as *A. pectinata* Lewis and the two Mediterranean species. It seems impossible to find valid characters to sustain *Toxocerus* Fairm. so that genus has been merged with *Amphicoma* Latr.

Lichnanthe Burm.—All of the known nearctic forms are referable to this genus.

Vol. 51, pp. 87–92 May 19, 1938

PROCEEDINGS
OF THE
BIOLOGICAL SOCIETY OF WASHINGTON

A REVIEW OF THE SOUTHERN (*MELANOSTIGMA*) GROUP OF THE RED-HEADED LAUGHING-THRUSH, *GARRULAX ERYTHROCEPHALUS* (VIGORS), WITH DESCRIPTIONS OF TWO NEW RACES FROM SIAM.[1]

BY H. G. DEIGNAN.[2]

An examination of the Indo-chinese specimens of the Red-headed Laughing-thrush deposited in the collection of the United States National Museum has seemed to show the existence in the mountains of northern Siam of no less than two forms meritorious of subspecific recognition. I have been confirmed in this opinion by being enabled to add to the series at hand the specimens from southern Asia in the collections of the Field Museum of Natural History, the Academy of Natural Sciences of Philadelphia, the American Museum of Natural History, the Museum of Comparative Zoölogy, and the Princeton Museum of Zoölogy. Descriptions of the new forms will be found in the following pages, together with comment on related races already recognized.

Study of these difficult birds is complicated by the existence of great individual variation in museum skins. Robinson[3] observes of *G. e. peninsulae*, that "the plumage of this bird is very liable to fading, old skins and birds about to moult have the general colour—especially the edges of the primaries and the wing-coverts—very much paler; the under surface is also more ferruginous brown with the maroon tint of the breast almost absent." Berlioz (*loc. cit. supra*, p. 78) likewise says: "Cette espèce représente l'ensemble de formes le plus complexe de tout le genre *Garrulax*, étant donné la variabilité individuelle des caractères de coloration—alors que les caractères morphologiques restent au contraire très constants—

[1] See also, Berlioz, J., in "L'Oiseau et la Revue française d'Ornithologie," vol. xi, no. 1 (January, 1930), pp. 78–85 (in reprint, pp. 28–35): "Revision Systématique du Genre *Garrulax* Lesson."

[2] Published by Permission of the Secretary of the Smithsonian Institution.

[3] "The Birds of the Malay Peninsula," vol. ii, p. 197.

l'influence de l'âge sur le plumage et les nombreux termes de passage existant entre les différentes races geographiques apparemment bien définies."

After making due allowance for such variation, it is nevertheless possible to recognize within Indo-chinese limits not less than five forms. This is not surprising when we realize that these sedentary birds are limited in their distributions to those areas in which the mountains achieve an altitude in excess of 4,500 feet above sea-level, with the result that the species exists in isolated colonies.

I. GARRULAX ERYTHROCEPHALUS PENINSULAE (SHARPE).

Trochalopterum peninsulae Sharpe, Proc. Zoöl. Soc., 1887, p. 436 (Perak: Gunong Ijau).

Crown and nape deep *chestnut-maroon;* sides of head *dark ashy-gray,* almost converging on nape, each feather with an indistinct *darker gray* streak along exposed portion of shaft, becoming broader toward concealed base; ear-coverts *maroon-chestnut,* with narrow *ashy-gray* edgings; general color above *reddish-brown* washed with *olive,* the *reddish-brown* hue strongest on upper back; primary-coverts *jet-black;* point of chin *black;* throat and upper breast *deep maroon-chestnut,* gradually becoming a *more brownish* color on belly; feathers of breast glossy at tip, giving a scaly appearance in certain lights.

This, the southernmost form of the species, occurs upon the higher peaks of the Malay Peninsula from southern Selangor north to Perak, along the main range; on the Larut range of Perak; and on Gunong Benom and Gunong Tahan in Pahang (Robinson).

Specimens have also been taken on the high mountains of Bandon province, Peninsular Siam; they are "certainly very much closer to the Malayan than they are to be (*sic*) Tenasserimese race, but have the crown and throat very slightly paler" (Robinson and Kloss).[4]

II. GARRULAX ERYTHROCEPHALUS MELANOSTIGMA (BLYTH).

Trochalopteron melanostigma Blyth, Journ. Asiat. Soc. Bengal, vol. xxiv, 1855, p. 268 (Tenasserim : Mt. Muleyit).

Trochalopterum ramsayi Ogilv.-Grant, Bull. B. O. C., vol. xiv, 1904, p. 19 (Karen-ni).

Crown and nape *chestnut;* sides of head *silvery-gray,* not convergent on nape, each feather with a narrow but distinct *dusky-brown* streak along exposed portion of shaft, becoming broader toward concealed base; ear-coverts *dusky-brown,* with broad *silvery-* or *pinkish-gray* edgings; general color above:

Type 1, *brownish-olive* washed with *reddish* (especially on upper back, giving appearance of vague collar);

Type 2, *grayish-olive,* with scarcely noticeable *reddish* wash on extreme upper back;

Type 3, *grayish-olive, reddish* wash almost completely absent;

[4]Journ. Nat. Hist. Soc. Siam, Bangkok, vol. v, no. 3, p. 285.

Primary-coverts *jet-black;* chin and sides of throat below ear-coverts *black;* color below:

Type 1, center of throat and upper breast *maroon-chestnut*, becoming a *light red-brown* or *bright tawny* on lower breast and belly;

Type 2, center of throat and upper breast *maroon-chestnut*, becoming *olive-tawny* on lower breast and *olive-washed tawny* on belly;

Type 3, center of throat *maroon-chestnut*, breast and belly *olive, suffused with tawny;*

Feathers of breast glossy at tip, giving a scaly appearance in certain lights—this shows better in birds with more red on breast (types 1 and 2).

Type 1 represents the bird named *ramsayi* by Ogilvie-Grant, on the basis of skins taken by Wardlaw Ramsay in Karen-ni. It seems to be impossible to recognize this "race," in the absence of any definite range: *melanostigma* occurs both north and south of Karen-ni, while *ramsayi* occurs both north and south of Mt. Muleyit. A skin taken by Hopwood on Mt. Nwalabo and marked "breeding" by the collector (U. S. N. M. No. 263978) agrees with the type-specimen of *ramsayi* (N. B. Kinnear *in epistola*) as well as with one of Grant's paratypes now in the American Museum of Natural History.

Moreover, birds representing more than one type occur at the same localities. I have before me topotypes of *melanostigma*, belonging to types 2 and 3. (Blyth's type-specimen seems to belong to type 2, the commonest phase.) Wardlaw Ramsay,[5] commenting on his collection from Karen-ni, says of this species: "In *some* specimens the ferruginous-chestnut colour of the throat and breast is continued over the whole lower surface." (Italics are mine.) It would almost seem that Grant had selected from the series only those birds which suited his purpose.

No one seeing these birds, with the three types differing only in the degree of suffusion of the reddish color, and the extremes linked together by type 2, could believe for a moment that we are here concerned with more than a single form. It is essential then to consider *ramsayi* (1904) simply a synonym of *melanostigma* (1855).

Melanostigma in its various phases is found in Tenasserim south to Mt. Nwalabo, north through the District of Karen-ni, and as far as the Shan State of Möng Köng.

The species occurs again commonly on certain of the highest peaks of Chiengmai province, northern Siam. In these localities the bird is comparatively stable, having only one phase of plumage, corresponding to *melanostigma* type 3, but generally grayer. This form may be known as:

III. **Garrulax erythrocephalus schistaceus,** subsp. n.

Crown and nape *chestnut;* sides of head *silvery-gray*, not convergent on nape, each feather with a narrow but distinct *blackish* streak along exposed portion of shaft, becoming broader toward concealed base; ear-coverts *blackish* with broad *silvery-* or *pinkish-gray* edgings; general color above *deep mouse-gray* (Ridgway) *with faint olive wash;* primary-coverts *jet-black;* chin and sides of throat below ear-coverts (sometimes center of upper

[5] Ibis, 1877, p. 464.

throat as well) *black;* rest of throat *maroon-chestnut*, this color rarely extending as far as upper breast; breast and abdomen *deep mouse-gray* (Ridgway) *faintly suffused with tawny* over mesial area; feathers of breast glossy at tip, the tendency to a scaly appearance more highly developed than in *melanostigma* type 3.

Type.—adult male, no. 336871, United States National Museum; collected on Doi Chiengdao, 7,000 feet, Chiengmai province, western North Siam, 19 March, 1937, by the author.

The new form reaches its highest development on the dolomite mass of Chiengdao. Skins from other localities show approximation to related subspecies in a logical manner.

On Doi Angka, the Siamese locality for the species nearest to Mt. Muleyit, occurs a bird which is very near *melanostigma* type 3, but with the upperparts of a purer grayish-olive and the underparts with a much fainter tawny suffusion. These birds may be considered as:

GARRULAX ERYTHROCEPHALUS MELANOSTIGMA > SCHISTACEUS.

On Doi Suthep, half-way between Doi Angka and Doi Chiengdao, is found a form with the pure grayish-olive upperparts of the Angka specimens, but with the underparts still more gray and less suffused with tawny. It is best represented as:

GARRULAX ERYTHROCEPHALUS MELANOSTIGMA × SCHISTACEUS.

The range of *schistaceus* will be found to extend from Doi Chiengdao north through the mountains as far as the Southern Shan State of Kengtung, where it inosculates with another form (see discussion below).

In the central provinces of northern Siam the species is still unknown and probably does not occur, in the absence of sufficiently high altitudes. It is found again within Siamese limits in the complex of hills over 5,000 feet high in the northeastern corner of Nan province. The form resident in this district is nearest to *G. e. connectens* (Delacour) of Laos and Tongking, but is sufficiently distinct to justify the erection of yet another name, which will be:

IV. **Garrulax erythrocephalus subconnectens,** subsp. n.

Crown and nape *chestnut;* sides of head *silvery-gray*, not convergent on nape, each feather with a narrow and rather indistinct *dusky-brown* streak along exposed portion of shaft, becoming broader toward concealed base; ear-coverts *dusky-brown* with broad *silvery-* or *pinkish-gray* edgings; general color above *grayish-olive;* primary-coverts *black*, sometimes with a faint wash of golden-green on concealed portion of outer webs; chin and sides of throat below ear-coverts *black;* center of throat a rather *dull maroon-chestnut;* breast and belly *olive-gray lightly washed with tawny*, the tawny sometimes quite vivid on the mesial area; the scaly appearance caused by the *brownish-gray* edgings of the breast-feathers is obvious in any light and is almost as highly developed as in the form *connectens.*

Type.—Adult male, no. 350108, United States National Museum;

collected on Phu Kha, 5,000 feet, Nan province, eastern North Siam, 6 April, 1936, by the author.

Delacour, in describing *connectens*, makes reference to a pair of skins from Loi Pangnan (Southern Shan States) which have "pure black primary-coverts," but are otherwise close to his race. As these probably belong to the form here described, the range of this bird will extend on the high peaks west of the Me Khong from northern Nan into the eastern part of Kengtung.

From Kyu Loi, farther west in the same State, I have seen two specimens which are somewhat intermediate between this race and *schistaceus*. One agrees well with topotypical *schistaceus;* the other has a slightly stronger olive wash above and a pale tawny suffusion over the mesial area below. Each has the tendency to a scaly breast slightly more highly developed, especially on the sides. I consider these birds to be:

GARRULAX ERYTHROCEPHALUS SCHISTACEUS > SUBCONNECTENS.

V. GARRULAX ERYTHROCEPHALUS CONNECTENS (DELACOUR).

Trochalopterum erythrocephalum connectans [sic] Delacour, Bull. B. O. C., vol. xlix, 1929, pp. 58–59 (Laos : Phu Ke, Xieng Khouang).

Crown and nape *chestnut;* sides of head *silvery-gray*, not convergent on nape, each feather with a narrow and rather indistinct *dusky-brown* streak along exposed portion of shaft, becoming broader toward concealed base; ear-coverts *dusky-brown* with broad *silvery-* or *pinkish-gray* edgings; general color above *grayish-olive;* primary-coverts *dark golden-green*, occasionally blackish on inner webs, especially toward base; chin and sides of throat below ear-coverts *black;* center of throat a rather *dull maroon-chestnut;* breast and belly *olive-gray*, more or less heavily washed everywhere with *tawny;* each feather of the breast with a *brown* central portion and a *gray* edging.

G. e. connectens is an abundant bird in the higher hills of Upper Laos and in the dependency of Tongking.

A deal of collecting remains to be done in Yunnan and the Shan States before we shall understand the interlacing and inosculation of races in that area, where we are concerned with the subspecies *melanostigma, schistaceus, subconnectens,* and *connectens* of the southern group, and with *woodi* and *forresti* of the northern group.

SPECIMENS EXAMINED.

1. *G. e. peninsulae:* 7.
2. *G. e. melanostigma,* type 1 : 3.
3. *G. e. melanostigma,* type 2 : 5.
4. *G. e. melanostigma,* type 3 : 2.
5. *G. e. melanostigma,* type 3 > *schistaceus*: 11.
6. *G. e. melanostigma,* type 3 × *schistaceus:* 1.
7. *G. e. schistaceus:* 3
8. *G. e. schistaceus* > *subconnectens:* 2.
9. *G. e. subconnectens:* 3.
10. *G. e. connectens:* 30.

I am indebted to the authorities of the museums named above, who have kindly put at my disposal the specimens in their charge. I have also to thank Mr. N. B. Kinnear of the British Museum of Natural History, who has been so good as to compare with the types deposited in London certain of my skins sent him for that purpose. Finally, my thanks are due to the ornithologists of the National Museum, who have been generous with advice during my work.

P. S.—Since these notes have gone to press, Mr. R. M. De Schauensee has courteously forwarded to me a series of 16 examples of this species, which he has just received from a new Siamese locality: Doi Pha Hom Pok, a mountain over 8,000 feet high, forming part of the boundary between Chiengrai province and the Southern Shan State of Mu'ang Hang, and situated about half-way between Doi Chiengdao and Kyu Loi. These specimens agree perfectly with topotypical *schistaceus*, and their provenance lies within the range predicted for this form above (p. 90).

Vol. 51, pp. 93–94 May 19, 1938

PROCEEDINGS

OF THE

BIOLOGICAL SOCIETY OF WASHINGTON

A NEW SPECIES OF FROG FROM HAITI.

BY DORIS M. COCHRAN.

In comparing wax impressions of the vomerine teeth of some Hispaniolan frogs identified as *Eleutherodactylus flavescens* in order to discover their degree of individual variation, a small lot from the Citadel of King Christophe in Haiti was found to differ markedly from the large series taken near Samaná in the Dominican Republic. Since other minor differences appeared when the two forms were closely compared, the Citadel species seems to merit separation.

Eleutherodactylus poolei, n. sp.

Diagnosis.—Resembles *Eleutherodactylus flavescens* Noble in having notched digital dilations. Differs in having two small weak patches of vomerine teeth widely separated from each other, larger eyes, a smaller tympanum and more distinct color pattern.

Type.—U. S. N. M. 73999, an adult male from the Citadel of King Christophe, Haiti, collected on February 14, 1928, by A. J. Poole. Paratypes, U. S. N. M. 74000–5 with the same data.

Description of the type.—Tongue elongate, narrow, not emarginate behind; vomerine teeth in two short, weak, posteriorly converging, widely separated patches behind the choanae and between their inner levels; head moderate, without ridges; nostril almost at end of snout, its distance from eye a little less than diameter of latter; upper eyelid broad, equal to interorbital diameter; tympanum equal to one-half the diameter of eye, and nearly touching its posterior border; disks of fingers and toes large, notched; disk of 3rd finger nearly as broad as the tympanum, of 4th toe about one-half this distance; 1st finger slightly shorter than 2nd; toes and fingers unwebbed; 1st toe long, reaching to base of disk of 2nd toe; 5th toe considerably longer than 3rd; subarticular tubercles well developed; two small metatarsal tubercles, the inner oval, the outer round; a few small plantar and palmar tubercles; a distinct inner tarsal ridge; the bent limbs being laid along the sides, knee and elbow are slightly separated; the hind limbs being adpressed, heel reaches nearly to nostril; the hind limbs being placed vertically to axis of body, heels overlap. Skin of upper parts finely sha-

greened; a median dorsal ridge, less prominent on snout, fading out on sacral region; a glandular ridge over tympanum, and a very fine, branching glandular line just above and behind the shoulder on the side of the body, but no prominent dorsolateral fold; skin of throat and chest smooth; belly and lower surface of thighs minutely granular; an external vocal sac extending across the throat, marked by some small diagonal folds of skin in front of the shoulders when not inflated.

Dimensions.—Snout to vent, 28 mm.; width of head, 10.5 mm.; diameter of eye, 4.5 mm.; diameter of tympanum, 2 mm.; foreleg from axilla, 19 mm.; hind leg from vent, 46 mm.; vent to heel, 27 mm.; tibia, 15.5 mm.; femur 15 mm.

Color (in alcohol).—Dorsum clay color; a narrow chocolate interorbital bar not extending onto the upper eyelids; an irregular W-shaped brown mark behind the occiput, its outer terminations extending onto the post-tympanic area; several small brown spots on the snout, and series of similar spots on the back tending to be arranged in short transverse rows; canthus rostralis with a brown stripe, spotted with deeper chocolate; upper lip light raw umber with indistinct dark and light spots; upper surfaces of tibia, foot and forearm with brown crossbars; upper femur with the bars very indistinct, its posterior surface immaculate; ventral surface immaculate buff, except for some faint dark suffusions on the throat of the male.

Variations.—The five paratypes, all smaller than the type, differ only slightly. The adpressed hind limb reaches sometimes to the anterior corner of the eye, sometimes to the tip of the snout. The vomerine teeth are weak and short in all specimens. The dorsal ground color varies from buff to drab, but the dark pattern is remarkably constant. The dorsal skin is minutely shagreened in all but one specimen, in which it appears to be smooth.

Observations.—The new species differs from the *flavescens* of the Samaná region in having larger eyes, the eye diameter equalling twice that of the tympanum, while the vomerine teeth are strikingly weak in comparison. The pigment is likewise more distinctly concentrated in a definite pattern of spots on the dorsal surface in these frogs from the Citadel, and the light and dark areas stand out sharply, instead of being blurred and suffused into half-tones, as is the case in practically all of the frogs from the eastern part of the island.

Three paratypes of *E. flavescens*, Amer. Mus. N. H., 31556–7 and 31543 from Lo Bracita, kindly loaned by Dr. G. K. Noble, differ from the new form in their larger size and less distinct color pattern, as well as in having tubercles on top of the snout, which is less pointed. The femur appears to be a trifle shorter. The eye is also considerably smaller, and is well separated from the tympanum, while in *poolei* this interval is quite narrow.

Vol. 51, pp. 95–96 May 19, 1938

PROCEEDINGS

OF THE

BIOLOGICAL SOCIETY OF WASHINGTON

THREE NEW BIRDS FROM BANKA AND BORNEO.

BY J. H. RILEY.[1]

In identifying Malaysian birds in the United States National Museum, the three following forms seem to require naming and are herewith described:

Porzana pusilla mira, subsp. nov.

Type.—Adult female, U. S. National Museum, No. 181740, Tanggarong, Mahakkam River, East Borneo, June 25, 1912. Collected by H. C. Raven (orig. no. 67).

Similar to *Porzana pusilla pusilla* from Northern China, but the brown of the upperparts with a more rufous tinge; superciliary and cheeks lighter gray; below the throat and breast are white, only the chest very pale gray; bill (in the skin) olive yellow, base and culmen medal bronze instead of olivaceous black. Wing, 86; tail, 39; culmen, 16; tarsus, 27; middle-toe and claw, 38 mm.

Remarks.—This specimen has been compared with four males and four females from northern China taken in March (1), July (1), and May (6). The most striking differences between *P. pusilla pusilla* and *P. pusilla mira* are the more rufous tinge to the brown of the upperparts, the white throat and breast, and the yellow sides to the bill of the latter. *Porzana pusilla palustris* of Australia is similar to *Porzana pusilla mira* in the color of the upperparts, but the chest, cheeks, and superciliaries are a deeper gray. *P. p. palustris* lacks the brown post-ocular streak of *P. p. pusilla* and *P. p. mira*, and the color of the bill is similar to *P. p. pusilla*, olivaceous black.

Apparently the form occuring in Borneo of *Porzana pusilla* has only been thought to be a visitor, but that there is a resident form there is now little doubt.

Four adult males of *P. p. pusilla* from northern China, measure: wing, 87.5–91 (89.9); tail, 42–45 (44); culmen, 17–18 (17.4); tarsus, 26–29 (28); middle-toe and claw, 36–40 (38); four adult females from Northern China: wing, 83–92 (87.4); tail, 38–46 (40.9); culmen, 16–17 (16.6); tarsus, 27–28 (27.4); middle-toe and claw, 36–38.5 (37.2).

This indicates little difference in size between the two forms and only a minor one between the sexes.

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

Rhopodytes sumatranus minor, subsp. nov.

Type.—Adult male, U. S. National Museum, No. 181,804, Tanjong Batoe, Dutch East Borneo, August 25, 1912. Collected by H. C. Raven.

Similar to *Rhopodytes sumatranus sumatranus* of Sumatra and the Malay Peninsular, but averaging a lighter gray on the head, throat, and chest; the size smaller. Wing, 136.5; tail, 210; culmen, 32.

Remarks.—Eight specimens from Borneo have been compared with a large series from the Malay Peninsula and a smaller series from Sumatra, Banka, Billiton, and Linga Island.

Five males from Borneo measure: wing, 130–145 (136.2); tail, 209–224 (214); culmen, 30–33.5 (31.7).

Ten males from the Malay Peninsula: wing, 132.5–151 (144); tail, 209–230 (221.7); culmen, 30–36.5 (33.3).

Erythrocichla bicolor bankana, subsp. nov.

Type.—Adult male, U. S. National Museum, No. 180,585, Klabat Bay, Banka Island, June 23, 1904. Collected by Dr. W. L. Abbott.

Similar to *Erythrocichla bicolor bicolor* of Sumatra and the Malay Peninsula, but darker above, especially the pileum, wings, tail, and auriculars. Also similar to *Erythrocichla bicolor whiteheadi* of northern and western Borneo, but darker above. Wing, 83; tail, 65.5; culmen, 20.

Remarks.—The above male from Banka has been compared with four specimens from the Malay Peninsula and one female from Sumatra, one male from Southwest Borneo, one male from Southeast Borneo, and four specimens from East Borneo. The four specimens from the Malay Peninsula and the female from eastern Sumatra are fairly uniform in color. Cinnamon brown above; the pileum, wings, and tail near russet; below white, a band across the chest, the flanks, and the under tail-coverts light buff. The female from Southwest Borneo has the pileum almost concolor with the back and the auriculars snuff brown. It evidently belongs to *Erythrocichla bicolor whiteheadi* described from North Borneo. The five specimens from Southeast and East Borneo are more like the specimens from the Malay Peninsula than they are to the single male from Southwest Borneo. Just what disposition should be made of the East Bornean birds is left in abeyance.

Vol. 51, pp. 97–98 May 19, 1938

PROCEEDINGS

OF THE

BIOLOGICAL SOCIETY OF WASHINGTON

A NEW FLOWER-PECKER FROM THE MALAY PENINSULA.

BY H. G. DEIGNAN.

Among the *Dicæidae* in the collection of the United States National Museum are three specimens of the Fire-breasted Flower-pecker from Peninsular Siam, which are sufficiently distinct from more northern birds to warrant subspecific separation. I propose for them the name

Dicæum ignipectus dolichorhynchum, subsp. nov.

Type.—Adult male, United States National Museum, no. 160382; collected at the summit of Khao Nom Plu, 3,000 feet, Trang province, Peninsular Siam, 26 February, 1897, by Dr. W. L. Abbott.

Diagnosis.—Near to *D. i. ignipectus* (Hodgs.) of Nepal, but distinguished therefrom by its longer bill in either sex, although not by other measurements. The black abdominal streak in *dolichorhynchum* is wider than the same marking in *ignipectus.*

Range.—Of the three specimens available to me, a male and a female were taken at the summit of Khao Nom Plu. The third, a male, is labelled "Trang," but almost certainly came from the hills nearby. Birds of the Malay States, hitherto known as *ignipectus*, probably appertain to the newly named form.

SPECIMENS EXAMINED.

D. i. ignipectus.—31: Annam (1); North Siam (8); Fohkien (4); Szechuan (18).

D. i. dolichorhynchum.—3: Peninsular Siam (3).

TABLE SHOWING COMPARATIVE LENGTHS OF BILL.

			EXPOSED CULMEN	AVER.
D. i. ignipectus	Annam	1 ♂	7.4	7.4
	N. Siam	4 ♂♂	7.0–7.7	7.45
		4 ♀♀	7.0–7.6	7.4
	China	8 ♂♂	7.2–8.0	7.5+
		11 ♀♀	7.0–7.9	7.4—
D. i. dolichorhynchum	Penins. Siam	2 ♂♂	9.3–10.0	9.65
		1 ♀	8.3	8.3

Vol. 51, pp. 99–100 May 19, 1938

PROCEEDINGS

OF THE

BIOLOGICAL SOCIETY OF WASHINGTON

A MEXICAN RACE OF THE GOSHAWK (ACCIPITER GENTILIS [LINNAEUS]).

BY A. J. VAN ROSSEM.

Some two years ago (Trans. San Diego Soc. Nat. Hist., 8, 1936, p. 126), the writer called attention to the peculiarities shown by six goshawks from southern Arizona, Sonora, and Jalisco, and suggested that they belonged to a race distinct from either of the two currently recognized North American forms, *atricapillus* and *striatulus*. On reviewing the matter recently it has seemed advisable to recognize the formerly mentioned characters by a distinctive name, and the goshawks of northwestern Mexico and extreme southern Arizona may be known as

Accipiter gentilis apache, subsp. nov.

Type.—Adult male, 25641, Dickey collection at the California Institute of Technology; Paradise, Cochise County, Arizona; July 10, 1918; collected by H. H. Kimball.

Subspecific characters.—Darker and more blackish (less bluish) dorsally even than *Accipiter genitilis striatulus* (Ridgway) of the Pacific Northwest, the darkest of the two previously described North American races; young with ventral streaking broader and darker (more guttate, less linear) than in the young of *striatulus*. Size largest among the North American races.

Range.—Extreme southeastern Arizona (Chiricahua Mountains), south through Sonora (Yecora) to Jalisco (Sierra de Nayarit).

Remarks.—A specimen taken by Chester Lamb (Moore, Condor, 1938, p. 24) in the mountains at Babizos, Sinaloa, would seem almost certainly to belong to *apache* since Moore comments on the large size and dark coloration. However, he gives no measurements.

MEASUREMENTS.

1 adult male (type) ..	Wing, 344	Tail, 250	Tarsus, 76 mm.
1 adult female.....	Wing, 390	Tail, 285	Tarsus, 84
1 imm. female.....	Wing, 365	Tail, 292	Tarsus, 84

Vol. 51, pp. 101–120 May 19, 1938

PROCEEDINGS
OF THE
BIOLOGICAL SOCIETY OF WASHINGTON

A SYNOPSIS OF THE PHILIPPINE LAND MOLLUSKS OF THE SUBGENUS RYSSOTA.

BY PAUL BARTSCH,[1]
Curator of Mollusks and Cenozoic Invertebrates, U. S. National Museum.

On January 23, 1932, a complete report, fully illustrated, with distribution charts, on the whole genus of which this group is a part, was presented to the United States National Museum for publication. Lack of funds has prevented its issue to date. I therefore take this opportunity to render the following synopsis thereof, in the hope that it may prove helpful to students of mollusks in arranging their collections.

Any doubtful points due to the brevity of the present paper will find explanation in the completed monograph when published.

RYSSOTA Albers.

In 1850 Johann Christian Albers, in his volume of Die Heliceen, on page 61, defines this genus as embracing shells that have the upper surface rugose-striate and polished below, with the last whorl depressed and anteriorly dilated, and the base excavated about the perforation. Under this genus he lists 13 species without designating a type. The shells listed range from the Philippines to the isles of the Indian Ocean, the Moluccas, Ceylon and Amboina.

Ten years later Eduard von Martens, in the second edition of Albers' Heliceen, on page 54, brings some order into this heterogeneous group, but he still retains some extraneous species in it; for example, *Rhysota sowerbyana* Pfeiffer from the Caroline Islands. However, he clinches the matter by designating *Nanina ovum* Valenciennes as type. Von Martens emended the name *Ryssota* to *Rhysota*, which has been generally followed. I return to the original spelling.

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

KEY TO THE SUBGENERA OF THE GENUS *Ryssota.*

Aperture produced at the peripheral angle.
  Upper surface of last whorls not granulose.....*Ryssota*
  Upper surface of last whorls granulose.....*Lamarckiella*[2]
Aperture not produced at the peripheral angle.....*Pararyssota*[3]

Subgenus RYSSOTA Albers.

Shell large and usually ponderous, the upper surface wrinkled, usually rough; the lower less so. Spiral incised lines are usually present. Aperture protracted at the peripheral angle.

Type.—Ryssota otaheitana ovum Valenciennes.

KEY TO THE SPECIES OF THE SUBGENUS *Ryssota.*

Shell huge and ponderous.
  Shell inflated.....*otaheitana*
  Shell not inflated.
    Shell lenticular.....*uranus*
Shell not huge and ponderous.
  Shell smaller and thin.
    Shell exceedingly rough.
      Periphery angulated.....*sauli*
      Periphery not angulated.
        Periphery rounded.....*dvitija*
    Shell not exeedingly rough.
      Periphery well rounded.
        Last whorl rather inflated.....*sagittifera*
        Last whorl not inflated.....*antoni*
          Subperipheral dark band present.
          Subperipheral dark band absent.....*webbi*
      Periphery not well rounded.
        Periphery carinated.
          Upper surface flecked and marbled.....*porphyria*
          Upper surface not flecked or marbled.....*mülleri*

RYSSOTA (RYSSOTA) OTAHEITANA Férussac.

Shell huge, varying in color from pale horn-colored to chestnut brown on spire and base. In some of the subspecies the spire is paler than the base,

---

[2]Subgenus LAMARCKIELLA.

Lamarckiella was proposed by von Möllendorff in 1898 in the Abhandlungen der Naturforschenden Gesellschaft zu Görlitz, volume 22, page 66, for *Ryssota*, whose nuclear whorls are axially wrinkled and the sculpture of whose postnuclear whorls is axially wrinkled and marked by axial and spirally incised lines, which renders the upper surface granulose, and whose periphery is sharply angulated.

He mentions *Rhysota lamarckiana* as type.

[3]Subgenus PARARYSSOTA.

In this subgenus the shell is huge and ponderous as in the larger species of *Ryssota*, but the aperture is not protracted at the periphery, the outer lip being evenly curved.

Type.—Ryssota (*Pararyssota*) *maxima* Pfeiffer.

while in others the reverse holds good; in still other races the color of the spire and base is the same. In many of the subspecies there is a narrow zone of paler color than the rest of the upper surface of the shell, immediately posterior to the periphery; in a few this narrow band is absent; in some there is a band of brown of varying width and intensity immediately anterior to the periphery. In all the subspecies there are more or less strongly developed, retractively slanting, varicial streaks of varying width, which are usually of a little deeper shade of brown than the color of the shell. The first nuclear whorl is usually flattened and marked by a few distantly spaced, broad, low, decidedly retractively slanting wrinkles; the rest of the nuclear turns are marked by closely spaced, slender, retractively slanting, axial riblets, and numerous, fine spiral lirations. Postnuclear whorls with or without a shoulder at the summit, which may or may not be tabulated. The last whorl may be well rounded, flattened, or flattened on the side between the shoulder near the summit and the periphery. The postnuclear whorls are marked by wrinkle-like riblets which are of irregular strength and spacing, and decidedly retractively slanting. In addition to this, low, spiral lirations of varying width are usually present, also exceedingly fine, closely spaced, spiral striations. In some of the subspecies we have in addition to the above sculpture, oblique wrinkles, which range from strong to obsolete in the different forms. Suture well impressed; periphery of the last whorl varying from strongly angulated to rounded in the different subspecies. Base inflated, with the umbilical area well impressed, marked like the spire, but with the fine spiral striations absent. The sculpture of the base varies materially in strength in the different subspecies. Aperture large, very oblique; peristome in some forms very heavily thickened with a callus, while in other forms it is thin. In all the subspecies the aperture is rather drawn out at the periphery and the outer lip is usually protracted between the summit and the periphery, the inner lip almost paralleling it. In some of the races the outer lip is in-bent at the edge and in almost all of them the inner lip is in-bent, thus materially contracting the aperture. In all of the subspecies the inner lip is broadly expanded at its insertion where it is reflected over the umbilicus, which it usually covers as a heavy callus; the parietal wall is covered with a callus of varying strength, depending upon the race in question. The interior of the aperture may be white, bluish white, or bluish white with a purplish tinge.

This species ranges from central Luzon south to Samar, Leyte, Cebu, Negros and Panay, and is also found on some of the off-lying islands of eastern Luzon. It is the largest one of the Philippine Island ground land shells and is used as food by the natives.

KEY TO THE SUBSPECIES OF *Ryssota* (*Ryssota*) *otaheitana.*

Upper and lower surface of the last whorl of the same color.
  Shell unicolor.
    Shell horn-colored ..... *catanduanensis*
    Shell not horn-colored.
      Shell pale chestnut brown ..... *ovum*

Shell not unicolor.
Early whorls pale chestnut brown.
Last whorl pale horn-colored.....*calayanensis*
Last whorl not pale horn-colored.
Last whorl brownish horn-colored.....*bataana*
Upper and lower surface of the last whorl not of the same color.
Base darker than upper surface.
Supraperipheral area with a light zone.
Outer lip ponderous in adult shells.
Last whorl rounded.....*cebuensis*
Last whorl not rounded.
Last whorl flattened.
Greater diameter more than 80 mm.
Aperture decidedly channeled at the peripheral angle.
Base strongly spirally lirate.....*samarensis*
Base not strongly spirally lirate.
Base obsoletely spirally lirate.....*buriasensis*
Aperture not decidedly channeled at the peripheral angle.
Base very dark chestnut brown.....*maquilingana*
Base not very dark chestnut brown.
Base pale.....*worcesteri*
Greater diameter less than 80 mm.
Surface of shell very rough.....*rhea*
Surface of shell not very rough.....*humerosa*
Outer lip not ponderous.
Outer lip rather thin.
Surface of the shell very rough.....*humilis*
Surface of the shell not very rough.
Shell dark chestnut brown.
Shell strong.....*otaheitana*
Shell not strong.
Shell very thin.....*romblonensis*
Shell not dark chestnut brown.
Shell brownish horn-colored.....*pagbilaeonsis*
Supraperipheral area without light zone.
Greater diameter more than 110 mm.....*pilsbryi*
Greater diameter less than 100 mm.....*batanensis*
Base not darker than upper surface.
Base lighter than upper surface.
Shell depressed.....*depressa*
Shell not depressed.....*demesai*

The characterizations in the above key together with the locality data and type designation following will help in bringing the salient features pertaining to the various races to attention.

Ryssota (Ryssota) otaheitana catanduanensis, new subspecies.

This race comes from Catanduanes Island. The type, U. S. N. M. No. 311502, has 5.4 whorls and measures: Height 52.2 mm.; greater diameter 77.5 mm.; lesser diameter 61.1 mm.

Ryssota (Ryssota) otaheitana ovum Valenciennes.

This race I now restrict to the region about Manila. A specimen from Lagunas, U. S. N. M. No. 66202, has 5.4 whorls and measures: Height 61.0 mm.; greater diameter 80.1 mm.; lesser diameter 61.8 mm.

Ryssota (Ryssota) otaheitana calayanensis, new subspecies.

This race comes from Calayan Island of the Babuyanes group. The type, U. S. N. M. No. 311505, has 5.1 whorls and measures: Height 42.3 mm.; greater diameter 63.1 mm.; lesser diameter 49.0 mm.

Ryssota (Ryssota) otaheitana bataana, new subspecies.

This subspecies comes from Bataan Province, Luzon. The type, U. S. N. M. No. 311506, was collected at Mariveles. It has 5.4 whorls and measures: Height 48.5 mm.; greater diameter 68.2 mm.; lesser diameter 53.3 mm.

Ryssota (Ryssota) otaheitana cebuensis, new subspecies.

This race comes from the Island of Cebu. The type, U. S. N. M. No. 195663, has 5.4 whorls and measures: Height 60.2 mm.; greater diameter 90.6 mm.; lesser diameter 88.7 mm.

Ryssota (Ryssota) otaheitana samarensis, new subspecies.

This subspecies comes from the Island of Samar. The type, U. S. N. M. No. 195662, has 5.3 whorls and measures: Height 59.0 mm.; greater diameter 88.6 mm.; lesser diameter 65.4 mm.

Ryssota (Ryssota) otaheitana buriasensis, new subspecies.

This race comes from Burias Island. The type, U. S. N. M. No. 256371, has 5.3 whorls and measures: Height 56.7 mm.; greater diameter 84.0 mm.; lesser diameter 64.1 mm.

Ryssota (Ryssota) otaheitana maquilingana, new subspecies.

This race appears to be confined to Mount Maquiling, Luzon. The type, U. S. N. M. No. 310515, has 5.7 whorls and measures: Height 58.3 mm.; greater diameter 83.0 mm.; lesser diameter 64.9 mm.

Ryssota (Ryssota) otaheitana worcesteri, new subspecies.

This race comes from the region of Ragay Gulf, Luzon. The type, U. S. N. M. No. 311509, was collected at Pasacao. It has 5.6 whorls and measures: Height 60.3 mm.; greater diameter 90.6 mm.; lesser diameter 69.7 mm.

Ryssota (*Ryssota*) *otaheitana rhea* Pfeiffer.

This race comes from Panay. A specimen of it, U. S. N. M. No. 184622, has 5.0 whorls and measures: Height 44.5 mm.; greater diameter 64.8 mm.; lesser diameter 49.7 mm.

This is one of the smallest subspecies of *Ryssota* (*Ryssota*) *otaheitana* and is one of the most strongly characterized, having rougher sculpture on the upper surface of the whorls than any so far observed.

Ryssota (*Ryssota*) *otaheitana humerosa* Möllendorff.

This race occupies the southern and southeastern part of the Island of Mindoro. A specimen, U. S. N. M. No. 7590, has 5.5 whorls and measures: Height 53.7 mm.; greater diameter 76.0 mm.; lesser diameter 57.5 mm. It differs from *Ryssota* (*Ryssota*) *otaheitana demesai* in having the base darker than the upper surface of the shell. This subspecies occupies the northeastern part of the Island of Mindoro.

Ryssota (*Ryssota*) *otaheitana humilis* Möllendorff.

This race comes from the Island of Guimaras. A specimen, U. S. N. M. No. 184629, has 4.8 whorls and measures: Height 30.0 mm.; greater diameter 57.7 mm.; lesser diameter 45.6 mm.

Ryssota (*Ryssota*) *otaheitana otaheitana* Férussac.

Specimens from the Island of Sibuyan in every way satisfy the figure and description by Férussac. I therefore restrict the name to this race. A specimen, U. S. N. M. No. 311515, from the above locality, has 5.3 whorls and measures: Height 52.7 mm.; greater diameter 80.5 mm.; lesser diameter 62.7 mm.

Ryssota (Ryssota) otaheitana romblonensis, new subspecies.

This race comes from the Island of Romblon. The type, U. S. N. M. No. 256260, has 5.4 whorls and measures: Height 58.0 mm.; greater diameter 88.4 mm.; lesser diameter 67.4 mm.

Ryssota (Ryssota) otaheitana pagbilaoensis, new subspecies.

This race comes from Pagbilao Island off Luzon. The type, U. S. N. M. No. 311516, has 5.6 whorls and measures: Height 51.0 mm.; greater diameter 81.4 mm.; lesser diameter 61.4 mm.

Ryssota (Ryssota) otaheitana batanensis, new subspecies.

This race comes from the Island of Batan off the east coast of Luzon. The type, U. S. N. M. No. 256373, has 5.6 whorls and measures: Height 61.0 mm.; greater diameter 93.6 mm.; lesser diameter 74.4 mm.

Ryssota (*Ryssota*) *otaheitana depressa,* Möllendorff.

This race comes from the Island of Marinduque. A specimen, U. S. N. M. No. 195666, has 5.3 whorls and measures: Height 46.5 mm.; greater diameter 75.3 mm.; lesser diameter 61.2 mm.

Ryssota (Ryssota) otaheitana demesai, new subspecies.

This subspecies comes from the northeastern part of Mindoro. The type, U. S. N. M. No. 382956, comes from the base of Mount Halcon. It has 5.8 whorls and measures: Height 60.0 mm.; greater diameter 84.0 mm.; lesser diameter 72.0 mm.

Ryssota (Ryssota) otaheitana pilsbryi, new name.

The gigantic size of this race will readily distinguish it from the rest. Neither Dr. Pilsbry's material nor that in our collection bears specific locality data. It probably came from southern Luzon. U. S. N. M. No. 346626, has 5.5 whorls and measures: Height 66.0 mm.; greater diameter 110.1 mm.; lesser diameter 88.0 mm. (= *Rhysota maxima gigas* Pilsbry, not *Rhysota sagittifera gigas* Möllendorff.)

RYSSOTA (RYSSOTA) URANUS Pfeiffer.

Shell large, almost lenticular. The first nuclear whorl almost flattened, marked by a few broad, depressed, retractively slanting, axial wrinkles. The rest of the nuclear whorls are marked by more closely spaced, irregularly developed, retractively slanting, axial riblets, and numerous fine spiral lirations. Postnuclear whorls moderately rounded, marked by poorly developed, retractively slanting, riblike wrinkles, which are of irregular strength and spacing and between which fine incremental lines are present. There are also very closely spaced, exceedingly fine, spiral striations present on the upper surface. Periphery of the last whorl strongly angulated. Base marked by rather closely spaced, wrinkle-like riblets. The fine incised spiral lines mentioned for the upper surface are absent on the base. The umbilical area is moderately impressed and usually only half covered by the callus. Aperture very broadly oval, almost angulated at the periphery; peristome not materially thickened; inner lip expanded at the base and reflected over the umbilicus which it more than half covers; parietal wall glazed with a thick callus. Interior of aperture bluish white.

This species appears to occupy the islands off the east coast of Luzon. There are two races on Polillo Island and a giant on the Island of Maculabo of eastern Luzon. The smallest member comes from Dalupiri Island. I am not quite sure whether this is the island off the southwest coast of the Island of Samar, or the island by that name in the Babuyanes group. Judging from the affinity, I am led to believe that it may be the former.

KEY TO THE SUBSPECIES OF *Ryssota* (*Ryssota*) *uranus* Pfeiffer.

Upper surface of shell horn-colored ..... *maculaboensis*
Upper surface of shell not horn-colored.
  Upper surface of shell brown.
    Shell rather inflated ..... *angulata*
    Shell not inflated.
      Greater diameter more than 75 mm. ..... *dryas*
      Greater diameter less than 70 mm.
        Shell pale brown ..... *uranus*
        Shell dark brown ..... *dalupiriensis*

Ryssota (Ryssota) uranus maculaboensis, new subspecies.

This race comes from Maculabo Island. The type, U. S. N. M. No. 311580, has 5.2 whorls and measures: Height 55.5 mm.; greater diameter 111 mm.; lesser diameter 84.8 mm.

Ryssota (Ryssota) uranus angulata Möllendorff.

Möllendorff cites this race as coming from the Karamuan Peninsula, Luzon, and gives the following measurements of two specimens: Height 50.0 and 49.5 mm.; greater diameter 88.0 and 92.0 mm., respectively.

Ryssota (Ryssota) uranus dryas, new subspecies.

This subspecies comes from Polillo Island. The type, U. S. N. M. No. 311520, has 5.1 whorls and measures: Height 39.2 mm.; greater diameter 86.3 mm.; lesser diameter 65.7 mm.

Ryssota (Ryssota) uranus uranus Pfeiffer.

U. S. N. M. No. 315613 contains two specimens from Polillo Island, one of which has 4.8 whorls and measures: Height 31.3 mm.; greater diameter 71.4 mm.; lesser diameter 55.9 mm.

This race probably occupies a distinct range from *Ryssota (Ryssota) uranus dryas,* which also comes from Polillo Island.

Ryssota (Ryssota) uranus dalupiriensis, new subspecies.

This race comes from Dalupiri Island. The type, U. S. N. M. No. 311519, has 4.7 whorls and measures: Height 27.9 mm.; greater diameter 61.3 mm.; lesser diameter 49.1 mm.

Ryssota (Ryssota) sauli, new species.

Shell of medium size, decidedly depressed helicoid. The early whorls may be pale chestnut brown or flesh-colored, depending upon the race in question, and the rest may be pale chestnut brown or greenish horn-colored on the spire. There is always a lighter zone posterior to the periphery or a brown band or brownish band immediately anterior to the periphery, which varies in width in the different races. The rest of the base is greenish or olivaceous horn-colored. Nuclear whorls a little more than 2; the first flattened, marked by rather distantly spaced, retractively slanting, flattened, axial riblets; the rest a little more rounded and marked by numerous, closely spaced, retractively slanting, axial riblets and numerous, spiral lirations. Postnuclear whorls somewhat flattened at the summit, slightly rounded on the rest of the turns, with the periphery conspicuously angulated. They are marked by irregular and irregularly developed, retractively slanting, axial riblets and numerous, spiral threads, which are of varying strength and spacing. These are less conspicuous on the last whorl than on the preceding one, but on the last turn there are also very strong, oblique wrinkles which give to the entire surface a very rough appearance. These wrinkles are a little less pronounced on the preceding

turn. Base moderately rounded with a well-impressed umbilical area, marked by retractively slanting, axial riblets, slender spiral lirations, and numerous, oblique wrinkles which are particularly strongly expressed near the periphery. Aperture large, oblique; the peristome slightly reinforced at the edge; outer lip evenly curved between the summit and the periphery and somewhat protracted, from the periphery basally being slightly retracted; inner lip somewhat sinuous; columella expanded and reflected over the base, almost covering the umbilicus.

Three subspecies of this species are recognized at the present; they come from the Islands of Panay, Guimaras and Burias.

KEY TO THE SUBSPECIES OF *Ryssota (Ryssota) sauli.*

Nuclear whorl flesh-colored.....*igbarasana*
Nuclear whorl not flesh-colored.
  Nuclear whorls pale brown.
    Base horn-colored.....*elerai*
  Base not horn-colored.
    Base olivaceous horn-colored.....*sauli*

Ryssota (Ryssota) sauli igbarasana, new subspecies.

The type, U. S. N. M. No. 311555, of this race, comes from Igbaras, Panay. It has 4.4 whorls and measures: Height 33.3 mm.; greater diameter 59.0 mm.; lesser diameter 45.5 mm.

Ryssota (Ryssota) sauli elerai, new subspecies.

This race comes from the Island of Burias. The type, U. S. N. M. No. 311559, has 4.5 whorls and measures: Height 32.2 mm.; greater diameter 58.2 mm.; lesser diameter 44.6 mm.

Ryssota (Ryssota) sauli sauli, new subspecies.

The typical race comes from the Island of Guimaras. The type, U. S. N. M. No. 311557, has 4.4 whorls and measures: Height 31.1 mm.; greater diameter 56.3 mm.; lesser diameter 43.5 mm.

RYSSOTA (RYSSOTA) DVITIJA O. Semper.

Shell of medium size, helicoid, covered with a rather thick periostracum which may be horn-colored with a brownish tinge or pale chestnut brown, toward the center of the base, becoming a little paler than on the spire. Nuclear whorls 2.3, slightly rounded, the early portion covered by a few broad, low, retractively slanting wrinkles, the rest by ill-defined, irregular, retractively slanting axial riblets which are a little stronger near the summit than on the rest of the shell, and a few irregular and irregularly distributed, incised, spiral lines. Postnuclear whorls moderately rounded, marked by ill-defined, retractively slanting, axial riblets which are more or less interrupted by numerous, coarse, more or less oblique wrinkles which are particularly strong on the last turn. Suture well impressed. Periphery of the last whorl with the merest indication of an angle. Base strongly

inflated, well rounded, slightly impressed at the umbilicus, marked by poorly developed, retractively slanting riblets and numerous, oblique wrinkles, the latter considerably weaker than on the spire. Aperture rather large, oblique, irregular, auriculate; peristome slightly thickened at the edge; the outer lip somewhat protracted between the summit and periphery, strongly curved; basal equivalent almost as strongly curved as that between summit and periphery; inner lip somewhat sigmoid, expanded at the base where it is reflected over the umbilicus which it almost closes as a white callus; both the inner and outer lips are slightly in-bent and somewhat contract the aperture; parietal wall covered with a thin callus.

This species appears to be the high mountain form which seems to have its center of distribution in the Benguet region.

KEY TO THE SUBSPECIES OF *Ryssota* (*Ryssota*) *dvitija*.

Aperture very large.
  Aperture rather high.....*dvitija*
  Aperture not rather high.
    Aperture rather low.....*polioana*
Aperture not very large.
  Aperture rather short.....*benguetana*

Ryssota (*Ryssota*) *dvitija dvitija* Semper.

A topotype, U. S. N. M. No. 110074, from Mount Data, Luzon, has 4.2 whorls and measures: Height 24.5 mm.; greater diameter 42.4 mm.; lesser diameter 39.9 mm.

Ryssota (Ryssota) dvitija polioana, new subspecies.

This race comes from Mount Polio, Mountain Province, Luzon. The type, U. S. N. M. No. 256399, has 4.4 whorls and measures: Height 24.0 mm.; greater diameter 43.8 mm.; lesser diameter 33.5 mm.

Ryssota (Ryssota) divitija benguetana, new subspecies.

This subspecies comes from Heights-in-the-Oaks, Benguet Province, Luzon, where it was collected at an altitude of 7000 feet. The type, U. S. N. M. No. 311561, has 4.1 whorls and measures: Height 21.8 mm.; greater diameter 38.3 mm.; lesser diameter 35.0 mm.

RYSSOTA (RYSSOTA) SAGITTIFERA Pfeiffer.

Shell rounded, ranging in size from rather large to small. The early whorls are almost always darker than the later, on the upper surface, and the basal portion almost always a shade darker than the upper part of the last whorl. There is a subperipheral band of varying width and shades of brown in all the races but *Ryssota* (*Ryssota*) *sagittifera richi*. The upper and lower surfaces are marked with arrow-shaped dashes of brown. These sometimes are very conspicuous, while at others they are merely indicated. The base of the last whorl is conspicuously inflated and very strongly rounded. The nuclear whorls usually consist of a little more than two turns,

the first of which, as a rule, is somewhat flattened and marked by a few distantly spaced, low, broad, retractively slanting, axial riblets, while the rest of the nuclear turns are marked by closely spaced, retractively slanting axial threads, and numerous incised spiral lines. The upper surface of the postnuclear whorls is marked by rather irregularly developed and distributed, retractively curved, riblets (the sculpture scarcely merits the name riblets), and incised spiral lines which vary in width and spacing. Frequently they are so closely spaced that the elements between them appear as elevated lirations, and when that takes place we usually have the axial threads cut up into fine tubercles. Sometimes we have in addition to this, incised spiral lines, also, numerous, closely spaced, microscopic spiral striations. The last whorl, also, usually has oblique wrinkles. These vary materially in strength in the different races and their strength determines the comparative smoothness or roughness of this part of the shell. The periphery of the last whorl is almost rounded and there is never more than a mere indication of an obsolete angulation present. The base is marked by the continuation of the axial riblets and spiral striations which vary in width and strength in the different races, and also numerous, fine, oblique wrinkles which give to the base a scratched-up appearance. All these basal elements vary in strength in the different forms and therefore produce the difference in sculpture characterized for the different races. The umbilical area also is somewhat variable in the depths of its impression, and the umbilicus may be narrowly open or closed with a plug. The aperture is usually large and varies in color within from bluish white to pale brown and to livid. The dark peripheral streak, as well as the arrow-shaped markings, are usually discernible within. The peristome is frequently slightly reinforced with a slender callus, and the outer lip is protracted between the summit and the periphery and retracted between the periphery and base. The inner lip varies from almost straight to somewhat sigmoid. The columella is always expanded and reflected to cover about half of the umbilicus and the parietal wall is covered with a callus which varies in thickness from a mere film to a rather heavy deposit.

This species ranges from northwestern Luzon through central Luzon, but apparently does not extend to the northeastern part of the island. It is closely related to *Ryssota* (*Ryssota*) *antoni*, from which it may be distinguished by its usually smoother sculpture, by the presence of the arrow marks which are practically always absent in *Ryssota* (*Ryssota*) *antoni*, though not always so, and by having the basal portion of the whorls more inflated and rounded. The color of *Ryssota* (*Ryssota*) *antoni* also is, as a rule, much darker than that of *Ryssota* (*Ryssota*) *sagittifera*.

KEY TO THE SUBSPECIES OF *Ryssota* (*Ryssota*) *sagittifera* Pfeiffer.

Greater diameter more than 58 mm.
  Arrow marks on base abundant and strong.....*gigas*
  Arrow marks on base few and obsolete.....*sagittifera*
Greater diameter less than 52 mm.
  Arrow marks strong on the upper surface.
    Greater diameter more than 46 mm.....*eldi*
    Greater diameter less than 43 mm.....*globosa*

Arrow marks not strong on the upper surface.
Arrow marks scattered and usually faintly expressed.
Greater diameter more than 45 mm.
Arrow marks on base numerous.....*bulacana*
Arrow marks on base not numerous.....*isabelana*
Greater diameter less than 45 mm.
Axial riblets rather strong.
Upper surface of shell brown or pale brown.
Aperture very high.....*ecijana*
Aperture not very high.....*solida*
Upper surface of shell not brown or pale brown.
Upper surface of shell horn-colored.....*uniona*
Axial riblets not strong.
Peripheral brown zone very narrow.
Spiral threads of last whorl coarse.....*morongana*
Spiral threads of last whorl not coarse.....*tarlacana*
Peripheral brown zone not very narrow.....*montalbana*
Arrow marks not scattered nor faintly expressed.
Arrow marks apparently absent.....*richi*

Ryssota (*Ryssota*) *sagittifera gigas* Möllendorff.

The type locality for this race is Pamploma, Cagayan Province, Luzon. I have not seen specimens of this, but Möllendorff's figure measures: Height 39.0 mm.; greater diameter 66.0 mm.; lesser diameter 52.5 mm.

Ryssota (*Ryssota*) *sagittifera sagittifera* Pfeiffer.

The typical race comes from Mount Sinait, Luzon. U. S. N. M. No. 116572, a cotype, has 4.7 whorls and measures: Height 35.5 mm.; greater diameter 59.4 mm.; lesser diameter 46.8 mm.

Ryssota (Ryssota) sagittifera eldi, new subspecies.

This race was collected by the U. S. Exploring Expedition. The type, U. S. N. M. No. 7591, does not bear a specific label. It has 4.7 whorls and measures: Height 28.9 mm.; greater diameter 46.8 mm.; lesser diameter 36.6 mm.

Ryssota (Ryssota) sagittifera globosa, new subspecies.

The type locality of this race is Mount Bulagao, Ilocos Sur, Luzon. The type, U. S. N. M. No. 311527, has 4.9 whorls and measures: Height 26.8 mm.; greater diameter 42.0 mm.; lesser diameter 33.4 mm.

Ryssota (Ryssota) sagittifera bulacana, new subspecies.

This race comes from the region of Sibul Springs, Luzon. The type, U. S. N. M. No. 311525, has 4.9 whorls and measures: Height 29.2 mm.; greater diameter 51.0 mm.; lesser diameter 38.8 mm.

Ryssota (Ryssota) sagittifera isabelana, new subspecies.

This race comes from Cawayan, Nueva Vizcaya, Luzon. The type, U. S. N. M. No. 311563, has 4.8 whorls and measures: Height 32.8 mm.; greater diameter 47.8 mm.; lesser diameter 38.2 mm.

Ryssota (Ryssota) sagittifera ecijana, new subspecies.

This race comes from Bongabong, Nueva Ecija, Luzon. The type, U. S. N. M. No. 311564, has 4.8 whorls and measures: Height 28.2 mm.; greater diameter 43.3 mm.; lesser diameter 33.0 mm.

Ryssota (Ryssota) sagittifera solida Möllendorff.

This race was described from Dingalan, Tayabas, Luzon. A topotype, U. S. N. M. No. 184829, has 4.7 whorls and measures: Height 26.7 mm.; greater diameter 42.2 mm.; lesser diameter 33.4 mm.

Ryssota (Ryssota) sagittifera uniona, new subspecies.

This race comes from La Union Province, Luzon. The type, U. S. N. M. No. 311565, has 4.5 whorls and measures: Height 29.3 mm.; greater diameter 39.8 mm.; lesser diameter 31.2 mm.

Ryssota (Ryssota) sagittifera morongana, new subspecies.

This subspecies comes from Morong, Rizal Province, Luzon. The type, U. S. N. M. No. 311566, has 4.8 whorls and measures: Height 26.0 mm.; greater diameter 41.0 mm.; lesser diameter 32.3 mm.

Ryssota (Ryssota) sagittifera tarlacana, new subspecies.

This race comes from the region of Tarlac, Luzon. The type, U. S. N. M. No. 195660, has 4.7 whorls and measures: Height 24.4 mm.; greater diameter 42.4 mm.; lesser diameter 32.8 mm.

Ryssota (Ryssota) sagittifera montalbana, new subspecies.

This race comes from Montalban, Luzon. The type, U. S. N. M. No. 256306, has 4.8 whorls and measures: Height 26.7 mm.; greater diameter 44.4 mm.; lesser diameter 34.6 mm.

Ryssota (Ryssota) sagittifera richi, new subspecies.

This subspecies was collected by the U. S. Exploring Expedition, probably on Mount Banahao or Mount Maquiling. The type, U. S. N. M. No. 311530, measures: Height 27.0 mm.; greater diameter 47.9 mm.; lesser diameter 35.7 mm.

RYSSOTA (RYSSOTA) ANTONI Semper.

Shell large to medium size, usually of dark coloration; chestnut brown predominates on the upper surface, though frequently the upper surface is horn-colored with a brownish tint. The under surface of the last whorl is usually darker than the upper surface. The shell, however, may be of

horn color throughout. There is also a rather broad, subperipheral brown zone which gradually fades into the basal coloration anteriorly. As a rule, there are no arrow markings, but in *Ryssota* (*Ryssota*) *antoni belophora* arrow marks are present on both the upper and lower surfaces. The nuclear whorls consist of a little more than two turns, the first of which is usually slightly flattened and marked by a few low, broad, distantly spaced, retractively slanting, axial ribs; the rest of the nuclear turns are marked by numerous, slender, retractively slanting, closely spaced, axial riblets and many incised spiral lines. The rest of the whorls are marked by irregular and irregularly spaced, retractively slanting, axial riblets, and incised spiral lines which vary materially in width of spacing and strength in the various subspecies, and not infrequently so cut the axial riblets as to render the upper surface almost granulose. In addition to this, the last whorl, or the last two whorls, may be marked by oblique wrinkles which again vary materially in strength in the different subspecies and add to the roughness of the upper surface of the shell. Periphery of the last whorl scarcely angulated. Base well rounded, but hardly inflated, marked by the continuations of the axial riblets, incised spiral lines and oblique wrinkles, the latter varying from somewhat rough to very fine may give to the surface, particularly the posterior half of the base, a roughish appearance or merely a finely cross-hatched aspect. The umbilical area is usually but shallowly impressed, and the umbilicus, as a rule, is closed with a callus in the adult shell, though at times it is open. The peritreme of the aperture is slightly reinforced with a callus; outer lip protracted between the summit and the periphery and slightly retracted in the basal equivalent of this; the basal lip may be evenly curved or slightly sinuous; the columella is always expanded and reflected over the umbilicus. The interior of the aperture varies from bluish white to livid, the peripheral dark band usually showing within.

This species occupies the islands to the north of Luzon and extends to the islands lying off eastern Luzon, as well as the north and east coastal strip of Luzon. The member penetrating furtherest into the island is *Ryssota* (*Ryssota*) *antoni sibulana*, which comes from Sibul Springs.

KEY TO THE SUBSPECIES OF *Ryssota* (*Ryssota*) *antoni*.

Greater diameter more than 60 mm.
- Arrow marks present ..... *belophora*
- Arrow marks absent ..... *antoni*

Greater diameter less than 60 mm.
- Upper surface of last whorl dark.
  - Base dark olive green ..... *domingoana*
  - Base not dark olive green.
    - Base horn-colored with an olivaceous flush.
      - Greater diameter more than 55 mm.
        - Upper surface of last whorl rough ..... *sibulana*
        - Upper surface of last whorl not rough ..... *palauiensis*
      - Greater diameter less than 50 mm. ..... *canonizadoi*

Upper surface of last whorl light.
Subperipheral brown band broad.
Greater diameter more than 50 mm. ..... *sabtanensis*
Greater diameter less than 50 mm. ..... *camiguinensis*
Subperipheral brown band not broad ..... *babuyanensis*

Ryssota (*Ryssota*) *antoni belophora* Möllendorff.

This race comes from Tauit, Luzon. A specimen from the type locality, U. S. N. M. No. 311541, has 4.8 whorls and measures: Height 34.0 mm.; greater diameter 60.0 mm.; lesser diameter 47.6.

Ryssota (*Ryssota*) *antoni antoni* Semper.

This race Semper tells us comes from northeastern Luzon. He gives the measurements for it as: Height 30.0 mm.; greater diameter 62.0 mm., and lesser diameter 48.0 mm. I have not seen specimens of it.

Ryssota (Ryssota) antoni domingoana, new subspecies.

This race comes from Batan Islands of the Batanes group. The type, U. S. N. M. No. 218756, has 4.5 whorls and measures: Height 26.4 mm.; greater diameter 50.0 mm.; lesser diameter 38.6 mm.

Ryssota (Ryssota) antoni sibulana, new subspecies.

This subspecies comes from the region of Sibul, Luzon. The type, U. S. N. M. No. 184621, has 4.6 whorls and measures: Height 31.7 mm.; greater diameter 57.6 mm.; lesser diameter 44.1 mm.

Ryssota (Ryssota) antoni palauiensis, new subspecies.

This race comes from the Island of Palaui. The type, U. S. N. M. No. 311539, has 4.5 whorls and measures: Height 31.4 mm.; greater diameter 57.2 mm.; lesser diameter 45.8 mm.

Ryssota (Ryssota) antoni canonizadoi, new subspecies.

This race comes from Polillo Island. The type, U. S. N. M. No. 311540, has 4.2 whorls and measures: Height 25.0 mm.; greater diameter 44.6 mm.; lesser diameter 34.7 mm.

Ryssota (Ryssota) antoni sabtanensis, new subspecies.

This race comes from the Island of Sabtan of the Batanes group. The type, U. S. N. M. No. 256357, has 4.3 whorls and measures: Height 30.2 mm.; greater diameter 53.0 mm.; lesser diameter 41.5 mm.

Ryssota (Ryssota) antoni camiguinensis, new subspecies.

This race comes from Camiguin Island of the Babuyanes group. The type, U. S. N. M. No. 256358, has 4.2 whorls and measures: Height 27.0 mm.; greater diameter 46.3 mm.; lesser diameter 36.6 mm.

Ryssota (Ryssota) antoni babuyanensis, new subspecies.

This subspecies comes from Babuyan, Claro Island. The type, U. S. N. M. No. 311538, has 4.3 whorls and measures: Height 27.8 mm.; greater diameter 47.8 mm.; lesser diameter 37.5 mm.

Ryssota (Ryssota) webbi, new species.

Shell small, helicoid. All but the last whorl and a third pale chestnut brown, the rest horn-colored, with a few scattered arrow marks. Base dark horn-colored with a few scattered arrow marks. The subperipheral dark band usually present in species of *Ryssota* is absent in this one. Interior of aperture pale livid. Peristome yellowish white. Nuclear whorls 2.4; the first flattened, marked by rather many, retractively slanting, low, axial riblets; the rest well rounded, marked by numerous, closely spaced, wavy, retractively slanting, axial threads and many still finer spiral threads. Postnuclear whorls slightly rounded, marked by irregularly developed and spaced, retractively curved, axial riblets, and poorly impressed spiral striations. The last whorl has, in addition to this, a few oblique wrinkles which give it a somewhat malleated appearance. On the last whorl the axial sculpture is rather rougher than on the preceding turn. The periphery of the last whorl is obtusely angulated. Base well rounded and marked by the feeble continuations of the axial riblets and a few, irregular, oblique wrinkles. Aperture very oblique; peristome thickened at the edge; outer lip protracted between the summit and the periphery, quite strongly inbent, from the periphery basally it is retracted; inner lip slightly sinuous; columella short, broadly expanded and reflected over the umbilicus, which it almost covers; parietal wall covered by a rather heavy callus.

The type, U. S. N. M. No. 311568, was collected by Quadras at Ilocos Sur, Luzon. It measures: Height 25.9 mm.; greater diameter 40.7 mm.; lesser diameter 32.0 mm.

RYSSOTA (RYSSOTA) PORPHYRIA Pfeiffer.

Shell small, depressed-helicoid. Nuclear whorls chestnut brown with pale varicial streaks, while the remaining turns are yellowish buff, marbled, the malleations usually appearing darker. There are also varicial streaks of pale brown at scattered intervals. A narrow light streak marks the periphery and extends slightly anteriorly and posteriorly to this. On the base there is a dark zone anterior to the narrow white line at the periphery, which is covered by a suffusion of yellow. The rest of the base is yellowish buff, a little brighter yellow than the upper surface. Peristome white; interior of aperture bluish white basally with a light peripheral streak, a broad zone of brown anterior to the peripheral streak, and the region between the summit and the light zone purplish brown. Nuclear whorls 2.3; the first marked by a few, low, retractively slanting, axial riblets; the rest by closely crowded, retractively slanting, axial threads and numerous, spiral lines.

The postnuclear whorls are moderately well rounded and marked by regularly developed and distributed, retractively slanting, axial riblets and numerous, very closely spaced, slender spiral lirations, the combination of

these and the finer axial sculpture produce an exceedingly fine granular surface. In addition to this, there are low, oblique wrinkles scattered at irregular intervals. These give to the surface a malleated appearance. Periphery of the last whorl rounded, marked by the continuations of the axial ribs and moderately strongly incised spiral lines, also numerous, oblique wrinkles, which are fully as strong as those on the spire and render the posterior half of the base also malleated; the inner half is smoother. The umbilical area is moderately impressed. Aperture oblique, large; peristome slightly reinforced with a very thin callus; outer lip strongly protracted between the summit and the periphery and somewhat retracted from the periphery basally; inner lip slightly sinuous; columella expanded and reflected over the umbilicus, which it almost completely covers; parietal wall glazed with a thin callus.

The specimen described, U. S. N. M. No. 100151, comes from Pasqual, Burias. It has 5 whorls and measures: Height 27.2 mm.; greater diameter 46.4 mm.; lesser diameter 37.0 mm.

RYSSOTA (RYSSOTA) MÜLLERI Pfeiffer.

Shell depressed-helicoid, varying in color from pale chestnut brown on the early whorls to dark brown. The rest of the whorls may be horn-colored with an olivaceous tinge on the upper surface to chestnut brown, with a lighter zone of varying width immediately posterior to the periphery. Anterior to the periphery there is a broad zone of chestnut brown, while the base is usually horn-colored, though sometimes materially darker. Interior of aperture bluish white with a purplish tinge, sometimes a little darker. Nuclear whorls about 2.5; the first flattened, marked by a few, distantly spaced, retractively slanting, flattened, wrinkle-like ribs; the rest by numerous, wavy, closely spaced, retractively slanting, axial threads and numerous, closely spaced spiral lirations. Postnuclear whorls varying from slightly to moderately rounded, marked by rather irregularly developed and distributed, retractively slanting, axial riblets, and on all but the last by numerous, closely spaced, spiral threads. On the last turn these become rather obsolete on the latter portion. In addition to this the last whorl is marked by a few, oblique wrinkles which vary in strength in the different races. Periphery strongly angulated. Base depressed, moderately well rounded, marked by the continuations of the axial riblets and rather irregularly spaced, spiral lines, and numerous fine oblique wrinkles. Aperture large, oblique; the outer lip decidedly protracted between the summit and the periphery and retracted from the periphery basally; basal lip moderately curved; columella expanded and reflected over the umbilicus, which it more than half covers; parietal wall covered by a moderately thick callus.

This species seems to be confined to the Island of Mindoro and it seems quite probable that Valenciennes' *Helix stoleophora* is this species. The figure shows a decorticated specimen which strongly suggests a badly worn member of this species and the description by Möllendorff is sufficiently general that it might fit it, but until an actual examination of the type can

be made, I prefer to hold to the name *Ryssota* (*Ryssota*) *mülleri*, under which name this species is best known at the present time.

Ryssota (*Ryssota*) *mülleri* appears to break up into a number of races in Mindoro. One of the subspecies described by Möllendorff, namely, *Ryssota* (*Ryssota*) *spiriplana*, I consider a mere freak form, which may occur in any of the races, representing a little different mode of coiling, possibly induced by an injury to the shell at some period. I find such a form in *Ryssota* (*Ryssota*) *mülleri fuscescens*. I shall, therefore, cite the name under that subspecies.

KEY TO THE SUBSPECIES OF *Ryssota* (*Ryssota*) *mülleri*.

Shell very rugose on upper surface of last whorl.
  Periphery strongly angulated.....*planata*
  Periphery not strongly angulated.....*rugata*
Shell not rugose.
  Shell very thin.
    Periphery angulated.....*calawagana*
    Periphery not angulated.....*calaviteana*
  Shell not very thin.
    Shell small.....*mulleri*
    Shell large.....*fuscescens*

Ryssota (*Ryssota*) *mülleri planata* Möllendorff.

This race I have seen from Pola, Mindora. A specimen, U. S. N. M. No. 382845, has 4.3 whorls and measures: Height 25.2 mm.; greater diameter 45.5 mm.; lesser diameter 37.4 mm.

Ryssota (*Ryssota*) *mülleri rugata* Möllendorff.

Specimens of this labeled simply "Mindoro" were received from the Möllendorff collection. One of these, U. S. N. M. No. 256292, has 4.5 whorls and measures: Height 29.7 mm.; greater diameter 52.0 mm.; lesser diameter 40.0 mm.

Ryssota (Ryssota) mülleri calawagana, new subspecies.

This subspecies comes from the region of Calawagan, Municipality of Palauan, northwestern Mindoro. The type, U. S. N. M. No. 382948, has 4.4 whorls and measures: Height 24.8 mm.; greater diameter 43.7 mm.; lesser diameter 33.6 mm.

Ryssota (Ryssota) mülleri calaviteana, new subspecies.

This race comes from Mount Calavite, Palauan, Mindoro. The type, U. S. N. M. No. 382951, has 4.1 whorls and measures: Height 25.2 mm.; greater diameter 42.8 mm.; lesser diameter 34.2 mm.

Ryssota (*Ryssota*) *mülleri mülleri* Pfeiffer.

U. S. N. M. No. 184633, has 4.2 whorls and measures: Height 23.7 mm.; greater diameter 41.6 mm.; lesser diameter 33.0 mm. It was collected by Möllendorff and bears the label "Mindoro" without specific designation.

Ryssota (*Ryssota*) *mülleri fuscescens* Möllendorff.

This race appears to occupy the slopes of Mount Halcon abundantly. A specimen, U. S. N. M. No. 256301, has 4.4 whorls and measures: Height 26.0 mm.; greater diameter 55.0 mm.; lesser diameter 43.3 mm.

Vol. 51, pp. 121–122 May 19, 1938

PROCEEDINGS

OF THE

BIOLOGICAL SOCIETY OF WASHINGTON

GENERAL NOTES.

JAW OF FOSSIL WHALEBONE WHALE : SIPHONOCETUS PRISCUS.

The Department of Geology and Geography at The Catholic University of America announces the finding and restoration of the left mandibular ramus of the Miocene whale, SIPHONOCETUS PRISCUS. The remain was removed from the bluffs of Chesapeake Bay a short distance above Scientist Cliffs, southern Maryland, during September, 1937, by Dr. Arthur R. Barwick and John H. Dante, and restored under the supervision of the former. Although somewhat fractured, the jaw is remarkably complete. The end toward the symphysis is in perfect condition and the articular extremity in a good state of preservation. The Department is indebted to Dr. Remington Kellogg of the United States National Museum for its identification as SIPHONOCETUS PRISCUS.

The jaw is now permanently mounted and placed in the Museum of Geology at The Catholic University of America. It is entirely edentulous and arcuate in shape. It has an actual length of 118 centimeters and a chord length of 115 centimeters. The greatest departure of the chord from the bony surface is 8 centimeters. The coronoid process is 15 centimeters from the articular end or about 1/8 of the entire length of the jaw. The average width (dorso-ventral) is 7 centimeters and the thickness 4 centimeters.

The age of the strata from which the remain was removed is Calvert Miocene and comprises that portion referred to by the Maryland Geological Survey as Zone 12. The jaw was found about four feet above low-tide level and extended into the bank so that, at the time of discovery, only the extreme end of the articular region was exposed. When the matrix was removed it was found that the main shaft—although badly fractured—was completely in alignment as though it had been buried quickly. The coronoid and articular portions, however, were badly out of line as though this portion had protruded from the sea-bottom for a more or less protracted period after the main shaft had been covered. If this was the case, the pieces that had been broken loose could not have been exposed to very strong currents or they would have been washed away. In addition to this the matrix is a fine gray sandy clay which must have been deposited a considerable distance off-shore. It is thought that these facts might indi-

cate that Zone 12, exposed at the mouth of Parker Creek, was formed on the outer limits of land-wash resulting from the major rivers of its time, and that the rate of deposition was subject to seasonal changes as such an hypothesis would suppose. It is a noteworthy fact that the more strictly sandy beds of the Choptank that succeed the upper (Zones 12–15) Calvert contain only an occasional disarticulated vertebra of a whale, whereas it is not uncommon to find well preserved and fairly complete dolphin remains in Zones 12 and 13.

Arthur R. Barwick,
Department of Geology,
The Catholic University of America.

Vol. 51, pp. 123–126 May 19, 1938

PROCEEDINGS
OF THE
BIOLOGICAL SOCIETY OF WASHINGTON

NOTES ON CRYPTURELLUS CINEREUS (GMELIN).

BY W. E. CLYDE TODD.

The Ashy Tinamou of Guiana was first made known by Buffon[1] under the name "Tinamou cendré," which was the basis of Gmelin's designation *Tetrao cinereus*.[2] Although it is thus one of the oldest-known species of the family, and although it has figured extensively in ornithological literature ever since, it can scarcely be called a well-known species, not many specimens having found their way into collections. A study of the small series (twelve specimens) in the collection of the Carnegie Museum, supplemented by additional material courteously placed at my disposal by the authorities of the American Museum of Natural History and the Academy of Natural Sciences of Philadelphia, indicates the need for further adjustments in the systematics of this species and is the basis for the present paper.

Buffon's brief description, "It is in reality of a uniform ashy brown on all the body, and this color varies only on the head and upper part of the neck, where it takes a russet tinge" (translation), is perfectly pertinent. His specimen came from Cayenne, French Guiana. In course of time the species was traced to Dutch and British Guiana, south to the Amazon Valley, west to eastern Colombia and Peru, and more recently to Bolivia. Authors generally (down to and including Peters,[3] 1931) have considered the species indivisible, although some of them allude to geographical variation. Salvadori[4] indeed refers to a "dark variety" and a "paler race," but carefully avoids committing himself. He lists but two (mounted) specimens from "Cayenne"; the others came from British Guiana and the upper Amazon. The late Count von Berlepsch[5] could cite no recent

[1] Histoire Naturelle Oiseaux, IV, 1778, 510.
[2] Systema Naturæ, I, ii, 1788, 768.
[3] Check-List of Birds of the World, I, 1931, 16.
[4] Catalogue Birds British Museum, XXVII, 1895, 518.
[5] Novitates Zoologicæ, XV, 1908, 298.

Cayenne records for this species. With such a dearth of topotypical material it is little wonder that later writers were under a misapprehension. The bird of British Guiana was described as a distinct species (*Crypturus macconnelli*) by Brabourne and Chubb,[6] and later was figured by Chubb[7] in connection with the form supposed by him to be *C. cinereus*. This allocation has been accepted, but I believe it to be erroneous.

Three specimens of our series come from French Guiana (Cayenne and Pied Saut, Oyapock River), and one from extreme northeastern Brazil (Upper Araucaua, just across the frontier). These agree among themselves, and differ from the rest of the series, in uniformly dark coloration. The upperparts and wings are deep bone brown; the underparts somewhat paler (olive brown). In one specimen the pileum and hindneck are dull auburn (inclining toward chestnut brown), in strong contrast with the back; in the others these parts are merely washed with chestnut brown, and not so strongly contrasted. A young bird closely resembles the adults. I consider that these specimens represent the true *Crypturellus cinereus*, since they come from the type-locality and fit the original description. However, Dr. Frank M. Chapman, who handled them some years ago, identified them as *C. macconnelli*. They certainly fit Chubb's plate of that form better than the one of (supposed) *C. cinereus*. In order to avoid any chance of mistake, however, I sent two of these birds to Mr. N. B. Kinnear at the British Museum, with a request to compare them with the type-series of *C. macconnelli*. He reports that "the two specimens can be taken the same as *C. macconnelli*. They are just a shade lighter, but that may be accounted for by the difference in the ages of the skins."

Dr. Chapman[8] accepts "Chubb's ruling calling the browner bird *cinereus*, the blacker one *macconnelli*," mainly on the ground that since both forms occur in Cayenne it would be "impossible to decide definitely on which Gmelin based the name *cinereus*." The only evidence (known to me) for the occurrence of the lighter-colored bird in Cayenne, however, is the two mounted specimens in the British Museum, without particulars of capture, and only *supposed* to have come from that locality. The chances that they came from some other part of South America are greatly increased by the circumstance that the only *authentic* specimens thus far known from French Guiana all belong to the dark-colored form. Moreover, there seems to be a definite difference in the ranges of the two forms. The dark-colored bird, as Chubb remarks, appears to be restricted to the lowlands, while the light-colored bird comes from the interior. If this is true the occurrence of the latter at Cayenne would be improbable. Because a certainty is better than an uncertainty, and because no case has been made out, in my judgment, for the other side, a new and different treatment of these forms from the taxonomic standpoint becomes necessary.

I am fully convinced that in describing *macconnelli* Chubb merely renamed *cinereus*, mistaking for the latter the lighter-colored rufescent form which ranges from the interior of British Guiana to the Amazon Valley.

[6] Annals and Magazine Natural History, (8), XI, 1914, 320.

[7] Birds British Guiana, I, 1916, pl. 1, fig. 1.

[8] Bulletin American Museum of Natural History, LV, 1926, 148.

Attention had already been called to the characters of this form by von Pelzeln[9] and by Schlegel.[10] The latter author says that specimens in the Vienna Museum bear the name *assimilis*, but since this name is merely a misidentification of *Nothura assimilis* Gray it is unavailable for the race in question. The *Crypturus megapodius* of Bonaparte[11] is not certainly identifiable either, but probably pertains to true *cinereus*, as Salvadori claims. The lighter-colored race may then be called

Crypturellus cinereus rufescens, subsp. nov.

Type.—No. 76,934, Collection Carnegie Museum, adult female; Miri-tituba, Rio Tapajóz, Brazil, February 20, 1920; Samuel M. Klages.

Subspecific characters.—Similar to *Crypturellus cinereus cinereus* of French Guiana, etc., but general coloration paler and more rufescent, the upperparts and wings bister (instead of bone brown) and the underparts correspondingly paler.

Range.—Interior of British Guiana south to the Amazon Valley in Brazil and west to the Rio Purús.

Remarks.—This is the *Crypturus cinereus* of Chubb (Birds British Guiana, I, 1916, 9, pl. 1, fig. 2), but not the *Tetrao cinereus* of Gmelin, which latter, as just shown, Chubb redescribed as *macconnelli*. Chubb's plate is somewhat overdrawn; the differences between the two forms, while perfectly obvious on comparison, are not so conspicuous as there indicated. Five specimens from the interior of British Guiana and the vicinity of Mount Duida, Venezuela (Collection American Museum of Natural History), resemble our four specimens from the Rio Tapajóz, but all have the under tail-coverts broadly tipped with rusty buff, and the Duida skins show dull buffy tipping to the feathers of the flanks, tibiæ, and abdomen generally. In all these specimens there is little contrast in color between the head above and the upperparts generally. Two adults from the Rio Purús (Hyutanahan and Arimã) are somewhat darker above, and seem to form the transition between typical *rufescens* and the recently described race *cinerascens* from Bolivia.[12] Whether Peruvian examples belong here also I do not know.

After examining the type-specimen, I am convinced that *C. cinereus cinerascens* is not nearly so distinct as the describer maintains. Its colors could better be described thus: occiput and nape Mars brown; upperparts warm sepia, the secondaries (near) fuscous; underparts uniformly olive brown. The grayish front and superciliaries, mentioned in the description, are of no value as diagnostic characters, since they occur in several of our Brazilian specimens. The type agrees well with our specimen from Upper Araucaua, Brazil, allowing for the immaturity of the latter. This form is far closer in color to the typical French Guiana race than it is to the geographically nearer Brazilian one. A character not mentioned in the

[9] Ornithologie Brasiliens, iii, 1870, 292.

[10] Museum Pays-Bas, VIII, Tinami, 1880, 20.

[11] Comptes Rendus de l'Académie des Sciences, XLII, 1856, 954.

[12] Carriker, Proceedings Academy Natural Sciences of Philadelphia, LXXXVII, 1935, 315.

original description is the decidedly paler, more grayish, outer webs of the primaries, as compared with the other races. But a larger series is needed to establish the constancy of this character.

A single specimen from Benevides (near Pará), Brazil, may represent still another race of this species. It is obviously paler than French Guiana birds—enough to be subspecifically separable if this feature holds good. Dr. C. E. Hellmayr, however, says that "specimens from Pará agree perfectly with a series from British Guiana."[13] This specimen, however, is certainly not like any British Guiana birds I have seen, rather resembling French Guiana birds, but paler throughout. More material will be needed to settle its status.

Crypturus "macconnelli" fumosus Chapman[14] of eastern Ecuador I have not examined, but judging from the description alone it seems to be a valid race of *cinereus*. *Crypturus berlepschi* Rothschild[15] of western Ecuador and Colombia, which Mr. Peters considers conspecific with "*macconnelli*" (i. e., *cinereus*), however, I should rank as a distinct species. Its darker coloration, pure black pileum, lack of white shaft-stripes on the throat, and differently colored bill seem to be good specific characters when compared with *cinereus*.

According to my views the forms discussed in the present paper should stand as follows:

Crypturellus cinereus cinereus (Gmelin). The Guianas (lowlands) and adjacent section of northeastern Brazil. Synonyms: *Crypturus megapodius* Bonaparte (1856); *Crypturus macconnelli* Brabourne and Chubb (1914).

? *Crypturellus cinereus* subsp. Pará region of Brazil.

Crypturellus cinereus rufescens Todd. British Guiana (interior) south to the Amazon Valley and west to the Rio Purús (at least).

Crypturellus cinereus fumosus (Chapman). Eastern (Colombia ?), Ecuador and Peru, in the Amazonian drainage.

Crypturellus cinereus cinerascens Carriker. Department of Beni, northeastern Bolivia.

Crypturellus berlepschi (Rothschild). Western Colombia and western Ecuador (Colombian-Pacific Fauna).

---

13 Novitates Zoologicæ, XIII, 1906, 385.

14 American Museum Novitates, No. 332, 1928, 1.

15 Bulletin British Ornithologists' Club, VII, 1897, 5.

Vol. 51, pp. 127–130 May 19, 1938

PROCEEDINGS

OF THE

BIOLOGICAL SOCIETY OF WASHINGTON

A NEW BURROWING FROG AND A NEW LIZARD FROM HAINAN ISLAND.

BY J. LINSLEY GRESSITT,

Museum of Vertebrate Zoölogy, University of California, Berkeley.

Herein are described two new subspecies of reptiles and amphibians in the Museum of Vertebrate Zoölogy of the University of California, at Berkeley, collected by the writer on a trip[1] to Hainan Island, south of China, during the summer of 1935. The first is a subspecies of *Kaloula pulchra*, a widely distributed oriental brevicipitid or burrowing frog of the family Microhylidae, from the eastern lowlands of Hainan; the second is a subspecies of a Formosan lacertid, *Platyplacopus kuehnei*, taken in the mountains of the interior of the island. The burrowing frog has been once before recorded from Hainan, but was not considered distinct from the typical mainland form, with which I have compared it.

I am indebted to Mr. Clifford H. Pope, Dr. Joseph Grinnell and Dr. Jean M. Linsdale in connection with the present study.

Genus KALOULA Gray, 1831.

Kaloula pulchra hainana, new subspecies.

Kaloula pulchra pulchra, Parker, 1934, Monogr. Microhylidae : 84 (part: Hainan), (not of Gray, 1831, Zoöl. Misc.: 38).

Type.—Adult female; No. 23189, Mus. Vert. Zoöl.; from Kachek, alt. 25 meters, eastcentral Hainan Island, South China Sea (lat. 18° 50′ N., long. 110° 30′ E.), August 7, 1935, J. L. Gressitt.

Paratype.—Adult male; No. 23188, Mus. Vert. Zoöl.; same data as type.

Diagnosis.—A large burrowing frog with heavy body, differing from *Kaloula pulchra pulchra* Gray in having the skin densely tuberculate over

[1]Gressitt, J. L.: Notes on collecting in Hainan Island with data on localities, Lingnan Science Journal, **15**: 465–470, July, 1936; New reptiles from Formosa and Hainan, Proc. Biol. Soc. Wash., **49**: 117–122, Aug., 1936.

entire ventral surface as well as on sides of body and around vent, the discs of fingers no wider, and those of the toes narrower, than the respective penultimate articulations.

Description of type.—Snout short, blunt, subemarginate apically, shorter than diameter of eye; canthus rostralis rounded; internasal distance three-fourths as great as interorbital distance; upper eye-lid one-half as wide as interorbital distance; a very weak, arcuate fold across occiput. Fingers moderately flattened, broader towards apices, tips truncate; discs hardly as wide as bases of apical phalanges, second finger nearly as long as fourth. Toes flattened, webbed basally and margined at sides, gradually tapering to apices, all but third and fourth toes shorter than first finger, fourth toe barely longer than third finger; subarticular tubercles large, but very feebly swollen; metatarsal tubercles large, subapproximate, inner one very prominent, spade-like; second toe extending nearly as far as fifth; tips of toes not swollen, distinctly narrower than penultimate phalanges. Tibio-tarsal articulation not reaching shoulder when hind leg stretched along side of body.

Skin moderately smooth on interorbital region and middle of back, densely and distinctly tuberculate over entire ventral surface, sides of body, thighs and region around vent; feebly tuberculate on sides of back, arms and feet.

Dorsal surface dark purplish brown, anterior portion of head, bounded by a line between middle of upper eye-lids, and a slightly sinuous dorso-lateral stripe from above eye to groin, of a lighter, pinkish or yellowish brown, narrowly bordered with pale; arms and legs dark brown, finely dotted with pale; tips of fingers and toes, and metatarsal tubercles dirty yellow; chin mottled brownish; lower sides of neck, throat and ventral surface of body dirty pale yellow, finely speckled with darker.

Notes on paratype.—The male differs from the female in having the throat and ventral surface more strongly tuberculate, the chin and throat black, dotted with white, the light dorso-lateral stripe finely edged with yellow and the back with some irregular blotches.

Measurements.—(Type and paratype, respectively): Length, from snout to vent, 75, 69 mm.; length of head, from snout to a line between posterior corners of eyes, 11, 10.5; distance between nostrils, 6, 5.2; distance from middle of nostril to eye, 4, 3.5; length of eye, 8, 7; width of head between hind corners of eyes, 21, 20; length of fore limb, 47, 44; length of hand, 24, 22; length of hind limb, 65, 64; tibia, 25, 24; foot, 29, 26.

Comparisons.—Differs from *Kaloula pulchra pulchra* Gray in having the snout shorter, the hind legs shorter, the second toe longer, the fingers with the discs much less swollen, and narrower, instead of broader, than the bases of the apical phalanges, the toes margined with a fringe of webbing and having much less distinct apical discs and subarticular tubercles, and the skin much more tuberculate on ventral surface, sides and thighs. The dorso-lateral pale stripe is narrow and distinctly margined.

Notes.—The stomachs contained remains of termites.

Genus PLATYPLACOPUS Boulenger, 1917.

Platyplacopus kuehnei carinatus, new subspecies.

Type.—Adult male; No. 23519, Mus. Vert. Zoöl.; Ta Han, alt. 775 meters, central part of Hainan Island, S. China, June 23, 1935, J. L. Gressitt.

Diagnosis.—Dorsals large, in six longitudinal rows, the inner four discontinuous at the middle; ventrals in six rows, all carinate and mucronate; snout subacute; prefrontals in contact for most of their length; loreals two, subequal in size; four pairs of postmentals; four inguinal pores on each side; dorsal surface brown, becoming slightly greenish laterally, lateral stripe light brown on head and neck, mottled black and golden on body, lower surfaces white with mother of pearl tints; feet yellow beneath.

Description of type.—Rostral not touching internasal (internasal divided into two unequal scales); prefrontals large, in contact for most of their length; frontal gradually narrowed posteriorly, equally angulated anteriorly and posteriorly; anterior and posterior supraocular separated from parietal by a small transverse plate; frontoparietals large; interparietal parallel-sided anteriorly, acute behind, not touching the triangular occipital; parietals smooth, nearly as broad as long. Postnasal absent; nasal small; anterior loreal nearly as large as posterior loreal; scales bordering lower eye-lid large, only 8 in number; temporals minute, keeled, no elongate ones bordering parietals; supralabials 7–6, the subocular produced anteriorly above the preceding. Mental equal in length to first postmental; four pairs separated by small throat scales, second pair only slightly separated. Dorsals in six longitudinal rows, but all except outermost discontinuous just behind middle of body, innermost pair approximate in anterior half and more distant posteriorly; sides covered with small granular scales, in about 18 longitudinal rows behind fore limb and 9 in front of hind limb, uppermost row and some of lower ones carinate, but marginal rows hardly enlarged; ventrals in six regular rows, all carinate and all more or less mucronate, particularly posteriorly, outer row most strongly carinate; femoral pores 4–4; preanal single, rounded behind, a small scale at each side of it. Hind limb stretched forward reaches front of humerus.

Color brown above, slightly tinged with green on snout, occiput, sides of nape and outer dorsal scale-rows; lateral stripe chestnut brown on head, margined below with black from snout to middle of neck, behind which it is composed of intermixed groups of black and golden or greenish granules; lower portions of sides of body pale golden to greenish; lower portions of sides of head and neck, and ventral surfaces of body white, tinged with nacreous green or blue-green, particularly on lower part of loreal region, hind angle of mouth, tympanic membrane and belly; legs brown above, finely dotted with black, and white below, with undersides of hands and feet and inguinal pores yellow; tail reddish brown, paler beneath.

Measurements.—Snout to vent, 53 mm.; vent to tip of tail, 142; snout to tympanum, 13.2; width of head, 7; fore limb, 21.5; hind limb, 29; base of fifth, to tip of fourth, toe, 13.5.

Comparisons.—Differs from *P. kuehnei kuehnei* (Van Denburgh) (1909,

Proc. Calif. Acad. Sci., (4) 3: 50; l. c., 1912: 252) in having the snout more acute, the dorsal plates smoother, the prefrontals larger, the suture between them over twice as long, the parietals shorter, the anterior loreal larger, the postmentals narrower, the last three pairs of which, instead of the last one and one-half, separated. In *P. k. carinatus* the dorsal scale rows are not continuous at middle, an anterior vertebral row is lacking, the lateral granular scales are in fewer rows than in *P. k. kuehnei,* the marginal rows are of much smaller scales, the ventrals are all carinate and angulated apically, instead of having the inner four rows smooth, and rounded behind, the hind legs are longer, the color is more brownish and less olive, and many of the scales have an iridescent lustre; the lateral stripe is more conspicuous, browner on head, and black and golden, instead of dull olive, on body, the undersurfaces of the body have a nacreous lustre and the undersides of hands and feet are yellowish, instead of pink, in *carinatus.* The division of the internasal is probably an abnormal condition. There is a vestige of a fifth femoral pore on each side.

Vol. 51, pp. 131–134 August 23, 1938

PROCEEDINGS

OF THE

BIOLOGICAL SOCIETY OF WASHINGTON

NOTES ON THE MEADOW MICE MICROTUS MONTANUS AND M. NANUS WITH DESCRIPTION OF A NEW SUBSPECIES FROM COLORADO.

BY E. RAYMOND HALL.[1]

Examination of the specimens of *Microtus montanus* and *M. nanus* accumulated in the Museum of Vertebrate Zoölogy shows that these two forms, currently treated as distinct species, intergrade and should be treated as subspecies of a single species. These specimens, particularly several series taken in 1933 by Miss Annie M. Alexander and Miss Louise Kellogg in Colorado, show also the existence of a heretofore unnamed geographic race in that State. The new race may be known as:

Microtus montanus fusus, new subspecies.

Type.—Male, adult, skin and skull; no. 61281, Mus. Vert. Zoöl.; 2½ miles east of summit of Cochetopa Pass, Saguache County, Colorado; September 21, 1933; collected by Annie M. Alexander; original no. 2568.

Range.—Rocky Mountain region north from Florida, southern Colorado, to Kinney Ranch, southern Wyoming.

Diagnosis.—Size: small (see measurements); tail relatively short, averaging 25 per cent of total length in a series of 7 topotypes; hind foot small. Color: reddish above with reduced amount of grayish. Skull: size small (condylobasal length averaging less than 27 mm.); bullae relatively uninflated; zygomatic breadth and mastoidal breadth relatively slight; brain case long and narrow.

Comparisons.—*M. m. fusus* shows approach to *M. m. arizonensis* in the distinctly reddish upper parts but is less reddish than *arizonensis*. At the same time *fusus* is much redder above than *caryi* or *nanus* which are grayish, or than *fucosus* or *micropus* which are blackish. In small size of skull, *fusus* resembles *nanus* but differs in relatively narrower skull, especially narrower, more nearly parallel-sided brain case, smaller bullae, and less elevated skull in the anterior frontal region. Also, in *fusus*, the anterior

[1] Contribution from California Museum of Vertebrate Zoölogy.

angle of each zygomatic arch is less acute than in other forms studied. Stated in another way, there is in *fusus* less projection anteriorly of the maxillary at the anterior angle of the zygomatic arch.

Measurements.—Average and extreme measurements of 5 topotypes (3 adults and 2 subadults) are as follows: Total length, 147 (140–156); length of tail, 36.2 (32.0–41.0); length of hind foot, 18.5 (18.0–19.0); condylobasal length, 26.0 (25.1–27.0); occipitonasal length, 25.0 (24.0–26.3); nasal length, 7.1 (6.6–8.2); zygomatic breadth, 14.1 (13.4–15.1); interorbital breadth, 3.6 (3.5–3.7); mastoidal breadth, 11.4 (11.1–11.6); length of upper molar series, 6.2 (6.0–6.4); breadth of rostrum, measured between ventral margins of infraorbital canals, 4.6 (4.4–4.9); palatilar length, 13.1 (12.5–14.3).

Specimens examined.—Total number 28; all in the Museum of Vertebrate Zoölogy, listed by counties from north to south, as follows:

Wyoming. *Sweetwater County:* Kinney Ranch, 23 mi. SW Bittercreek, 8.

Colorado. *Gunnison County:* Deckers Ranch, Crested Butte, 2. *Saguache County:* 2 to 2½ mi. E of Summit of Cochetopa Pass, 10. *Alamosa County:* 1.6 mi. NE Medano Springs Ranch hdq., 1. *La Plata County:* Columbine Ranger Station, 8700 ft., Cascade Creek, 1; Florida, 6.

Remarks.—Intergradation with *M. m. caryi* is suggested by the larger bullae, broader brain case and sharper angle of the anterior end of the zygoma of the specimens from Kinney Ranch, Wyoming. Otherwise, and in the sum total of their characters, they are referable to *fusus*. The specimens from Florida and from Medano Ranch, southern Colorado, are intermediate in many respects between *arizonensis* and *fusus*, but all characters considered, seem to me better referred to *fusus*. Two other specimens having the reddish color of *fusus*, from Jensen, Uinta County, Utah, at the same time show an amount of blackish suggestive of *micropus*. They lack the grayish of *caryi* and *nanus*. Their greater size than in *nanus* or in *fusus*, and the more robust skull, with relatively large bullae and broad brain case, is further suggestive of *micropus*. Whatever better material from here shows these mice to be, they do indicate intergradation of *fusus* in this westerly direction with the larger sized mice currently identified as *micropus*.

In addition to the already mentioned specimens which provide evidences of intergradation between races heretofore assigned to one or the other of the two supposedly full species *Microtus montanus* and *Microtus nanus*, there are among others, 19 skulls with skins from Goose Creek, 5000 feet, 2 miles west of the Utah line, Elko County, Nevada. These are intermediate between *M. m. micropus* and *M. n. nanus*. Employing topotypes of *micropus* and specimens of *nanus* from the vicinity of Pocatello, Idaho (for precise localities see Whitlow and Hall, Univ. California Publ. Zoöl., vol. 40, p. 266, September 30, 1933), it is seen that the animals from Goose Creek closely resemble *nanus* in light color, small size of body and small size of most parts of the skull. However, in longer tail and hind foot, and wider rostrum, the series in question is intermediate between *nanus* and *micropus*. Even so, when all characters are taken into account the specimens from Goose Creek are nearer *nanus*. Other specimens from northern

Nevada, namely series from Mountain City, 7 miles northwest of Mountain City, and 20 miles south of Owyhee, though almost as small as those from Goose Creek, average darker colored, and the sum total of their characters places them with *micropus*. Continuing southward in Nevada additional specimens from 22 miles north of Deeth on Marys River and others from several localities farther southward in the Ruby Mountains (see Borell and Ellis, Journ. Mammalogy, vol. 15, p. 32, February 15, 1934) exhibit a gradual transition from the small gray-colored *nanus* to the larger blackish-colored *micropus*.

Microtus canicaudus Miller, with type locality at McCoy, Polk County, Oregon, may be only subspecifically distinct from the other voles of the *Microtus montanus* group. With this possible exception the systematic arrangement below is suggested as best expressing our present knowledge of the relationships of the several voles here listed. The type locality is given for each.

Microtus montanus canescens Bailey, Conconully, Okanagan County, Washington.

Microtus montanus nanus Merriam, Pahsimeroi Mountains, head of Pahsimeroi River, 9350 ft., Custer County, Idaho.

Microtus montanus caryi Bailey, Milford, Fremont County, Wyoming.

Microtus montanus fusus Hall, 2½ miles east of summit of Cochetopa Pass, Saguache County, Colorado.

Microtus montanus micropus Hall, Cleveland Ranch, 6000 ft., Spring Valley, White Pine County, Nevada.

Microtus montanus yosemite Grinnell, Yosemite Valley, 4000 ft., Mariposa County, California.

Microtus montanus montanus (Peale), Headwaters of Sacramento River, near Mount Shasta [probably close to Sisson (=Mount Shasta City), 3600 ft., Siskiyou County], California.

Microtus montanus dutcheri Bailey, Big Cottonwood Meadows, 10,100 ft., southeast of Mount Whitney, Inyo County, California.

Microtus montanus undosus Hall, Lovelock, Pershing County, Nevada.

Microtus montanus nevadensis Bailey, a big salt marsh below Watkins Ranch, Ash Meadows, Nye County, Nevada.

Microtus montanus fucosus Hall, Hiko, 4000 ft., Pahranagat Valley, Lincoln County, Nevada.

Microtus montanus rivularis Bailey, St. George, Washington County, Utah.

Microtus montanus arizonensis Bailey, Springerville, Apache County, Arizona.

Vol. 51, pp. 135–136 August 23, 1938

PROCEEDINGS
OF THE
BIOLOGICAL SOCIETY OF WASHINGTON

A NEW MELOLONTHINE SCARAB BEETLE FROM BRAZIL.

BY LAWRENCE W. SAYLOR,
Bureau of Biological Survey, U. S. Department of Agriculture.

The present new species was found among a small number of Melolonthine scarabs submitted to the author for determination by his good friend Dr. F. Ohaus of Germany. The shipment represented a small part of the material collected by Dr. Ohaus in various parts of South America, though mainly in Brazil, on his collecting expedition through those regions in 1926.

Heteronyx ohausiana Saylor, new species.

Male.—Robust-oval, much wider behind; legs, underside, pygidium, scutellum, clypeus antennae, and thorax (except for a large circular piceous discal area), rufous; the remainder piceous with a strong dull-greenish tinge; elytra unicolorous. Head regularly, finely, not densely punctured, with short procumbent hair; clypeus tumid at middle, punctured like the front, sides strongly convergent apically and nearly straight, apex subtruncate and moderately well reflexed, the angles rounded. Antennae 8-segmented, unicolorous, segments 4 and 5 combined as long as segment 3, the club (measuring the whole thing and not each individual segment) about one-fourth longer than the funicle. Thorax with sides evenly rounded, margin entire, not ciliate, the sparse cilia being in an erect line just inside the marginal border; hind angles obtuse, the basal margin faintly sinuate each side of the middle; front angles acute but rounded; surface disc sparsely somewhat finely punctured, with short subprocumbent yellowish hairs. Scutellum punctured only at sides of basal half. Elytra faintly rugose and alutaceous, very sparsely finely punctured, with short hair as on the thorax; striae not obvious, even the sutural striae but very poorly defined; lateral margins with moderately long fine cilia. Pygidium coarsely moderately densely punctured, with short fine erect hairs, apex subrounded. Abdomen with a double transverse row of short erect hairs at about the middle of each segment; 5th segment but slightly longer than 4th and with hairs a little more dense and longer; 6th similar to 5th in size and covering. Front

tibiae tridentate, the 3rd tooth small and high up near base; all tarsal segments of front legs strongly dilated in male, the 1st about one-third as wide as long at apex, and the 2nd to 4th inclusive successively smaller than the preceding, but each three-fourths as wide at middle and apex as long; all segments including the last with a very dense pad of short hairs beneath. Middle tarsi also dilated, but not as wide as the front ones; 2nd segment more triangular in shape and at middle half as wide as long and at apex a little more so, the 3rd and 4th about half as wide as long both at the middle and apex of the segments; all segments densely pilose below. Hind tarsi plane, 1st and 2nd segments equal in length, the 3rd slightly longer than the 4th. All claws very short and cleft at apex, the lower tooth shorter and broader than the apical one. Spurs of hind tibiae long, slender, and nearly equal in length, the longest one reaching the apex of the first tarsal segment. Length 10 mm. Width 5.5 mm.

The unique male *Holotype* is from S. Paulo (Alto d.S.) in Brazil, collected on November 12, 1926, by Dr. F. Ohaus, and has been returned to him at his request.

The present species is related to *Heteronyx corumbanus* Moser but is 10 mm. long and not 6, the anterior tibiae are tridentate and not bidentate, the antennal club is longer and the proportions of the cleft tarsal claws are evidently different. From *Blepharatoma nitidula* Moser, which it also resembles, the present new species differs in the larger size, color of antennae, and length of antennal club, and the color and non-vittate condition of the elytra. From *H. schenklingi* Moser, of which the author has types, the new species differs greatly in the ♂ genitalia as well as in the non-angulate clypeus and much less densely-pilose dorsal surface.

Vol. 51, pp. 137–142 August 23, 1938

PROCEEDINGS

OF THE

BIOLOGICAL SOCIETY OF WASHINGTON

A NEW SPECIES OF FRESH-WATER AMPHIPOD OF THE GENUS SYNPLEONIA, WITH REMARKS ON RELATED GENERA.[1]

BY CLARENCE R. SHOEMAKER.

In May, 1932, Mr. Andrew Pizzini brought to the United States National Museum a collection of amphipods which he had taken from a spring a short distance west of Georgetown, D. C. One of the specimens, a mature male, possessed a combination of characters not agreeing with those of any of the established genera of fresh-water amphipoda, and was, therefore, recognized as a new genus and species. In 1934 Dr. Edwin P. Creaser established the genus *Synpleonia* for specimens which he had received from Franklin County, Kansas, and, as the present species agrees in all essential characters with his genus, I now designate it as *Synpleonia pizzinii*. Since the discovery of this species in 1932, fine specimens have been taken at a number of localities in the District of Columbia and near-by Maryland and Virginia. Mr. John W. Price, of Lancaster, Pennsylvania, has from time to time taken very large mature specimens of this species in Refton Cave and in the outcrop of subterranean waters in Lancaster County, Pennsylvania. Mr. K. Dearolf has also taken it in Pennsylvania at Refton Cave, Lancaster County; Johnson (upper) Cave, Center County; and Barton Cave and Dulany Cave, Fayette County.

Synpleonia pizzinii, new species.

Diagnosis.—First antenna not greatly longer than second. First gnathopod very much stronger and stouter than second. The fifth peraeopod of the male with second joint very long and narrow, and produced distally into a very prominent anterior downward-projecting lobe which is separated from the posterior lobe by a deep narrow oblique sinus.

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

Description.—Female. Head with lateral lobes produced, rounding and prominent; blind. Antenna 1, first peduncular joint about as long as second and third combined; flagellum composed of about twenty-six joints; accessory flagellum very short, two-jointed. Antenna 2, fourth and fifth peduncular joints about equal in length; flagellum shorter than peduncle and consisting of about fourteen joints. Right mandible with molar conical, prominent, and bearing a long seta on inner margin; seven spines in spine-row; accessory cutting plate prominent; palp with third joint longer than second. Maxilla 1, inner plate with five plumose setae; outer plate with seven barbed spine-teeth; palp with second joint much longer than first, and the rounding apex bearing many slender spines. Maxilla 2, outer plate much narrower than inner and distally spinose; inner plate bearing many spines distally and an oblique row of six plumose spines near inner margin. Maxillipeds, inner plate longer and wider than outer and armed distally with three teeth and about six plumose setae; outer plate not reaching end of first joint of palp and bearing distal and inner marginal spines; palp well developed, second joint larger than the others.

Coxal plates 1 to 4 deeper than their segments, lower margins convex and furnished with short setules; fourth slightly excavate behind. Gnathopod 1 much stouter and stronger than 2; second joint shorter than sixth; fifth joint narrowly produced between fourth and sixth; sixth joint widest proximally and converging gradually toward the dactyl hinge, hind margin very short and bearing several groups of setae, palm very oblique, slightly convex, and passing imperceptibly into the short hind margin, armed throughout with a row of short, blunt, notched spines on the outside and a similar row on the inside, defined by two stout spines beyond which is a row of shorter spines; dactyl stout, fitting palm and reaching to the stout defining spines. Gnathopod 2 slenderer than 1 but equalling it in length, second joint about equal in length to the third, fourth and fifth combined, fifth nearly as long as sixth with lower margin broadly convex and bearing groups of long setae; sixth joint widest distally, hind margin bearing groups of long setae, palm slightly oblique, slightly convex, and passing into the hind margin by an evenly rounding and somewhat protruding curve, armed on the outside and inside with short, blunt, notched spines as in gnathopod 1, defined by a stout spine beyond which is a row of shorter spines; dactyl fitting palm, the apex resting against the row of short spines on the rounding corner of the joint.

Peraeopods 1 and 2 similar in size and shape, dactyls rather short and bearing a comparatively long nail. Peraeopods 3 to 5 increasing consecutively in length, second joints with hind margin broadly expanded and forming a shallow distal lobe, dactyls short and bearing short nail.

Pleon segments 1 to 3 with lower margins broadly rounding and without lower hind angles, lower margins and lower hind margins armed with short spinules. The three ural segments coalesced. Although the division between the first and second segments in many specimens is still quite visible, in others it has completely disappeared.

Uropod 1 the longest and extending back farther than 2 or 3, outer ramus slightly shorter than inner. Uropod 2, peduncle about equal in length to

the inner ramus which is considerably longer than the outer. Uropod 3 very short, scarcely reaching to the middle of the telson, the single, one-jointed ramus about half the length of the peduncle. Telson about twice as long as wide, armed laterally usually with two or three groups of spines, but in some specimens lateral spines are absent, apex slightly angular or slightly convex and bearing six or seven spines on either side of the center. Length of the largest females about 16 mm.

Male.—The younger males are very much like the females in appearance, but larger or older males differ in several characters. The palm of the first gnathopod is not evenly convex, but has a rounding protuberance near the dactyl hinge bearing several short spines, then a shallow depression followed by a low protuberance which passes imperceptibly into the remaining palm. The palm of gnathopod 2 appears to be more oblique than in the female. In peraeopod 5 the second joint is proportionately much longer and narrower, being about two-thirds as long as all the following joints together, whereas in the female this joint is not one-half the length of the following joints combined. The second joint of peraeopod 5 is produced distally into a very prominent rounding anterior lobe which reaches far below the third joint, the posterior margin of this joint is produced into a shallow lobe which is separated from the anterior lobe by a narrow oblique sinus.

The peduncle of uropod 1 is produced distally into a narrow triangular lobe which rests against the inside surface of the outer ramus. The telson is longer proportionally than in the female with the apex more convex; lateral margin bearing several groups of spines. Length of the largest males about 21 mm.

The gill arrangement of this species is quite complex. J. G. Mackin (1935, p. 46) has already mentioned and figured the bifurcate sternal gills of the sixth and seventh thoracic segments of *Synpleonia americana* (*Boruta americana*). These bifurcate sternal gills were not mentioned by Creaser in his description of the genus *Synpleonia*, but they are present on the sixth and seventh thoracic segments of the male paratype in the U. S. National Museum. Sternal gills of this type were described by Dr. A. Schellenberg (1930, p. 86) who demonstrated that they do not arise from the coxal plates, but from the ventral surface of the segments as do also the median sternal gills. In the genus *Synpleonia* these lateral sternal gills arise from the anterior margin of the segment near the lateral margin and at a considerable distance in front of the coxal gills. In the younger males and females of *S. pizzinii* single simple cylindrical median sternal gills arise from the center of the second, third, and fourth thoracic segments, and in the female a pair of similar, but longer, simple cylindrical sternal gills arise from the first pleon segment in front of the pleopods. In the fully grown males and females the median sternal gills are apparently confined to the second thoracic segment, and in the males of all sizes the sternal gills of the first pleon segment are absent. The coxal gills are biarticulate, as shown by Mackin (1935, Pl. X, fig. 13) for *Synpleonia americana.*

Type.—Mature male taken by Mr. Andrew Pizzini at Wetzel's spring, about one-half mile west of Georgetown, D. C., March 6, 1932. U. S. N. M. no. 76116.

Crangonyx tenuis Smith is undoubtedly a *Synpleonia*. Kunkel (1918, p. 95, fig. 21) states that the last two abdominal segments are fused and figures them so, but I believe he was misled by the depression dividing the first and second ural segments into the supposition that they were articulated. However, further study of mature specimens from the type locality is necessary in order to determine the correct status of this species. *Crangonyx alabamensis* Stout is also a *Synpleonia*, but this species was founded on what were probably immature specimens measuring only 5 to 7 mm., and the description and figures are inadequate for the correct placing of this species.

I have examined the paratypes of *Stygonectes flagellatus* (Benedict) and find that the only generic difference between *Synpleonia* and *Stygonectes* lies in the sternal gills. In *Synpleonia* the lateral sternal gills of the sixth and seventh thoracic segments are bifurcate, while in *Stygonectes* they are simple elongate oval sacks. Lateral sternal gills are present on the first pleon segment of the female in *Stygonectes flagellatus*, and median sternal gills are present on some of the anterior thoracic segments, but owing to the state of preservation of the specimens their exact arrangement could not be ascertained.

Benedict in his description of *Crangonyx flagellatus* (1896, p. 616) did not mention the coalescence of the three ural segments, while W. P. Hay in his creation of the genus *Stygonectes* to receive *Crangonyx flagellatus* (1902, p. 430) states that the last two segments of the urosome are coalesced. He, however, was misled by the shallow depression between the first and second ural segments which he thought to be an articulation. As with *Synpleonia*, this depression in some specimens has very much the appearance of an articulation, while in others it is scarcely perceptible. Ada L. Weckel (1907, p. 53) follows Hay in stating that the last two segments of the urosome of *Stygonectes flagellatus* are coalesced. She also states that the third uropod has a rudimentary inner ramus, but I have examined the paratypes of *Stygonectes flagellatus* and find that the third uropods have no inner ramus.

As was pointed out by Weckel (1907, p. 53), the single specimen of *Crangonyx bowersii* described by C. J. Ulrich (1902, p. 85) was in all probability a female of *Stygonectes flagellatus*. The specimen came from the same artesian well at San Marcos, Texas, from which the type specimens of *Stygonectes flagellatus* were procured, and I can find nothing in the description or figures to distinguish it from that species. He speaks of a rudimentary inner branch to the third uropod and figures the segments of the urosome as articulated, but I believe these observations to be erroneous.

There are four fresh-water genera whose three ural segments are coalesced: *Synurella*, occurring in Europe, Asia, and North America; *Stygonectes*, occurring in North America; *Austroniphargus* (=*Niphargopsis* Monod, 1925, not *Niphargopsis* Chevreux, 1922), occurring in Madagascar; and *Synpleonia*, occurring in North America. The genus *Boruta* is now considered a synonym of *Synurella*. Spandl (1924, p. 460) regards *Boruta tenebrarum* as nothing more than a blind *Synurella*. Borutzky (1927, p. 65) says, "*Boruta tenebrarum*, found by Wrzesniowski in a well at Zakopane in

the Tatras in 1890, a blind form, presents some unimportant differences from *Synurella ambulans*, which points to the close relationship of both forms. It may well be that *Boruta tenebrarum* directly originates from *Synurella ambulans*, which form found unusual conditions in a well and lost the pigment of the eyes. The endemism of *Boruta tenebrarum* (found only once) and the pronounced tendency in *Synurella ambulans* toward a reduction of the eyes, formed only of several ommatidia, all speak in favor of this supposition." Karaman (1931, pp. 28–29) says that the genus *Boruta* is to be eliminated and *Boruta tenebrarum* is to be retained as a *Synurella* standing close to *Synurella jugoslavica subterranea*.

Stygonectes and *Synpleonia* are very closely related, differing only in the form of the sternal gills, and both genera differ from *Synurella* by the complete absence of eyes and by having the telson simple and not partially cleft as it is in *Synurella*. They differ from *Austroniphargus* by having a single one-jointed ramus to the third uropod, and by the simple undivided telson. In *Austroniphargus* the third uropod has a two-jointed outer ramus and a small inner ramus, and the telson is partly cleft.

Literature Cited.

Benedict, James E.
1896. Preliminary Descriptions of a New Genus and Three New Species of Crustaceans from an Artesian Well at San Marcos, Texas. Proc. U. S. Nat. Mus., Vol. XVIII, pp. 615–617.

Borutzky, E. V.
1927. On the Occurrence of the Amphipod *Synurella ambulans* in Russia. Ann. & Mag. Nat. Hist., Ser. 9, Vol. 20, pp. 63–66.

Creaser, Edwin P.
1934. A New Genus and Species of Blind Amphipod with Notes on Parallel Evolution in Certain Amphipod Genera. Occasional Papers of the Mus. of Zool., Univ. of Michigan, No. 282, pp. 1–5, pl. 1.

Hay, W. P.
1902. Observations on the Crustacean Fauna of Nickajack Cave, Tennessee, and Vicinity. Proc. U. S. Nat. Mus., Vol. XXV, No. 1292, pp. 417–439, figs. 1–8.

Karaman, S.
1931. Über die Synurellen Jugoslaviens. Prirodoslovne Razprave, Knjiga 1. Ljubljana, pp. 25–30, figs. 1–2.

Kunkel, B. W.
1918. The Arthrostraca of Connecticut. State of Connecticut. State Geological and Natural History Survey, Bulletin No. 26, pp. 1–261, figs. 1–84.

Mackin, J. G.
1935. Studies on the Crustacea of Oklahoma, III. Subterranean Amphipods of the Genera *Niphargus* and *Boruta*. Trans. Amer. Microscop. Soc. 54 (1), pp. 41–51, 2 pls.

Schellenberg, A.
1930. Süsswasseramphipoden der Falklandinseln nebst Bemerkungen über Sternalkiemen. Zool. Anz., Bd. 91, Heft 1/4, pp. 81–90, figs. 1–3.
Spandl, Herman.
1924. Studien über Süsswasseramphipoden I. Akad. Wissensch. Wien, Math.-Naturwissensch. Klass, Sitzb. Abt. I, Bd. 133, Heft 9, pp. 431–525, 2 pls., 10 figs., 2 charts.
Ulrich, Carl J.
1902. A Contribution to the Subterranean Fauna of Texas. Trans. Amer. Microscop. Soc., Vol. XXIII, pp. 83–100, 5 pls.
Weckel, Ada L.
1907. The Fresh-water Amphipoda of North America. Proc. U. S. Nat. Mus., Vol. XXXII, pp. 25–58, figs. 1–15.

Vol. 51, pp. 143–146 August 23, 1938

PROCEEDINGS

OF THE

BIOLOGICAL SOCIETY OF WASHINGTON

A NEW WATERDOG FROM CENTRAL LOUISIANA.[1]

BY PERCY VIOSCA, JR.

Since publishing my revision of the genus *Necturus*,[2] much material has been gathered which will throw light on taxonomic and distributional problems of the forms occurring in the southern Gulf drainage area. While collecting life history stages during the summer of 1937, some strange larvae and juveniles from central Louisiana were taken. On a trip to the same locality during February, 1938, a juvenile larger than any of the earlier lot and six adults were taken. These proved to be a new type which seems to warrant specific recognition.

I am indebted to George H. Penn, Jr., and O. F–R. Bruce for valuable assistance rendered in the field work which brought this species to light, and to George H. Penn, Jr., for making the measurements and preparing the statistical table used in this study.

Necturus louisianensis, sp. nov.

Type.—U. S. N. M. No. 104238, a female collected in Big Creek a few miles east of Pollock, Louisiana, February 22, 1938. Total length 243 mm.; head[3] 42 mm. (in length 5.79); tail 74 mm. (in length 3.28); width of body 25 mm.; depth of body 18 mm. (in width of body 1.39); costal grooves 15. Head and body depressed; muzzle probe-like, rounded in outline and profile; canthus rounded; origin of upper dermal border of tail anterior to vent. Tooth formula: premaxillary, right 10, left 9; vomero-palatine, right 10, left 11; pterygoid, right 6, left 5.

Color, in formalin: above and on sides a pattern of dark brown mot-

[1] A contribution from the Research Department, Southern Biological Supply Company, Inc., New Orleans, La.

[2] Viosca, Percy, Jr. A Tentative Revision of the Genus *Necturus* With Descriptions of Three New Species from the Southern Gulf Drainage Area. Copeia No. 2, August 18, 1937.

[3] The head is measured from the tip of the muzzle to the line connecting the inner bases of the upper gill insertions; the tail, from the middle of the cloaca to the tip, including the dermal border; the width of the body, at the widest point in the first third (near the fourth or fifth costal groove); the depth of the body, at the same point as the width.

tlings and reticulations inclosing lighter interspaces, the whole superimposed with black spots in about twelve more or less irregular, longitudinal rows; underparts immaculate except on sides. Two less pigmented, vermiculated areas extend along the latero-dorsal region from the snout to the end of the tail, these bordering a definitely darker, reticular, mid-dorsal region, upon which are superimposed black spots in two fairly definite longitudinal rows. The sides exhibit a brown ground inclosing irregular, more or less stellate, light blotches, upon which pattern is superimposed about five irregular rows of dark spots on either side. A dark band, distinctly visible from above, extends along the canthus and through the eye to the gills.

Paratypes.—In addition to the type there are 24 paratypes, all collected in Big Creek, east of Pollock, Louisiana. Eighteen (advanced larvae and young juveniles) were collected by the author and George H. Penn, Jr., on July 20, 1937, and eight, including the type (one juvenile, two mature males, and four mature females), were collected by the author and O. F–R. Bruce on the night of February 22–23, 1938.

Summary of diagnostic characters.—Size larger than *N. beyeri*, but considerably smaller than *N. maculosus;* a relatively slender, depressed species normally with 15 (rarely 14 or 16) costal grooves; adults 196 to 243 mm., ave. 222 mm., weight, in formalin, 56.4 grams to 65.5 grams, ave. 61.2 grams (approx. 2 oz.). Head depressed, somewhat octagonal in outline, flattened in profile, with probe-like snout and rounded canthus.

Color, in life.[4]—above and on sides, a pattern of leaf-mold brown mottlings and reticulations inclosing interspaces of umber to cocoa brown, the whole superimposed with black spots in about ten or twelve more or less irregular longitudinal rows. Normally, the black spots obliterate the ground pattern over the areas covered by them. A dark band, distinctly noticeable from above, extends from the snout through the eye to the gills. The juvenile pattern persists throughout life in the form of two less pigmented dorso-lateral areas extending from the snout to the end of the tail.

In the ground pattern of the mid-dorsal region, the leaf-mold brown appears for the most part as rather definite reticulations inclosing umber interspaces. The superimposed black spots are close together in this area and arranged in two fairly definite rows. In the latero-dorsal regions, the leaf-mold brown tends to form delicate vermiculations, more or less longitudinally arranged, and here the light pattern of umber predominates. Black spots from the sides and mid-dorsal regions encroach on these areas and may even occasionally be isolated in them. On the sides, the leaf-mold brown predominates, the umber appearing only as irregular, more or less stellate, blotches. Black spots are present in about four to five more or less irregular rows on either side. The underparts are dirty white tinged with pinkish, especially in the regions of the throat, axilla and groin. The dorsal pattern encroaches on the edges of the belly as a spotted and mottled zone with an irregular margin.

The dark spots vary between 126 and 177 (ave. 148) for the adult series;

[4] These notes were made while the specimens were under chloretone narcotization.

Necturus louisianensis, upper surfaces of larva, juvenile and adult female, reduced approximately one-third.
(Natural size of the adult was 243 mm.)

Necturus louisianensis, lower surfaces of larva, juvenile and adult female, reduced approximately one-third.
(Natural size of the adult was 243 mm.)

the largest lateral, dorsal, and tail spots approximate each other in size; spots on head, chin, and sides of belly smaller; 23 to 36 (ave. 31) lateral spots, in 4 to 5 irregular rows between axilla and groin. Tooth formula: 10 (8–11), 10 (8–12), 5 (4–6).

Life history data.—Adults taken in February are in mature sexual condition, indicating an early spawning season. The larvae are striped somewhat like those of *N. maculosus*, but exhibit rows of short light dashes in the dark areas, and at an early age develop a sprinkling of dark spots over both dark and light areas.

They are also of much more slender build than larvae of *maculosus* from the St. Francis River System near Paragould, Arkansas, the nearest locality from which I have secured larvae of that species.

Relationships.—This species, in some respects, bridges the gap between *N. beyeri* and *N. maculosus*. It has a number of positive characters, however. The immaculate belly, the linear arrangement of other distinctive areas, and the umber pigment which gives it a pinkish cast, distinguish it from both *beyeri* and *maculosus*. While in these respects it suggests *alabamensis*, it is easily distinguished from that species by the several rows of small lateral spots, whereas in *alabamensis* the lateral spots are large, normally in one row, and may even be fused into a broad lateral band. The presence of the fifteen costal grooves in this species is unusual in the genus. This form may have arisen by hybridization between *maculosus* and *beyeri*, but because of the rather uniform and distinctive characters of the colony studied, they must, tentatively at least, be assigned the rank of an independent species.

Summary of Statistics Used in Defining *Necturus louisianensis*.

Total length (mm.)	min.	196	Premaxillary teeth	min.	8
	max.	243		max.	11
	ave.	222		ave.	10
Weight (grams)	min.	56.4	Vomero-palatine teeth	min.	8
	max.	65.5		max.	12
	ave.	61.2		ave.	10
Tail in length	min.	3.16	Pterygoid teeth	min.	4
	max.	3.77		max.	6
	ave.	3.37		ave.	5
Head in length	min.	5.44	Spots, total	min.	126
	max.	5.92		max.	177
	ave.	5.71		ave.	148
Depth in width	min.	1.26	Spots, lateral	min.	23
	max.	1.44		max.	36
	ave.	1.38		ave.	31

Vol. 51, pp. 147–156 August 23, 1938

PROCEEDINGS
OF THE
BIOLOGICAL SOCIETY OF WASHINGTON

REPTILES AND AMPHIBIANS FROM THE LESSER ANTILLES COLLECTED BY DR. S. T. DANFORTH.

BY DORIS M. COCHRAN,
United States National Museum.

A small collection of frogs, lizards and snakes from the Lesser Antilles was made in 1937 by Dr. Stuart T. Danforth of the University of Puerto Rico, while engaged primarily in collecting the birds of that region. His material is noteworthy in containing a new species of lizard and a subspecies of snake not hitherto recognized. Perhaps the most important item in the lot is a series of 22 skinks from a single island which shows that some of the supposedly variable characters do not vary greatly in an adequate series from a single region.

The remaining records are more or less supplementary to my notes on the Bartsch collections[1] made in some of the same localities. Part of the Danforth collection is now deposited in the United States National Museum, the rest is in the Museum of the University of Puerto Rico in Mayagüez.

Eleutherodactylus urichii (Boettger).

Seven frogs of this species, U.S.N.M. 103972–5 and U.P.R. 884–6 were taken in the crater of Soufrière Mt., St. Vincent, on March 15, 1937, and two others (U.P.R. 887–8) are labeled simply "St. Vincent, March 1937." Although the following species *Eleutherodactylus martinicensis* likewise occurs on this island, it is not difficult to distinguish them, as the former has a larger head and longer femur than the latter.

Eleutherodactylus martinicensis (Tschudi).

One from Kingston, St. Vincent (U.S.N.M. 103965) collected on May 15, 1937; three from Montserrat (U.P.R. 880–2) collected in February, 1937;

[1] Herpetological Collections from the West Indies made by Dr. Paul Bartsch under the Walter Rathbone Bacon Scholarship 1928–1930 (Smithson. Misc. Coll., vol. 92, No. 7, 1934, pp. 1–48).

53 from Saba (U.S.N.M. 103922–64 and U.P.R. 870–9) taken in January, 1937.

Three individuals (U.S.N.M. 103676–7 and U.P.R. 83) from Matouba, Guadeloupe, and four from Dolé, Guadeloupe (U.S.N.M. 103968–71) are referred with some doubt to this species. They have a somewhat larger head than do the *martinicensis* from Saba, while the large size of the adults—32 mm.—the spotted venter and the tubercular dorsal surface are not in agreement with *urichii*.

Eleutherodactylus johnstonei Barbour.

Two individuals (U.P.R. 889–90) were taken in Grand Etang, Grenada, on May 3, 1937.

Leptodactylus validus Garman.

Three fine males and two females from the north end of Bequia Island Grenadines (U.P.R. 93–4 and U.S.N.M. 103976–8) collected on March 24, 1937, seem to be identical in every respect with those of this species from St. Vincent.

Hemidactylus mabouia (Moreau de Jonnés).

Five specimens of various ages (U.S.N.M. 103979–80 and U.P.R. 104 and 891) were taken at Mayreau, Grenadines, in April, 1937. One young individual (U.S.N.M. 104204) came from Saba Island, January, 1937.

Thecadactylus rapicaudus (Houttuyn).

U.S.N.M. 103981–3 and U.P.R. 892–4, six specimens altogether, were collected on Saba Island in January, 1937.

Sphaerodactylus fantasticus Duméril and Bibron.

Two individuals (U.S.N.M. 103984 and U.P.R. 895) from Dolé, Guadeloupe, were collected on June 19, 1937.

Sphaerodactylus sabanus, new species.

Diagnosis.—Resembles *Sphaerodactylus vincenti* in general appearance. Differs in having smooth scales on chest and in lacking any pale V-shaped marking above base of tail.

Type.—U.S.N.M. 103985, male, Saba Island collected in January, 1937, by Dr. Stuart T. Danforth. Snout rather long and acuminate, its length 2½ times the diameter of the eye-opening; eye considerably nearer to ear than to tip of snout; rostral moderate, with a short median cleft behind and a pair of weak crescentic grooves posteriorly; nostril between rostral, first supralabial, one postnasal and two supranasals, the anterior of which is separated from its fellow by two relatively large hexagonal scales; superciliary spine moderate in size; three large supralabials to a point below the center of the eye, followed by two or three very small supralabials; a very large anterior infralabial and a much smaller second to the same point, followed by two others decreasing in size posteriorly; top of head covered with elongate keeled granules, enlarging considerably on the snout

and becoming smooth anteriorly, those between the supranasals being about 3 times the area of the interocular granules; granules of occiput and nuchal region very small, heavily keeled; scales of back heavily keeled, imbricate, those of the middorsal area smaller but not granular, about 12 scales on the side of the back equal to distance from tip of snout to center of eye; laterals about equal in size to dorsals, slightly irregular, faintly keeled, about 12 in the standard distance; mental considerably longer than rostral, followed by two postmentals which are scarcely larger than the anterior gulars which follow them; scales of central gular region very small, smooth, becoming larger and very faintly keeled at base of throat; scales of chest and belly smooth, rounded, imbricate, about 10 ventrals to the standard distance, quite regular in size; scales of limbs anteriorly and below like those of belly, much smaller and granular posteriorly, keeled above; 11 smooth lamellae under the 4th toe; scales of tail (partly reproduced) above keeled, imbricating, below smooth, transversely enlarged. A round "escutcheon" of differentiated scales about 5 scales wide on the posterior belly, with a narrow prolongation 1 scale wide extending down each femur over halfway to the knee in the male.

Dimensions.—Head and body, 28 mm.; tail (reproduced), 22 mm.; width of head, 5 mm.; tip of snout to ear, 7 mm.; foreleg, 7 mm.; hind leg, 9 mm.

Color in alcohol.—Dorsum immaculate olive, lightening to drab on the tail, which is coarsely spotted with sepia; venter pale ecru drab, the throat faintly clouded with drab; a few dark dots on the belly; lower surface of tail dark spotted.

Paratypes.—Twenty-nine specimens, U.S.N.M. 103986–104004 and U.P.R. 896–905 with the same data as the type.

Variation.—The largest female measures 30 mm. from snout to vent; none of the males exceed 28 mm. in length, however. The dorsal scales are 11 to 13 in the standard distance, while the ventrals are 8 to 10. There are 11 or 12 lamellae under the 4th toe. Some specimens are very dark and appear of one shade all over the upper surfaces; some which are a little lighter show a dark dotting over the back and some wavy light lines irregularly encircling a dark occipital spot. There is no trace of any specialized marking above the base of the tail. The young measuring 16 mm. are identical in color with the adults and there seems to be no sexual dimorphism. In some specimens the venter is more coarsely dotted with brown than in others, and the throat has a dark reticulated pattern.

Relationships.—The new form is apparently most closely related to *Sphaerodactylus vincenti* from the distant island of St. Vincent, rather than to its much closer neighbors, *sputator* from St. Eustatius and *elegantulus* from Antigua.

Its differences from *vincenti* have already been pointed out in the diagnosis, while its pattern alone serves to distinguish it at once from *sputator* and *elegantulus*.

Iguana iguana iguana (Linnaeus).

The dried skin of a half-grown male (U.P.R. 906) was preserved at Spring Bay, Saba Island, on January 25, 1937. Under date of April 4,

1938, Dr. Danforth writes: "I have two additional skins . . . No iguanas were collected in the Grenadines due to lack of time for their preparation, although they abounded on most of the smaller islets. On Petit Nevis they swarmed as I had never dreamed of seeing them. There they perched in low trees and as one walked through the bush they fell to the ground with a great flop and scrambled hurriedly off through the leaves making a great commotion. At any given moment two or three were in sight or hearing scuttling rapidly away."

Anolis asper Garman.

A fine adult male, U.S.N.M. 104005 with a wide tail fan was taken at St. Louis, Marie Galante, on July 1, 1937, and a smaller specimen, U.P.R. 128, presumably a female, came from Trois Islets, Marie Galante, July 18, 1937.

Anolis cristatellus cristatellus (Duméril and Bibron).

An adult male, U.P.R. 907, from St. Thomas, Virgin Islands, collected on January 18, 1937.

Anolis krugi gingivinus (Cope).

Lizards of all ages, U.S.N.M. 104006–30 and U.P.R. 908–917 from St. Bartholomew, collected on December 28, 1930; one individual, U.P.R. 130 from St. Eustatius, taken on the same date.

Anolis krugi wattsi (Boulenger).

A very young one from Nevis, U.P.R. 918, taken on February 5, 1937, agrees entirely with the smallest in a series from St. Kitts.

Anolis leachii lividus (Garman).

A large series, U.S.N.M. 104031–63 and U.P.R. 919–928 was taken at Montserrat in February, 1937.

Anolis richardii Duméril and Bibron.

Two specimens, U.P.R. 99 and U.S.N.M. 104064 from the north end of Bequia Island, Grenadines, taken on March 25, 1937; one, U.P.R. 129 from Lake Antoine, Grenada, collected on May 7, 1937; a large male, U.S.N.M. 104065 from Carriacou, Grenadines, July, 1935. A male, U.S.N.M. 104197 from Montrose, St. Vincent, taken on March 19, 1937, is apparently the first one to be recorded from this island. A very young lizard, U.S.N.M. 104195 from the Crater of Soufrière Mt., St. Vincent, collected on March 15, 1937, is referred to this species, as it is obviously not like the long-snouted young of *Anolis roquet vincentii.*

Anolis roquet gentilis (Garman).

An adult male, U.P.R. 92, from the south end of Bequia Island, Grenadines, collected on March 23, 1937; 19 specimens, U.S.N.M. 104076–87 and U.P.R. 932–938 from Bequia collected during April, 1937; 13 lizards, U.S.N.M. 104066–75 and U.P.R. 929–931 from Mayreau, Grenadines (spelled Mayero in Debes' Handatlas, 1905) collected in April, 1937.

Anolis roquet vincentii (Garman).

A large series of over 100 lizards, U.P.R. 949–968 and U.S.N.M. 104108–90 was taken at Kingstown at various dates between March 18 and May 16, 1937; one, U.S.N.M. 104196 came from Montrose, St. Vincent, on March 19, 1937; one, U.S.N.M. 104191 from the Grand Bonhomme Mts., in March, 1937; and three very young ones, U.S.N.M. 104192–4 are labeled simply "St. Vincent, March, 1937." It seems to be very common in Kingstown.

Anolis sabanus Garman.

Thirty specimens, U.P.R. 938–948 and U.S.N.M. 104088–107 were taken on Saba Island in January, 1937. It appears to be quite abundant.

Ameiva aquilina Garman.

I can now add some additional counts to the record for this species in my earlier paper ("Herpetological Collections from the West Indies made by Dr. Paul Bartsch under the Walter Rathbone Bacon Scholarship 1928–1930," Smithson. Misc. Col. Vol. 92, No. 7, 1934, p. 41).

Mus. No.	Locality	Head & Body mm.	Ventrals: Transverse rows	Ventrals: Longitudinal rows	Femoral pores	Tail at 15th verticil scales	Lamellae under 4th toe
UPR 89	Bequia Id.	106	32	10+2	19–19	42	37
UPR 90	"	93	33	10+2	18–18	39	38
USNM 104199	"	104	33	12	19–19	43	36
USNM 104198	"	114	32	10+2	19–19	41	39
UPR 102	"	53	33	12	18–16	41	36
USNM 104202	Union Id.	45	32	10+2	19–21	42	36
USNM 104200	Mayreau Id.	75	32	12	19–18	41	35
USNM 104201	"	62	33	10+2	18–20	40	34

Those from Bequia were collected between March 23 and 25, 1937; the one from Union Island in April, and the two from Mayreau on April 16 and 17.

Ameiva exsul Cope.

Two young ones, U.P.R. 969 and U.S.N.M. 104203 from Signal Hill, St. Thomas, collected on January 16, 1937.

Ameiva pluvianotata Garman.

One specimen, U.P.R. 970 from Montserrat, collected in February, 1937.

Mabuya mabouya mabouya (Lacépède).

Probably the largest series of this form yet taken in the Lesser Antilles was secured by Dr. Danforth on Mayreau Island, Grenadines, in April, 1937. A single individual also came from Carriacou, Grenadines, in July, 1935. Regarding these, Dr. Danforth wrote me on April 4, 1938, that "a rather large series was obtained on Mayreau, due to exceptional luck as they are ordinarily rarely seen. We happened to be there during the

first shower after a prolonged dry spell. These lizards emerged from their hiding places in large numbers during the shower to drink water at tiny pools formed by the rain, and could be taken in numbers. No more were taken as at the time we had run practically out of containers and preservative. One from Carriacou, U.S.N.M. 104205, is also included; I do not recall the details regarding its capture (two years previously). Local name, 'Shine Lizard.' "

The variations in the 22 specimens from Mayreau, Grenadines, U.S.N.M. 104206–27 listed in the same order as in Dunn's "Notes on American Mabuyas" (Proc. Acad. Nat. Sci. Philadelphia, vol. 87, 1935, pp. 540–543) are given below:

Supranasals: Distinctly or barely in contact in 11 cases; not in contact in 10 cases; not determinable because of injury in 1 case.

Prefrontals: Not in contact in every instance.

Parietals: Distinctly or barely in contact in 19 cases; not in contact in 3 cases.

Nuchals: 1 pair in every instance, except that two individuals have a subdivided nuchal on one side.

Supraoculars: 4 in every case, the second always being the largest.

Subocular: The sixth supralabial is beneath the eye in 8 cases; the fifth in 34 cases, and the fourth in 1 case. Here the right and left sides are given separately.

Scales around the body: 30 in 20 cases; body mutilated in 2 cases.

Scales from chin to vent: Range in 17 cases, 57 to 61; average, 59.1. The remainder of the specimens are mutilated so that this count can not be made.

Anals: Contrary to Dr. Dunn's statement that "all *mabouya* have the median anals more or less larger than the lateral," the median pair is distinctly smaller than the scales directly bordering them laterally in most of the specimens of this series. One lizard has the median anals about 2/5 the area of the bordering scales; 5 have them 1/2 that area; 6 have them 2/3 the area, while only 3 have them equal. In five individuals the median pair is dissimilar in size, so that the proportions of the four median scales are 1 : 1 : 1 : 2 or 2 : 1 : 1 : 1½. In two, mutilations prevent the count.

Proportions: The limbs adpressed along the sides are widely separated in all cases. The tail is nearly perfect on three of the individuals, of which a body length of 82, 75 and 71 mm. corresponds with a tail length of 129, 118 and 108 mm. respectively. This shows that the normal tail length slightly exceeds 1½ times that of the head and body. The largest specimen in the series measures 92 mm. from snout to vent; its tail is broken off.

Coloration: All the specimens are quite uniform as to the dark stripe, about 1½ scales in width, along the side of head and body, bordered above and below by distinct narrow light stripes. Occasionally some dark spots along the sides of the back may suggest the remnants of still another stripe.

Although Dr. Dunn does not list the number of lamellae under the fourth toe, I find that in this series there are 16 in 3 cases, 15 in 11 cases, 14 in 6 cases and 13 in 1 case. This is all the more interesting since the single Carriacou specimen has 19 lamellae. This individual also differs in having

the sixth and seventh labials beneath the eye on the right side of the head, and the sixth, seventh and eighth on the left. In this specimen the supranasals, the prefrontals and the parietals are not in contact; 1 pair of nuchals; 4 supraoculars; 30 scales around the body; median anals 2/3 the size of the bordering scales.

Boa hortulana cookii (Gray).

A single specimen (U.P.R. 106) from Union Island, Grenadines, taken on April 22, 1937, has 42 scales at midbody; ventrals ?; anal single; 105 caudals; 10 pitted supralabials followed by 2 or 3 very small smooth ones.

Another from Bequia, Grenadines, collected on April 1, 1937, now U.S.N.M. 104228 has 39 scalerows, 253 ventrals, a divided anal, caudals?, supralabials 11 pitted plus 2 or 3 smooth.

Dr. Danforth writes that "this conspicuously marked snake is greatly feared by the natives, who all insist it is poisonous. With its striking markings and enlarged head it is very different from anything else I have seen in the West Indies . . . Native name, Congo snake."

Drymobius boddaertii bruesi (Barbour).

U.P.R. 101 a female from Bequia Island, Grenadines, captured on March 25, 1937; scales 17, ventrals 198, anal divided, tail defective, supralabials 9, oculars 1+2, temporals 1+2, with a very small scale intercalated above the anterior temporal on each side.

U.S.N.M. 104231 a female from Bequia collected on April 1, 1937; scales 17, ventrals 201, anal divided, tail defective, supralabials 10 on right side, 9 on left, oculars 1+2, temporals 1+2, with an intercalated scale above the anterior temporal on each side.

U.S.N.M. 104230 a male from Bequia collected in April, 1937; scales 17, ventrals 197, anal divided, caudals 124, supralabials 9, oculars 1+2, temporals 1+2 with a very small scale intercalated above the anterior temporal on the right side only.

U.P.R. 100 an immature specimen from Spring Bay, Bequia, collected on March 25, 1937; scales 17, ventrals 198, anal divided, tail defective, supralabials 9, oculars 1+2, temporals 1+2 without intercalated scales.

U.S.N.M. 104229 a female from Carriacou, Grenadines, collected in July, 1935; scales 17, ventrals 207, anal divided, caudals 120, supralabials 9, oculars 1+2, temporals 1+2 without intercalations.

U.P.R. 971 a mutilated specimen, probably an immature male, from Kingstown, St. Vincent, collected on May 16, 1937; scales 17, ventrals 196, anal divided, tail defective. The supralabials and oculars are injured, but there appears to be a single anterior temporal without intercalations followed by two posterior temporals on each side of the head.

Alsophis leucomelas danforthi, new subspecies.

Diagnosis: Resembles *Alsophis leucomelas sanctorum* Barbour, differs mainly in coloration, being darker and more spotted.

Type.—An adult male, U.S.N.M. 104237 (formerly U.P.R. 126) from

Terre-de-Bas, Iles des Saintes, collected on July 5, 1937, by Dr. Stuart T. Danforth. Paratype, a male U.P.R. 127 with the same data as the type.

Description of the type.—Rostral much broader than deep, scarcely visible from above; internasals about equal to prefrontals in length; frontal longer than its distance from end of snout, a little shorter than the parietals, separated from the preocular; supraocular about two-thirds as wide as frontal; nasal divided, slightly longer than its distance from eye; loreal rather small, rectangular, broader than deep; one preocular; two postoculars, nearly the same in size; temporals 1+2; 8 upper labials, the second in contact with the posterior nasal and loreal and barely touching the preocular, the third, fourth and fifth entering the eye; 9 lower labials, the first meeting its fellow behind the symphysial, the first four in contact with the anterior chinshields, the fourth and fifth with the posterior ones, which are considerably longer than the anterior; scales in 19 rows at midbody and on the neck, 15 just before beginning of tail; ventrals 207; anal divided; caudals 141.

Color (in alcohol).—Ground color ecru drab; top of head slate color; a series of very irregular black blotches about 5 scales wide on top of neck, the outer margins of which gradually form an irregular black dorsolateral line on the 7th and 8th scale rows, the median area having irregular transverse blotches, decreasing on the anterior third of the body, then increasing in area so that the posterior part of the body as well as the tail are black, with only an occasional small light spot; a dark brown stripe on side of head leading to a series of indistinct, vertical dark blotches on the side of the body, ending on the outer corners of the ventrals as a group of dark dots; upper labials with minute sepia dots; venter pale ecru drab, the throat finely dotted with brown; a more or less double series of irregular small black spots on the middle of each ventral beginning approximately at the 40th and increasing in area until the entire center of each ventral is quite black, with a pale area near the ends of the ventrals, the lower side of the tail being nearly entirely black.

Dimensions.—Head and body, 606 mm.; tail, 334 mm.

Variation.—The only other specimen secured, also a male, has 205 ventrals, the tail defective, otherwise the same formula as the type. In this individual the dark dorsolateral lines are much more broken, so that the dorsal pattern appears like a dark and very irregular chain along the back. On the other hand, a light dorsolateral stripe bordering this chain pattern below becomes quite prominent before the beginning of the middle third of the body, and remains light and conspicuous even on the tail.

Alsophis leucomelas manselli Parker.

Two males and a female of this species were collected at Montserrat in February, 1937. The larger male, now U.S.N.M. 104235, measures 725 mm. from snout to vent, the tail being defective. It has 19 scale rows, 200 ventrals, a divided anal, 8 supralabials, 1+2 oculars, 1+2 temporals. The smaller male, U.S.N.M. 104236, has 19 scale rows, 204 ventrals, a divided anal, 136 caudals, 8 supralabials, 1+2 oculars, 1+2 temporals on the right, and on the left an intercalated scale above the anterior temporal.

The female, U.P.R. 975, has 203 ventrals and 116 caudals, otherwise like the larger male in scalation. The coloration of all specimens seems to agree well with that of the type series.

Alsophis rufiventris (Duméril and Bibron).

Six examples were taken on Saba Island in January, 1937. A female, U.S.N.M. 104232, has scales 23, ventrals 214, anal divided, caudals 119, supralabials 8, oculars 1+2, temporals 1+2.

U.S.N.M. 104233, scales 23, ventrals 214, anal divided, caudals 102, supralabials 7 on the right, 8 on the left, oculars 1+2, temporals 1+2 on the right, and a small scale preceding the large anterior temporal on the left.

A male, U.P.R. 972, scales 23, ventrals 216, anal divided, caudals 119, supralabials 8, oculars 1+2, temporals 1+2.

A male, U.P.R. 973, scales 23, ventrals 216, anal divided, caudals 115, supralabials 8, oculars 1+2, temporals 1+2 on the right, 1+1 on the left side.

A half-grown male, U.P.R. 974, scales 23, ventrals 114, anal divided, caudals 123, supralabials 8, oculars 1+2, temporals 1+2.

The sixth specimen, U. S. N. M. 104234, is a very young one. The coloration seems to be normal on all the individuals.

Testudo tabulata Walbaum.

Dr. Danforth informs me that "land tortoises were found on most of the Grenadines, apparently the common South American species which also occurs on Barbuda, etc. No specimens were saved, though I had some alive for a while. I recall finding them on Bequia, Petit Nevis, Isle à Quatre, Mustique, Canouan, and probably other islands. On Canouan on April 10, 1937, I found an egg of this species lying loose among the leaves and other debris under the xerophytic forest on Mt. Royal, the highest point on the island and one of the highest in the Grenadines. A number of the adult tortoises were found in the same vicinity. I kept the egg for some weeks in the vain hope that it might hatch."

Vol. 51, pp. 157–158 August 23, 1938

PROCEEDINGS
OF THE
BIOLOGICAL SOCIETY OF WASHINGTON

CHAGUNIUS, A NEW GENUS OF ASIATIC CYPRINOID FISHES.

BY HUGH M. SMITH.

A cyprinoid fish with peculiar physiognomy and with taxonomic characters which make it easily distinguishable was described by Hamilton (Fishes of the Ganges, 1822) under the name *Cyprinus chagunio*, and for a hundred years has been carried in the heterogeneous genus *Barbus*. It seems desirable to separate the fish from this composite group and to give it a position coordinate with *Lissochilus*, *Cyclocheilichthys*, *Hampala*, and the various other genera of the *Barbus* complex that have been recognized by recent writers on Oriental fishes.

CHAGUNIUS, new genus (Cyprinidae).

Body and head well compressed; head with no sensory folds, short, deep, its sides flat; snout slightly overhanging the mouth, its free pendant border entire and covering the base of the upper lip; well-developed pairs of rostral and maxillary barbels; a short groove extending upward and forward from base of each rostral barbel, thus dividing the snout into central and lateral lobes; eyes with a narrow annular lid, in midlength of head and extending to dorsal profile; suborbital bones forming a narrow ring less than one-third depth of cheek; branchial apertures extending to a point under posterior edge of eyes; branchial membranes narrowly joined to isthmus; gill-rakers on lower arm of first arch 9 fleshy plates of roughly triangular shape, those on inner side of arch smaller; a few (4 or 5) slender, flattened lingulate gill-rakers on upper arm of first arch; mouth large, horizontal, horseshoe-shaped; lips thick, fleshy, papillose, continuous around corners of mouth, closely investing jaws, which have no horny covering; lower lip sharply defined by a long, deep, straight, posterior groove which does not extend to median line of chin; pharyngeal teeth 5,3,2 — 2,3,5, those in outer row much the largest and of several shapes, the first tooth strongly compressed antero-posteriorly, its broad surface concave; snout and cheeks thickly beset with short, horny tubercles in male, smaller and fewer tubercles in female; scales small, over 40 in longitudinal series in type species; lateral line com-

plete, running along middle of caudal peduncle; a scaly sheath at base of dorsal and anal fins; dorsal fin arising nearer to tip of snout than to base of caudal and in advance of ventrals, its rays iii,8 or iv,8, the last simple ray osseous, strong, compressed, gently curved, its posterior edge coarsely serrated; anal fin with 5 branched rays, the last two rays greatly elongated in the adult male (representing the species *spilopholus* of McClelland), not elongated in the female (species *chagunio* of Hamilton and *beavani* of Günther); ventral and pectoral fins inserted low, pectoral rays in male with rows of tubercles on dorsal side.

Genotype.—*Cyprinus chagunio* Hamilton, inhabiting India, Burma, and Siam.

The generic and specific names of this fish are based on the Indian vernacular *chaguni* given to it in the province of Behar.

Vol. 51, pp. 159–164 August 23, 1938

PROCEEDINGS
OF THE
BIOLOGICAL SOCIETY OF WASHINGTON

SOME AMPHIBIANS FROM FORMOSA AND THE RYU KYU ISLANDS, WITH DESCRIPTION OF A NEW SPECIES.

BY J. LINSLEY GRESSITT,
Museum of Vertebrate Zoölogy, University of California, Berkeley.

The species included in the following list were collected on my two trips to Formosa and the Ryu Kyu (Loochoo) Islands in 1932 and 1934. Only eleven species were collected, for no particular effort was made to collect amphibians. However, one of the species appears to be new to science, and is herein described.

The localities at which collecting was done on the Island of Formosa have been described by the writer in an article entitled "Notes on Collecting in Formosa" (The Entomological World, Tokyo, 4: 711–727, 1 map, 1 pl., 5 figs., 1936). In the Ryu Kyu Archipelago, between Formosa and Japan, collecting was done on Iriomote Island (lat. 24° 20′ N, long. 123° 40′ E); Ishigaki-jima (Yaeyama Island) (lat. 24° 25′ N, long. 124° 20′ E); Miyako Island (lat. 24° 42′ N, long. 125° 28′ E); Okinawa Island (lat. 26° 30′ N, long. 127° 45′ E); and Amami-Oshima Island (lat. 28° 15′ N, long. 129° 25′ E).

The writer is indebted to Dr. Joseph Grinnell for the privilege of reporting on this collection, which is deposited, with others made by the writer, in the Museum of Vertebrate Zoölogy of the University of California at Berkeley.

SALAMANDRIDAE.

Triturus ensicaudus (Hallowell).

Triton subcristatus, Hallowell, **1860**, Proc. Phila. Acad.: 494 (part, not of Schlegel).

Triton ensicauda Hallowell, **1860**, Proc. Phila. Acad. : 494 (Amakarima and Amami-Oshima Islands).

Molge pyrrhogaster var. *ensicauda*, Boulenger, **1887**, Proc. Zool. Soc. London : 150.

Molge pyrrhogastra var. *ensicaudatus*, Okada, 1891, Cat. Vert. Japan : 65 (Okinawa).

Diemyctylus ensicauda, Stejneger, 1907, U. S. Nat. Mus., Bull. **58** : 21–24, figs. 9–15.

A single specimen was collected (No. 22415, Mus. Vert. Zoöl.) in an artificial pond in a stream behind Nase (Naze) at an altitude of 90 meters, Amami-Oshima Island, N. Ryu Kyu (Loochoo) Islands, July 9, 1932. Numerous individuals were present in the same pond.

The example measures 145 mm. from snout to end of tail, and 64 mm. from snout to anterior end of vent. The head is 13.5 mm. broad at jaw angles. The color is pitchy brown above and reddish orange beneath, with an orange stripe along each side of body and tail.

The stomach contained amphibian eggs, presumably of the same species, and some plant material.

Distribution.—Amami-Oshima and Okinawa Islands (northern and central Ryu Kyu Archipelago).

Japanese name.—Shiriken-imori.

BUFONIDAE.

Bufo bankorensis Barbour.

Bufo bankorensis Barbour, 1908, Bull. Mus. Comp. Zoöl., **51** (12): 323 (Bankoro, C. Formosa); 1909, Proc. New Engl. Zoöl. Club, **4** : 55, pl. 6; Okada, 1931, Tailless Batr. Japanese Emp. : 53–56, pl. 4, fig. 1, pl. 19, fig. 7, pl. 23, fig. 2, text figs. 24–25.

Thirteen specimens (Nos. 22511–23, Mus. Vert. Zoöl.) were collected in the mountains of Formosa in 1934; three at Arisan, alt. 2,150 meters, south-central Formosa, May 27; two at Suisha, by Lake Candidius, alt. 750 meters, C. Formosa, June 2; three at Sozan, alt. 450 meters, north of Taihoku, N. Formosa, June 30; one at Rokki (Rokkiri), alt. 350 meters, SW. Formosa, May 17; one at Bukai, alt. 1,200 meters, north of Lake Candidius, C. Formosa, June 15; two at Taiheizan, alt. 1,500 meters, NE. Formosa, July 7; and one at Rimogan, alt. 800 meters, south of Urai, N. Formosa, July 23, 1934.

The largest specimen (No. 22513; female; Arisan) measures 110 mm. from snout to vent, and 43 mm. across head at jaw angles; the tibio-tarsal articulation reaches slightly anterior to the posterior end of the paratoid, which latter is longer than its distance from tip of snout, and is broadly elliptical in shape.

Stomach contents included the following: a cockroach (*Panesthia*); a scarabaeid larva; ants (several stomachs); melolonthid-, cetoniid-, elaterid-, carabid-, staphylinid-, lagriid-, tenebrionid-, and chrysomelid-beetles; a polydesmoid millipede; plant material; small stones.

Distribution.—Mountains of Formosa; southern and western China: Fukien, Kwangtung (?), Kwangsi, and Szechuan provinces.

Japanese name.—Bankoro-hikigaeru.

Bufo bufo miyakonis Okada.

Bufo bufo miyakonis Okada, 1931, Tailless Batr. Japanese Emp. : 47–50, pl. 3, figs. 1–2, pl. 18, fig. 3, pl. 22, fig. 5, text figs. 19–20.

A single example (No. 22510, Mus. Vert. Zoöl.) was collected in a dry ditch by a sugar cane field on Miyako Island, at an altitude of about 35 meters, S. Ryu Kyu Islands, August 29, 1934.

The specimen is a juvenile, measuring 34 mm. from snout to vent. The head is 15.5 mm. broad at jaw angles. The parotoid is shorter than its distance from tip of snout, and there is no sharp ridge above eye. The color is variegated light and dark brown, somewhat buffy on head.

Distribution.—Restricted to Miyako Island.

Japanese name.—Miyako-hikigaeru.

Bufo melanostictus Schneider.

Bufo melanostictus Schneider, 1799, Hist. Amph., **1** : 216; Stejneger, 1907, U. S. Nat. Mus., Bull. **58** : 72–75, figs. 56–61; Okada, 1931, Tailless Batr. Japanese Emp. : 50–53, pl. 4, fig. 2, pl. 18, fig. 3, pl. 23, fig. 1, text figs. 21–23.

A single specimen (No. 22524, Mus. Vert. Zoöl.) was collected at Rokki (Rokkiri), alt. 300 meters, SW. Formosa, May 13, 1934.

The specimen measures 85 mm. from snout to vent, and 32 mm. across head at jaw angles. The sharp ridge on each side of head from tip of snout to anterior end of paratoid is characteristic.

The stomach contained remains of the following: scarabaeid- (*Anomala* and *Serica?*), carabid-, cicindelid- (*C. sexpunctata*), and tenebrionid-beetles; water bugs (*Sphaeroderma* and *Corixa?*); ant; braconid wasp; reduviid bug and a moth.

Distribution.—India; Malay Archipelago; peninsula of southeastern Asia; S. China; Hainan Id.; Hong Kong and Formosa.

Japanese name.—Heriguro-hikigaeru.

RANIDAE.

Rana gracilipes, new species.

Type.—Gravid female; No. 23108, Mus. Vert. Zoöl.; from Kuraru, alt. 150 meters, Koshun district, near South Cape, Formosa, Aug. 10, 1934, J. L. Gressitt (orig. no. 197).

Diagnosis.—A small frog with narrow head and slender arms and legs; heels barely touching when legs folded at right angles to body; tibio-tarsal articulation reaching to tympanum; eye as long as snout; fingers and toes slender, webbed only at base; skin smooth on most of surface.

Description of type.—Slender, attenuated anteriorly. Head narrower than shoulders, longer than broad; snout narrow, truncate, projecting; canthus rostralis moderately distinct; lores subvertical; external nostril much closer to tip of snout than to eye; eye practically as long as its distance from tip of snout; inter-nasal distance less than inter-orbital

distance, which latter is greater than width of upper eyelid. Internal nares transversely oval; vomerine teeth not distinguishable. Tympanum minute, indistinct, about one-third diameter of eye, separated from eye by a distance equal to its diameter. No dorso-lateral fold. Arms long and slender; fingers slender and blunt at tips, first shorter than second, which latter is two-thirds as long as third, third much longer than fifth, subarticular tubercles distinct but not greatly swollen; toes webbed only at extreme bases, blunt at apices, third much longer than fifth; inner and outer metatarsal tubercles moderately large, indistinct; tibio-tarsal articulation barely reaching tympanum; tibia contained two and one-half times in distance from snout to vent, nearly as long as foot. Heels not touching when legs folded at right angles to body. Skin largely smooth, microscopically granular; some minute tubercles around vent and bases of thighs.

Color dull chocolate brown above, with minute white dots on flanks and femora; lips and sides mottled brown and bluish white; undersurfaces dirty white mottled with brown.

Measurements.—Length, from snout to vent, 27 mm.; length of head, 8; breadth of head, 7.5; nostril to eye, 2; length of eye, 2.7; diameter of tympanum, 1.2; length of fore limb, 19; hand, 7; hind limb, 36; tibia, 11; foot, 12.

Comparisons.—Differs from *Rana adenopleura* Boulenger in lacking the dorso-lateral fold, in having the tympanum smaller and less distinct, the limbs, fingers and toes much more slender, the toes less webbed, the metatarsal tubercles less prominent and the skin much smoother. Differs from *Rana guentheri* Boulenger in being much smaller, in lacking the dorso-lateral fold, in having the appendages more slender, the toes less extensively webbed, the eyes and tympanum smaller, the head narrower and less acute apically, and the canthus rostralis less distinct.

Notes.—The ovaries contained many brownish eggs, measuring about 1.4 mm. in diameter. The stomach contained several ants, about 4.5 mm. long.

Distribution.—Southern Formosa.

Japanese name.—Hosoashi-gaeru.

Rana limnocharis Wiegmann.

Rana limnocharis Wiegmann, 1835, Nova Acta Acad. Leop. Carol., **17** (1) : 255; Stejneger, 1907, U. S. Nat. Mus., Bull. **58** : 127–131, figs. 107–110; Okada, 1931, Tailless Batr. Japanese Emp.: 138–146, pl. 7, fig. 1, pl. 19, fig. 5, pl. 26, fig. 4, text figs. 62–63.

Rana gracilis, Wiegmann, 1835, Nova Acta Acad. Leop. Carol., **17** (1) : 257 (Cape Syng-more, China) (not of Gravenhorst).

Rana vittigera, Günther, 1858, Cat. Batr. Sal. Brit. Mus. : 9 (not of Wiegmann).

Nine specimens (Nos. 22792–800, Mus. Vert. Zoöl.) were collected in 1934: six on Iriomote Island, S. Ryu Kyu Is., Aug. 20–26; one on Ishigaki Island (Yaeyama), S. Ryu Kyu Is., Aug. 27; one at Rokki, alt. 300 meters, SW. Formosa, May 16; and one at Suisha, alt. 750 meters, by Lake Candidius, C. Formosa, June 2.

The largest specimen (Ishigaki Id.) measures 54 mm. from snout to vent. The stomach contents included remains of small beetles and an acridiid grasshopper.

Distribution.—India and Malay Archipelago to Japan, through S. China, Hainan Id., Formosa and the Ryu Kyu Islands.

Japanese name.—Numa-gaeru.

Rana swinhoana Boulenger.

Rana swinhoana Boulenger, 1903, Ann. Mag. Nat. Hist., (7) **12** : 556; 1909, op. cit., (8) **4** : 495; Stejneger, 1907, U. S. Nat. Mus., Bull. **58** : 132; 1910, Proc. U. S. Nat. Mus., **38** : 95.

A single example (No. 23090, Mus. Vert. Zoöl.) was caught in a swiftly flowing stream near Bukai, alt. 950 meters, north of Lake Candidius, C. Formosa, June 13, 1934.

The specimen measures 83 mm. from snout to vent, and 30 mm. across corners of mouth. Color dusky brown above and sooty white beneath. The stomach contained the remains of a reduviid bug and an insect grub.

Distribution.—Lower mountains of central and south-central Formosa.

Japanese name.—Suinho-gaeru.

POLYPEDATIDAE.

Polypedates moltrechti (Boulenger).

Rhacophorus moltrechti Boulenger, 1908, Ann. Mag. Nat. Hist., (8) **2** : 221; Okada, 1931, Tailless Batr. Japanese Emp. : 192–193, pl. 17, fig. 1, text fig. 90.

Polypedates moltrechti, Stejneger, 1910, Proc. U. S. Nat. Mus., **38** : 97; Van Denburgh, 1912, Proc. Calif. Acad. Sci., (4) **3** : 203.

A single example (No. 23169, Mus. Vert. Zoöl.) was taken at Arisan, alt. 2,000 meters, C. Formosa, May 27, 1934.

The specimen measures 47 mm. from snout to vent, and 18.5 mm. in breadth of head at angles of mouth. The color is dark green above and white beneath, with sides of body and hind limbs spotted with black.

Distribution.—Mountains of Formosa.

Japanese name.—Morutorekito-aogaeru.

Polypedates owstoni Stejneger.

Polypedates owstoni Stejneger, 1907, U. S. Nat. Mus., Bull. **58** : 149–150 (Ishigaki Id.).

Polypedates schlegelii owstoni, Van Denburgh, 1912, Proc. Calif. Acad. Sci., (4) **3** : 202.

Rhacophorus owstoni, Okada, 1931, Tailless Batr. Japanese Emp. : 194–196, pl. 16, fig. 1; pl. 29, fig. 2, text fig. 91.

Four specimens (Nos. 23170–73, Mus. Vert. Zoöl.) were collected: three on Iriomote Island, Aug. 23–26, and one on Ishigaki Island (Yaeyama), August 27, 1934, S. Ryu Kyu Islands.

The largest specimen measures 52 mm. from snout to vent, and 18 mm.

across angles of mouth. The color is blue-green, or grayish green mottled with grayish black. Stomach contents included a reduviid bug, a cerambycid beetle (*Apomecyna?*) and other insect remains.

Distribution.—S. Ryu Kyu Archipelago and Formosa.

Japanese name.—Osuton-aogaeru.

Polypedates robustus (Boulenger).

Rhacophorus robustus Boulenger, 1909, Ann. Mag. Nat. Hist., (8) **4** : 494 (Kankau, Alikang, and Kosempo, Formosa); Okada, 1931, Tailless Batr. Japanese Emp. : 196–198, pl. 17, fig. 4, pl. 21, fig. 4, pl. 29, fig. 3.

Polypedates robustus, Stejneger, 1910, Proc. U. S. Nat. Mus., **38** : 97; Van Denburgh, 1912, Proc. Calif. Acad. Sci., (4) **3** : 206.

Three specimens (Nos. 23180–82, Mus. Vert. Zoöl.) were collected at Rokki (Rokkiri), alt. 350 meters, SW. Formosa, May 13–17, 1934.

The largest specimen, a gravid female, measures 70 mm. from snout to vent and 26 mm. in breadth of head at mouth angles. The color is speckled grayish green with a darker band across top of head at upper eyelids; ventral surfaces dirty white. The stomach included insect wings.

Distribution.—Formosa.

Japanese name.—Muku-aogaeru.

MICROHYLIDAE.

Microhyla ornata (Dum. and Bibr.).

Engystoma ornata Duméril and Bibron, 1841, Erpét. Gén., **8** : 745 (Malabar Coast).

Microhyla ornata, Boulenger, 1882, Cat. Batr. Sal. Brit. Mus. : 175; Pope, 1931, Bull. Amer. Mus. Nat. Hist., **61** : 597.

Microhyla fissipes Boulenger, 1884, Ann. Mag. Nat. Hist., (5) **13** : 397 (Formosa); Okada, 1931, Tailless Batr. Japanese Emp. : 71–74, pl. 7, fig. 3, pl. 18, fig. 7, pl. 23, fig. 6, text figs. 33–34.

Microhyla okinavensis Stejneger, 1901, Proc. Biol. Soc. Wash., **14** : 189 (Okinawa, Ryu Kyu Islands).

Microhyla undulata Brown, **1902**, Proc. Phila. Acad. Sci.: 186 (Loochoo Is.).

Two examples (Nos. 23214 and 23256, Mus. Vert. Zoöl.) were collected, the former at Kuraru, alt. 150 meters, Koshun district, S. Formosa, August 8, 1934, the latter on Iriomote Island, S. Ryu Kyu Islands, August 23, 1934.

The specimen from Formosa (gravid female) measures 30.5 mm. from snout to vent, and 7.5 mm. in breadth of head at angles of mouth. Stomach included numerous ants and an acridiid grasshopper nymph.

Distribution.—India and Malay Peninsula to the Ryu Kyu Islands, through S. China, Hainan Id. and Formosa.

Japanese name.—Hime-amagaeru.

Vol. 51, pp. 165–166 August 23, 1938

PROCEEDINGS
OF THE
BIOLOGICAL SOCIETY OF WASHINGTON

STATUS OF THE ORIENTAL FISH GENERA APLOCHEILUS AND PANCHAX.

BY HUGH M. SMITH.

An unfortunate situation exists in regard to the availability of two generic names, *Aplocheilus* and *Panchax*, which have long been associated with cyprinodont fishes of Africa, Asia, and the Indo-Australian Archipelago. It appears that neither of these names may be employed in accordance with recent usage, if the recognized rules of zoölogical nomenclature are to be followed.

The genus *Aplocheilus* was established by McClelland (Indian Cyprinidae, 1839), with three species listed thereunder: *chrysostigmus* (new), *melastigmus* (new), and *panchax*, first described as *Esox panchax* by Hamilton-Buchanan (Fishes of the River Ganges, 1822). As the genus was composite and McClelland indicated no genotype, the way was opened for subsequent misunderstanding and confusion.

In 1846 Cuvier and Valenciennes (Histoire Naturelle des Poissons), ignoring McClelland's *Aplocheilus*, created the genus *Panchax* and placed in it four species, including Hamilton-Buchanan's *Esox panchax*, which they renamed *Panchax buchanani*, together with *Panchax pictum*, which is a spiny-rayed fish of the genus *Betta*.

While Günther (Catalogue of Fishes in British Museum, vol. 6, 1866) and Day (Fishes of India, 1878) considered all the fishes that had been placed in *Aplocheilus* and *Panchax* as belonging in a single genus (*Aplocheilus*), as a matter of fact two very distinct genera are involved and, as Myers has indicated (The Primary Groups of Oviparous Cyprinodont Fishes, 1931), these genera belong in different tribes of the subfamily Fundulinae.

The designation of a type species in *Aplocheilus* appears to have been first made in 1863 when Bleeker (Atlas Ichthyologique, III), in a synopsis of the genera of cyprinodontoid fishes, named *Aplocheilus chrysostigmus* McClelland as the type. This action was cited by Jordan (Genera of Fishes, II, 1919). Other published opinions of Bleeker indicate that what he did in this case was directly opposite to what he intended to do, for

chrysostigmus is a synonym of *panchax* which Bleeker, in the same synopsis, included in the genus *Panchax*. Weber and de Beaufort (Fishes of the Indo-Australian Archipelago, IV, 1922), Ahl (Zur Systematik der altweltlichen Zahnkarpfen der Unterfamilie Fundulinae, 1924), and various other recent students of these fishes have stated or assumed that *Aplocheilus melastigmus* McClelland is the type of the genus, but Bleeker's designation necessarily takes precedence. Regan (The Osteology and Classification of the Teleostean Fishes of the Order Microcyprini, 1911) stated that Bleeker "definitely restricted" *Aplocheilus* to the *melastigmus* group, but I have been unable to find any reference which would confirm Regan's statement.

From the foregoing it would appear that the name *Aplocheilus* must be associated with *panchax* and other species characterized by the possession of protractile premaxillaries, jaw teeth in broad bands, vomerine teeth, and pseudobranchiae; that *Panchax* is a synonym of *Aplocheilus;* and that fishes of the *melastigmus* group, characterized by non-protractile premaxillaries, jaw teeth in a single row or a narrow pluriserial band, a small group of enlarged teeth at the outer ends of the premaxillaries, no vomerine teeth, and no pseudobranchiae, are without an available generic name unless *Oryzias* should prove applicable.

The genus *Oryzias* was established by Jordan and Snyder (A Review of the Poeciliidae or Killifishes of Japan, 1906) for *Poecilia latipes* Schlegel, a fish of the rice fields of Japan. Bleeker, Günther, and others referred the species to *Aplocheilus*. Jordan and Snyder wrote: "This genus differs from *Aplocheilus* (=*Panchax*) of India in the short jaws and in the absence of teeth on the vomer." Weber and de Beaufort (l.c.) and Regan (l.c.) considered *Oryzias* a synonym of *Aplocheilus*. Ahl (l.c.), however, regarded *Oryzias* as a distinct genus, separable from *Aplocheilus* by the absence of a set of enlarged teeth at the outer sides of the premaxillaries. These teeth in *Aplocheilus melastigmus* have been described and figured by B. Sundara Raj (Notes on the Fresh-water Fish of Madras, Records of the India Museum, XII, 1916, 266, pl. XXV) who has shown that in the male there are four coarse teeth on each side, while in the female the premaxillary "is drawn out into a bifid tooth."

Published descriptions of the teeth in *Oryzias* make no reference to the existence of enlarged teeth at the outer end of the premaxillaries. In the original definition of the genus, Jordan and Snyder said: "mouth small, with 2 rows of small, simple, pointed teeth." As a matter of fact, however, there is in *Oryzias latipes*, at the outer end of the premaxillaries, an enlarged group of teeth, similar to those that have been found in *melastigmus* and various related species of Siam, Indo-Australian Archipelago, and Philippines, all of which should apparently now be included in *Oryzias*.

In offering the foregoing observations and conclusions, I have had the benefit of the views of Dr. Carl L. Hubbs, Dr. George S. Myers, and Dr. Leonard P. Schultz, to whom grateful acknowledgment is made.

Vol. 51, pp. 167–168 August 23, 1938

PROCEEDINGS
OF THE
BIOLOGICAL SOCIETY OF WASHINGTON

A NEW BAT, GENUS MYOTIS, FROM WEST-CENTRAL CALIFORNIA.

BY O. P. SILLIMAN AND J. C. VON BLOEKER, JR.

Among the mammals recently collected in Monterey County, California, by Mr. R. L. Rudd and the junior author, there are specimens of a species of *Myotis* which we are unable to identify through comparison with other known North American members of this genus. The form in question may be named and diagnosed as follows:

Myotis ruddi, sp. nov.

RUDD BLACK BAT.

Type.—♂ adult, skin and skull, no. 81549, Museum of Vertebrate Zoölogy, from Lime Kiln Creek, 250 feet altitude, Santa Lucia Mountains, Monterey County, California, July 31, 1937, collected by R. L. Rudd and J. C. von Bloeker, Jr., orig. no. 8385JvB.

Distribution.—In California, known to occur from Lake Espinosa, Monterey County, southeast to Laguna Ranch, San Benito County, thence south to Priest Valley and west to Lime Kiln Creek, Monterey County. Altitudinal range extends from near sea-level up at least to 5000 feet.

Diagnosis.—A medium-sized (see measurements) *Myotis* of extremely dark coloration, pelage blackish brown dorsally and mummy brown ventrally; skull short and narrow, with short, broad rostrum and relatively great occipital depth.

Comparisons.—In general, *Myotis ruddi* is darkest of the known North American species of this genus. Comparisons are here given with three species which occur within the range of *M. ruddi* and with which it might possibly be confused in characters other than color. From *Myotis lucifugus,* distinguishable in greater total length, longer tail, larger hind foot, smaller ear, longer tibia, and shorter pollex; skull shorter and narrower, with greater occipital depth, alveolar length of mandibular tooth row greater. Compared with *Myotis yumanensis,* ear and pollex smaller, all other measurements greater. Differs from *Myotis volans* in greater total length, longer tail and larger hind foot; skull longer, with shorter and broader rostrum, and greater occipital depth.

Color (using color terms from Ridgway's *Color Standards and Color Nomenclature*, 1912).—Type: Dorsal hairs plumbeous black in basal half, blackish brown (3) in apical half; ventral body hairs black in basal three-fourths, apical tips mummy brown; hairs on ventral surface of wing membrane, extending from body between axilla and groin to a line between elbow and knee, entirely mummy brown; membranes and ears dark grayish brown in transmitted light, black in reflected light.

Measurements (in millimeters).—Averages and extremes of eight adults (7 males and 1 female), paratypes: Total length, 99 (96–105); tail, 45 (44–47); hind foot, 10 (10); ear, from notch, 12 (11–13); radius, 38 (35–40); tibia, 18 (17–20); pollex, 6.3 (5.8–6.5). Skull: Greatest length, 14.5 (14.0–14.8); condylobasal length, 13.7 (13.2–14.0); greatest zygomatic breadth, 8.7 (8.6–8.8); least interorbital breadth, 4.1 (4.0–4.2); width of cranium, 7.2 (7.0–7.4); occipital depth, 5.6 (5.5–5.7); length of mandible, 10.3 (10.1–10.5); alveolar length of maxillary tooth row, 5.3 (5.1–5.5); alveolar length of mandibular tooth row, 6.1 (6.0–6.2); maxillary width at M^3, 5.7 (5.5–5.9).

Specimens examined.—Unless otherwise indicated, specimens are in the senior author's collection. Nine, from the following localities in California: Monterey County: Lake Espinosa, 50 feet, Salinas Valley, 1; Chew's Ridge, 5000 feet, Santa Lucia Mountains, 1; Priest Valley, 2500 feet, Diablo Range, 3; Lewis Creek, 1750 feet, Diablo Range, 1; Lime Kiln Creek, 250 feet, Santa Lucia Mountains, 2 (Type in Museum of Vertebrate Zoölogy). San Benito County: Laguna Ranch, 4000 feet, 4 miles south of Hernandez, Gabilan Mountains, 1 (MVZ).

Bibliography.

Grinnell, H. W.

1918. A synopsis of the bats of California. Univ. Calif. Publ. Zool., **17** : 223–404, pls. 14–24, 24 figs. in text.

Miller, G. S., Jr.

1897. Revision of the North American bats of the family Vespertilionidae. U. S. Dept. Agr., Div. Biol. Surv., N. Am. Fauna, **13**: 1–140, 3 pls., 40 figs. in text.

Miller, G. S., Jr., and Allen, G. M.

1928. The American bats of the genera Myotis and Pizonyx. U. S. Nat. Mus. Bull., **144** : i–viii+1–218, 1 pl., 1 fig., 13 maps in text.

Vol. 51, pp. 169–172 August 23, 1938

PROCEEDINGS
OF THE
BIOLOGICAL SOCIETY OF WASHINGTON

DESCRIPTIONS OF TWO NEW RACES OF THE GROUND CUCKOO (MOROCOCCYX ERYTHROPYGUS [LESSON] FROM MEXICO.

BY A. J. VAN ROSSEM.

This curious cuckoo, type of the monotypic genus *Morococcyx*, is commonly represented in most of the larger collections in America and abroad, but by far the great majority of specimens are from Central America and belong to the typical race *erythropygus*. This occurs commonly along the Pacific slope from Costa Rica to southeastern Chiapas with no trenchant geographic variation, save that an offshoot which inhabits the arid Motagua Valley in interior Guatemala has been described by Griscom (Amer. Mus. Novit., 414, 1930, p. 2) as *Morococcyx erythropygus macrourus* on the basis of longer tail and slightly paler coloration. In Oaxaca there is an abrupt change in several characters and Ridgway has named the larger and much paler colored race of that region as *Morococcyx erythropygus mexicanus*. Unfortunately, specimens from north of Oaxaca have been included under this name, principally because the comparative scarcity of the species northerly has made the accumulation of material difficult, and there simply are not enough specimens in American collections to define the behavior of the species from more northern points. This lack has led to the unjustifiable "lumping" of what are in reality three races into one, and conversely has operated to obscure the real characters of *mexicanus*.

A synopsis of the situation in western Mexico is appended to the formal descriptions which follow. Parenthetically it may be stated here that the definitions are possible chiefly through the opportunity to study the great collections of Mexican birds in

the British Museum. As in many other cases the material in America is, to be frank, inadequate, and is of use chiefly to verify or check the characters noted in the British Museum series.

Morococcyx erythropygus simulans, subsp. nov.

Type.—Adult, sex not recorded, 97.4.1.70 British Museum; Acapulco, Guerrero, Mexico, September, 1888; collected by Mrs. H. H. Smith.

Subspecific characters.—Similar to *Morococcyx erythropygus erythropygus* (Lesson) of Central America in the dark coloration of the underparts and in general size; differs, however, in the very much darker under tail coverts (dark uniform chocolate instead of reddish brown mixed with rufous), darker under surface of rectrices, more diffused and less sharply defined tail markings, paler upper parts, and more greenish (less purplish) reflections on the upper surface of the tail. Resembles *Morococcyx erythropygus mexicanus* Ridgway of Oaxaca in the relatively pale upper parts and diffused tail markings, but differs in the *very much* darker underparts and under tail coverts, darker under surface of rectrices, and smaller size.

Range.—The State of Guerrero (Acapulco; La Venta; Sierra Madre del Sur; Dos Arroyos; Cayacal).

Morococcyx erythropygus dilutus, subsp. nov.

Type.—Female adult, 97.1.4.62 British Museum; San Blas, Nayarit, Mexico, May 10, 1889; collected by W. B. Richardson.

Subspecific characters.—Similar to *Morococcyx erythropygus mexicanus* of Oaxaca but size smaller; coloration slightly paler below; under tail coverts very much darker and in decided contrast to the pale abdominal region; upper parts slightly darker and grayer, with the greenish gloss on the upper surfaces of the wings and tail at a minimum for the species; under surface of tail very much darker and with black subterminal bar and terminal light tip obsolete. Differs from the geographically nearest race, *simulans* of Guerrero, in very much paler underparts, more diffused and more nearly obsolete tail markings, and grayer (less greenish) wings and tail.

Range.—Colima (Plains of Colima; Manzanillo), Nayarit (San Blas), and Sinaloa (Mazatlan).

Remarks.—The general geographic trends observable in this species are (1) the under surface of the tail, which is silvery gray with well defined terminal markings southerly, and dark slate with diffused or obsolete markings northerly; (2) the color of the upper parts which is darker and more iridescent southerly and more grayish green and less iridescent northerly. However, there are several characters which break up these gradual trends into distinct and abruptly defined races. These are: (1) size, by which the smaller *erythropygus* of Central America is separated from the equally small *simulans* and *dilutus* by the larger *mexicanus* of Oaxaca; (2) coloration of the under parts, which from south to north present the following combinations: *erythropygus* with dark underparts and mixed

rufous and chocolate under tail coverts; *mexicanus* with pale underparts and pale rufous under tail coverts; *simulans* with dark under parts and dark chocolate under tail coverts; *dilutus* with pale underparts and dark chocolate under tail coverts.

In the above discussion I have not considered *Morococcyx erythropygus macrourus* Griscom of the arid interior of Guatemala since it is in the nature of an offshoot from the direct line of the north-south chain of races. It is said to be similar to *erythropygus* but with longer tail and slightly paler coloration, in both of which particulars it appears to be intermediate toward *mexicanus*.

Measurements (Sex Disregarded).

		Wing	Tail
26	*erythropygus*	95–103	115–134
20	*mexicanus*	94–109	126–143
10	*simulans*	90–97	108–138
7	*dilutus*	92–98	118–133

Vol. 51, pp. 173–176 August 23, 1938

PROCEEDINGS

OF THE

BIOLOGICAL SOCIETY OF WASHINGTON

RESTITUTION OF THE NAME PTYCHEMYS HOYI AGASSIZ FOR A WESTERN RIVER TORTOISE.

BY LEONHARD STEJNEGER.

The "cooters" recorded for the last fifty years under the name *Pseudemys texana* have been a source of misunderstanding and perplexity to herpetologists.

The confusion really started in 1857 when Agassiz (Contr. Nat. Hist. U. S., vol. 1, p. 433) referred two young specimens in the National Museum, Nos. 80 and 76, from the Pecos River, Texas, and San Luis Potosi, Mexico, respectively, to the species which he called *Ptychemys mobiliensis*. By this name he understood a species totally different from Holbrook's *Emys mobilensis*, misled by their having the same type locality. As a matter of fact his *mobiliensis* is the Gulf Coast form of the red-bellied slider, now known as *Pseudemys rubriventris alabamensis*, which is characterized by the maxillary tomium of its beak having a median notch flanked on either side by a cusplike projection. As the two specimens mentioned above possessed this character he naturally referred them to the *mobiliensis* as he understood it.

The matter rested thus until 1893 when Baur discovered Holbrook's type specimen of *mobilensis* in the collection of the Philadelphia Academy and corrected Agassiz' mistake about the name. He also found at the Academy the shell of an adult specimen from San Antonio, Texas, which he recognized as being different from *mobiliensis* (*alabamensis*) though apparently belonging to the same group of the genus *Pseudemys*. With this he associated the two specimens in the National Museum already mentioned and described the new form as *Pseudemys texana*. He also found in the Philadelphia collection an adult shell (No. 247) from Old Fort Cobb, Indian Territory, the soft parts of which were in the National Museum (U. S. N. M. No. 7173). Apparently without examining the latter he regarded the dry shell as identical with the San Antonio specimen and described all four specimens under the name *texana*, though particularly mentioning the San Antonio specimen (No. 246) as the type.

The first author to apply Baur's name independently was probably C. S. Brimley (Journ. Elisha Mitchell Soc., vol. 23, No. 2, June 1907, p. 77)

who listed two specimens, one from Colmesneil, Texas, the other from Shell Bank, Louisiana. The exact identification, however, must remain in doubt until new material from these localities can be examined. However, in 1909, Hurter and Strecker's paper on the Amphibians and Reptiles of Arkansas (Trans. Acad. Sci. St. Louis, vol. 18, May 14, 1909, p. 21), appeared, in which they stated that "the range of this species [*Chrysemys texana*] extends from Southwestern Missouri (Jasper and Newton Counties) south through western Arkansas and eastern Oklahoma to the Gulf of Mexico and the Rio Grande River . . . Dr. Baur considered *C. texana* the western representative of *C. concinna*, from which, according to his diagnosis, it differed in many important characters." Their error in quoting Baur as considering *texana* the representative of *concinna* instead of *rubriventris* may have originated in the obvious relationship of the Missouri and Arkansas specimens with *concinna*. The identification of the Missouri and Arkansas specimens as *texana* was undoubtedly influenced by Baur's inclusion of the Old Fort Cobb (Oklahoma) specimen among the type material of this species.

From this time on, the status of *Pseudemys texana* has remained as outlined by Hurter and Strecker above, and was accepted in all three editions of Stejneger and Barbour's Check List of the Amphibians and Reptiles of North America.

In the meantime, Mrs. H. T. Gaige submitted to me for identification a large, somewhat unusually patterned turtle from Brewster County, Texas. Its most conspicuous feature was a large, isolated yellow spot which completely dominated the side view of the head. My material for comparison available at the time was the two hatchling paratypes of *texana* which showed various differences from the large Brewster County specimen, yet because the paratypes varied considerably among themselves—a circumstance only too common in this variable genus—but especially because the Pecos River type presented a supratympanic yellow insulated spot, almost as conspicuous as that of the Brewster County specimen, I concluded that the latter represented one of the extreme variations of *P. texana*. This conclusion did not at the time appear unreasonable in view of the comparative closeness of the type localities.

Recent accumulation of Texas and other Transmississippian material at the National Museum, chiefly through the efforts of Burt, Ortenburger and others, led to a reexamination of the species with the result that I became highly suspicious of the identification of the Brewster County specimen and consequently requested the loan of it for a reexamination. In generously acceding to my request, Dr. Hartweg wrote me that he also questioned my determination and suggested that the specimen in reality was referable to the *Pseudemys ornata* group, a conclusion in which, upon seeing the specimen again, I was very glad to concur.

Through the courtesy of Dr. Dunn I was recently enabled to examine Baur's holotype of *Pseudemys texana* and confront it with his three paratypes, U. S. N. M. Nos. 76, 80 and 7173 with the startling result that No. 7173 collected in 1868 by Dr. E. Palmer at Old Fort Cobb, Indian Territory, does not belong to the same species as the other three specimens,

but is, as Hurter and Strecker remarked, a western representative of the *concinna* group. I need only point out that its upper beak does not show the faintest indication of a notch and cusps, and agrees in all other respects, including the important pattern on the side of the head, with the other specimens from Oklahoma, Kansas, Missouri and Arkansas.

As these appear to possess characters which have led to their misidentification with *Pseudemys texana* and apparently differentiate them from other forms of the typical *concinna*, it seems expedient to recognize them nomenclatorially as

Pseudemys concinna hoyi (Agassiz).

The revival of the name requires an explanation:

In his "Contributions," vol. 1, p. 433, Agassiz under *Ptychemys concinna* wrote as follows:

"Professor Baird has sent specimens to me, collected by Dr. Hoy in south-western Missouri . . . The young . . . vary very much more in size and form than those of any other species in the family. This is also the case with the adults . . . some have a blunt head while in others the snout is more prominent. Before I knew that the blunt form of the head was an embryonic feature which is sometimes preserved in advanced age, I have distinguished such specimens under the name of Ptychemys Hoyi."

These blunt-headed specimens collected by Dr. P. R. Hoy for the Smithsonian Institution have apparently not been preserved as there are no such specimens in the Museum collections at present nor any entry in the National Museum registration catalog of any turtles collected by Hoy. Dr. Hoy collected only along the southern bank of the Missouri, and Agassiz' "southwestern Missouri" as the locality of these specimens is apparently only meant for western Missouri south of the Missouri River.

As already stated, this form belongs to the *concinna* group of the genus *Pseudemys* and seems to represent it west of the Mississippi River. One of the reasons, no doubt, which has contributed to its confusion with *P. texana* is the fact that in a number of specimens the horny cutting edge of the maxilla is marked by a median notch or emargination often emphasized on both sides by a slight bulge recalling the "cusps" of the beak of *texana*.

The actual types of Agassiz' *Ptychemys hoyi* apparently having been lost, I have selected as a neotype for the form as here understood, U. S. National Museum No. 55516, a female collected in Newton County, Missouri, by J. H. Black and by him presented to Mr. Julius Hurter. The plastral cheek pattern is present but obscure; the light lines on the carapace are of the usual reticulate type and so are the light head lines, except that those on the occiput form a somewhat intricate pattern behind the median head line. The horny edge of the upper jaw is smooth and mesially wavy, the median notch and lateral bulges being but slightly developed; edge of horny lower jaw is strongly denticulate. Total length of carapace 237 mm.; width 174 mm.; length of plastron 216 mm.; height of shell, 75 mm.; width of head (in alcohol) 29.4 mm.

The range of this form, as at present known, includes southeastern Kansas, Missouri south of the Missouri River, Arkansas, Northern Louisiana, Oklahoma and northeastern Texas.

Vol. 51, pp. 177–182 November 3, 1938

PROCEEDINGS

OF THE

BIOLOGICAL SOCIETY OF WASHINGTON

NOTES ON VIRGINIA BUTTERFLIES.

BY AUSTIN H. CLARK AND LEILA F. CLARK.

We have recently secured a number of records of Virginia butterflies of considerable interest. Among these are records of three species and two subspecies heretofore not known to occur in the State. We have taken *Zegris olympia* and *Pieris virginiensis* in Frederick County, and *Basilarchia archippus floridensis* and *Danaus plexippus nigrippus* in Princess Anne County, and in company with Mr. and Mrs. Ernest L. Bell we took *Atrytone dukesi* in Norfolk County. The addition of these five species and subspecies raises the number of butterflies definitely known from Virginia to 144.

In view of the rarity of *Amblyscirtes carolina* in collections we have thought it desirable to call attention to its wide distribution in the coastal plain. It is, however, nowhere very common. With it occurs *A. textor*, which is always more numerous and often abundant.

We wish to thank our friends Carroll M. Williams, Carroll E. Wood, Jr., Walter van Gelder, and W. Herbert Wagner for their kindness in permitting us to include some of their records with our own.

Basilarchia archippus floridensis (Strecker).

This subspecies is common about willows in the marshes from the southern end of Virginia Beach southward, but we have never found it outside of this restricted area, in which it occurs with *Cercyonis alope pegala*. The western border of the range of both these forms is roughly a line running somewhat west of south from Princess Anne Court House to the North Carolina border. Within this area is the single locality in which we have found *Atrytone dukesi*. At the Back Bay and at the northern end of Currituck Sound we have also found *Danaus plexippus nigrippus*.

Ever since its original description in 1878 *floridensis* appears to have been misunderstood. It was described as follows:

> var. a. Floridensis, nob.—The form found in Florida and other parts of the extreme south. Whilst our more northern form is of the same colour as *Danais Plexippus*, this southern variety exactly mimics in its dark colouration *Danais Berenice*, with which it associates.

Strecker gave the range of his new variety as Florida, southern Alabama, Mississippi, and Louisiana.

Basilarchia archippus floridensis differs from typical *archippus* in being markedly darker, with the fore wings slightly darker than the hind wings. In the U. S. National Museum (Barnes collection) there is a specimen from Myakka City, Florida, that was compared with Strecker's type specimen of *floridensis* by the late Foster H. Benjamin, who noted that it was slightly darker than the type.

Our specimens from southeastern Virginia agree with this in all particulars, and one or two are even somewhat darker.

We have examined specimens of *Basilarchia archippus floridensis*, all now in the U. S. National Museum, from the localities listed below:

Virginia: near the beach east of Pungo, Princess Anne Co., Sept. 4, 1938. Georgia. Florida: Myakka City, Manatee Co., July, 1900. Mississippi: Vicksburg. Louisiana: Crowley, Sept. 28, 1911. Tennessee: Nashville, Aug. 16, 1923. Missouri: Curryville, Pike Co., June 1, 1889.

The confusion regarding *floridensis* appears to have arisen from the somewhat unfortunate comparison with *Danaus berenice*. It is a dark southern form of *archippus*, which it resembles in every way except for its darker color. It bears no close resemblance to *Danaus berenice*.

Following the description of var. a. *floridensis* Strecker described what he called ab. b. ♂ *Nig.* of *archippus*. His specimen of this was taken in Florida by Mr. Jacob Doll. This form, supposed by Strecker to be an aberration, was later described by W. H. Edwards as a new species under the name of *eros*, and Edwards' type specimen was figured by Dr. W. J. Holland in 1931 (pl. 73, figs. 1, 2). *Basilarchia archippus eros* is entirely distinct from *B. a. floridensis*. It is much darker with the fore and hind wings the same color, and bears a considerable resemblance to *Danaus berenice*. Edwards gives as the locality Indian River, Florida; we have found it common at Fernandina.

Phyciodes batesii (Reakirt).

Bedford Co.: Sunset Field, Apple Orchard Mountain, June 1, 1938 (Carroll E. Wood, Jr.).

Note.—This is the first definite record for this species in Virginia.

Argynnis diana (Cramer).

Northampton Co.: Bayford (Florence Walker). *Surry Co.:* Just west of Surry Court House, June 15, 1938. About two miles west of Spring Grove,

June 15, 1938. Cabin Point, June 15, 1938. *Pulaski Co.:* Little Walker Mountain, on the road from Pulaski to Mechanicsburg, July 31, 1938. Northeastern end of Little Walker Mountain, August 9, 1938. *Rockbridge Co.:* near Greenlee (Carroll E. Wood, Jr.). *Wythe Co.:* near the summit of Comer Rock, southwest of Speedwell, August 11, 1938. *Giles Co.:* Kerns, Interior, and Kire, August 12, 1938.

Notes.—We were surprised to find the males of this species quite common west of Spring Grove. We captured four on butterfly-weed (*Asclepias tuberosa*) in about twenty minutes, and saw others. Mrs. Barnes, whose flower garden we examined for butterflies, told us that sometimes there would be as many as twenty-five at one time about her butterfly-bush. We have never seen it so numerous elsewhere in Virginia, though we have found it fairly common in Poverty Hollow in Montgomery County, and along the road from Kerns to Kire in Giles County.

This fine species is now known from twenty counties in Virginia. Most of these are in the mountains, but it is found in Prince George, Isle of Wight, Nansemond, and Surry Counties in the coastal plain, and in Northampton County on the Eastern Shore. In the last named it is probably of only casual occurrence.

Danaus plexippus nigrippus Haensch.

Surry Co.: Two miles west of Spring Grove, June 15, 1938. *Princess Anne Co.:* Back Bay, July 4, 1938.

Notes.—There are two forms of this butterfly in Virginia. The typical form, *plexippus*, famous for its migrations, occurs over the entire State. It is most numerous in the higher regions in the west, but is fairly common on the coastal plain. On the coastal plain, and in the marshes about the northern end of Currituck Sound in North Carolina, there is found occasionally another form in which the preapical spots on the fore wings are light or whitish, sometimes almost pure white, the brown in the apical portion of the fore wings is largely or wholly obscured by black, and the small white spots in the black margin of the hind wings are much reduced or obsolete. This form is easily distinguished from true *plexippus* when on the wing.

As found in Virginia this form resembles the figure of *Danais plexippus* published by Dr. W. J. Holland in "The Butterfly Book." The specimen from which this figure was made was kindly looked up for us by Dr. Hugo Kahl and Mr. Ralph Chermock. It bears the label "*Danais erippus*, South America," and was purchased from Dr. O. Staudinger. There is a similar specimen from Salvador in the U. S. National Museum. Dr. W. T. M. Forbes writes us that, judging from the localities from which Dr. Staudinger secured his specimens, it may have come from Surinam, and that he has a series of specimens resembling it from Paramaribo. But, he adds, it might have come from Chanchamayo or some neighboring part of Peru.

Holland's figure represents the form of *plexippus* known as *nigrippus* found in Central and northern South America. In addition to those listed above from Virginia we have examined specimens from the following localities in the United States:

North Carolina: Northern end of Currituck Sound, July 4, 1938. Florida: Key West; Lucien Harris, Jr., December 18, 1936. Louisiana: Rigolets Pass, St. Tammany Parish, Percy Viosca, Jr.

Mr. Percy Viosca, Jr., was so kind as to send us 57 milkweed butterflies taken in November in St. Tammany Parish, Louisiana. Fifty-three of these, 22 males and 31 females, proved to be much worn migrants of *Danaus plexippus plexippus*, but four, three males and one female, were referable to *D. p. nigrippus*.

Dr. H. T. Fernald was so very good as to send, through Mr. James A. Hyslop, four specimens from Florida, one from Indian River City, December 6, 1934; one from the Cheney highway near the St. Johns River, April 1, 1935; and two from Orlando, April 25, 1931, and January 25, 1937. All of these represent *D. p. plexippus*.

We wish to call special attention to the fact that some of the milkweed butterflies of the coastal plain of Virginia appear to be indistinguishable from certain varieties of the tropical *nigrippus*, a non-migratory form, and to suggest the advisability of an intensive study of this insect as it occurs on the southeastern coastal plain, on the Gulf coast, and in southern Florida.

The female from Surry County was captured on butterfly-weed (*Asclepias tuberosa*). On July 5 on the same plant we found a partly grown caterpillar that may have come from an egg laid by this female.

Glaucopsyche lygdamus (Doubleday).

Frederick Co.: Collinsville, April 24, 1938. West of Cross Junction, near the West Virginia line, April 24, 1938. This butterfly is common a few miles west of here, in the region of Ice Mountain, West Virginia.

Atlides halesus (Cramer).

Nansemond Co.: Dismal Swamp near Suffolk, April 1, 1938. Lake Drummond, June 12, 1938. Edge of the Dismal Swamp, eight miles south of Suffolk, September 5, 1938.

Incisalia henrici (Grote and Robinson).

Frederick Co.: West of Cross Junction, near the West Virginia line, April 24, 1938; common along wood roads, and about the red-bud (*Cercis canadensis*).

Zegris olympia (W. H. Edwards).

Frederick Co.: Collinsville, April 24, 1938. West of Cross Junction, near the West Virginia line, April 24, 1938; frequent. This species is very common a few miles to the westward in the region of Ice Mountain, West Virginia.

Pieris virginiensis W. H. Edwards.

Frederick Co.: West of Cross Junction, a few hundred feet east of the West Virginia line, April 24, 1938.

Terias jucunda (Boisduval and LeConte).

Bedford Co.: Major, August 6, 1938 (Walter van Gelder). *Rockbridge Co.:* Near Greenlee, about July 30, 1938 (Carroll E. Woods, Jr.).

Papilio cresphontes Cramer.

Warren Co.: Front Royal, May 22, 1938; frequent.

Atrytone dukesi Lindsey.

Norfolk Co.: At the Norfolk County end of the bridge over Pocaty Creek on route 190, two and one half miles east of the intersection with route 165; on pickerel-weed along the north side of the road just before reaching the bridge; June 14 and July 4, 1938.

Notes.—In company with Mr. and Mrs. Ernest L. Bell we stopped at a small patch of pickerel-weed (*Pontederia*) at the side of the road just north of the bridge over Pocaty Creek, about which Mr. Bell had noticed some skippers. Of these Mr. Bell and the senior author each secured two males and one female—six in all. These were compared with the long series of *Atrytone dukesi* in the National Museum collection and were found to be identical in every particular. They were, however, much darker and more blackish, the Museum specimens having faded.

It was somewhat of a surprise to find this butterfly in Virginia, for it was known previously only from Mobile, Alabama. The type series was secured by Mr. W. C. Dukes on August 6, 27, and 29, 1922, and the species was described by Professor A. W. Lindsey in 1923. Mr. Bell collected it at Mobile between August 24 and September 2, 1925, recording his captures in 1926, and it has been found there by others up to October 11.

In this connection it is interesting to recall that *Atrytone dion alabamae*, described by Professor Lindsey from Mobile and also taken there by Mr. Bell, was found in abundance by the authors in the Dahl Swamp in Accomac County, Virginia, a few years ago. In the region in which *A. dukesi* occurs in Virginia, however, we have found only the typical form of *A. dion.*

Amblyscirtes carolina (Skinner).

Prince George Co.: New Bohemia, June 25, 1937 (G. W. Rawson and W. H. Wagner). Swamp about two miles north of New Bohemia, June 22, 1936 (W. H. Wagner). *Surry Co.:* A short distance west of Surry Court House, June 15, 1938. *Greensville Co.:* Just east of Emporia, September 3, 1936. *Southampton Co.:* Cypress Bridge, July 23, 1936 (C. M. Williams). *Nansemond Co.:* Dismal Swamp near Suffolk, April 1, 1938; May 30, 1937; June 11, 14, 1938, 26, 29, 1937. Four miles south of Suffolk, May 30, 1937. About eight miles south of Suffolk, September 1, 1935. *Norfolk Co.:* Wallaceton, May 31, 1937. *Princess Anne Co.:* Princess Anne, September 4, 1938.

Vol. 51, pp. 183–184 November 3, 1938

PROCEEDINGS

OF THE

BIOLOGICAL SOCIETY OF WASHINGTON

A NEW VARIETY OF COTONEASTER CONSPICUA

BY PAUL RUSSELL.

In November, 1924, while traveling in Tibet, the English botanical explorer, Capt. F. Kingdon Ward, collected some cotoneaster seeds at a little place called Gyala. His field note is as follows:

> K. W. 6400. Cotoneaster. Gyala, 8,000 to 9,000 feet, 15/11/24. Shrub, prostrate on rocks, or erect, up to 3 to 4 feet high. Profusely covered with scarlet berries in winter. Open sunny situations among rocks in moderately dry region.

As indicated by the field note, there were two forms observed, one erect, the other prostrate, and both forms have appeared among the plants grown from the seeds sent back to England by Captain Ward. In growth habit, at least, these two forms are quite distinct as grown by English gardeners.

When the plants grown in English gardens had flowered and borne fruits, it became evident that this cotoneaster was a new species, and it was so described by James Comber under the name *Cotoneaster conspicua*.[1] A more formal description was published the following year[2] by C. V. B. Marquand.

Through the courtesy of Major Lionel de Rothschild, of London, England, some of the original seeds collected by Captain Ward were presented to the United States Department of Agriculture in 1925, and assigned Plant Introduction number 64253. From the seeds a plant was successfully grown at the United States Plant Introduction Garden at Glenn Dale, Maryland. This plant proved to be the prostrate form, and numerous propagations made from it, both by cuttings and seeds, have retained uniformly the habit and foliage characters of the parent plant. Chiefly because of this prostrate habit, and also because of the uniformly small leaves, it is proposed to describe this as a distinct botanical variety, as follows:

[1] Gard. Chron. III. **99** : 388. 1936.

[2] Kew Bull. Misc. Inf. **1937** : 119, 120. 1937.

Cotoneaster conspicua var. **decora** Russell, var. nov.

Frutex prostratus, ramis lateralibus ascendentibus 60–70 cm. longis; folia elliptico-oblonga, 5–7 cm. longa, raro usque ad 10 cm. longa.

Type in the National Arboretum Herbarium, No. 35381, collected by W. B. Clarke from a cultivated plant at San Jose, California, March, 1938.

The name "decora" was first used in a horticultural sense by Mr. W. B. Clarke, a nurseryman of San Jose, California, who received two plants from the United States Department of Agriculture in 1929. At the present time there are large numbers of this cotoneaster established on the Pacific Coast under the name "Cotoneaster decora."

Under favorable conditions, *Cotoneaster conspicua decora* eventually becomes a dense evergreen mat up to 2.5 meters across and about 60 cm. high, with the main branches prostrate, and the lateral ascending branches occasionally 70 cm. in height. The solitary flowers, terminating very short spurs on the branchlets, have wide-spreading white suborbicular petals 3 mm. long and 4 mm. wide, and the globose or obovoid scarlet fruits are about 9 mm. long and contain two pyrenes.

Vol. 51, pp. 185–190 November 3, 1938

PROCEEDINGS

OF THE

BIOLOGICAL SOCIETY OF WASHINGTON

SEVEN NEW NEOTROPICAL SCARAB BEETLES.

BY LAWRENCE W. SAYLOR,

Bureau of Biological Survey, U. S. Department of Agriculture.

The seven species of scarab beetles described herein are all members of the large genus *Phyllophaga*. For the opportunity of studying the present material the author is indebted to Dr. E. A. Chapin, of the U. S. National Museum; Dr. P. J. Darlington, of Harvard University; H. E. Hinton, of Cambridge, England; and Ferd. Nevermann, of Costa Rica.

Phyllophaga (Listrochelus) venodiola, new species.

Male.—Robust to elongate-oval, rufocastaneous above, legs, head, and thorax strongly shining, entirely glabrous above except for elytra, which are densely pruinose. Front shallowly, finely and (usually) not densely punctured; vertex without noticeable carina; clypeal suture strongly biarcuate, not impressed; clypeus (usually) much more densely punctured than front, apex subtruncate and but little reflexed, the angles rounded. Antennae 10-segmented, reddish, club testaceous and subequal to funicle. Thorax with lateral margins roundly dilated, sparsely but coarsely crenulate and ciliate, angles obtuse but well indicated; base and apex with well-defined marginal lines; disc very finely and moderately densely punctate, the punctures separated by two to three times their diameters; more closely punctate along apical margin and sides. Elytra densely and finely punctured, with one weak stria indicated besides the sutural, each puncture with a minute, scarcely obvious hair. Pygidium strongly convex at middle, finely, moderately-coarsely and densely punctured in basal two-thirds, the punctures separated by two to three times their diameters and each with a minute hair; basal area pruinose, apical third highly polished. Abdomen flattened, pruinose, finely punctured; 6th sternite longer than 5th and more obviously transversely flattened, disc scabrose and with moderately dense, short, and fine erect hairs; apical margin ciliate. All claws finely pectinate along a *double* margin, without larger intermixed teeth. Hind tibial spurs slender, unequal, one being considerably longer than the basal tarsal segment. Front tarsal segments 1 to 3, inclusive, each with a brush of short yellowish hairs at inner apex.

Female.—Antennal club shorter than funicle; puncturing of vertex denser than in male; elytral striae more obvious; pygidium flattened, with a slight convex area just before apex, this small gibbosity highly polished, the remainder of pygidium pruinose, and sparsely punctured, with fine short, subprocumbent hair; abdomen highly polished at middle, 6th sternite shorter and more densely punctured than 5th. All claws with a strong sharp tooth a little beyond the middle and the lower margins basad of this tooth finely crenulate; claws serrate along a *double* margin (high power). Otherwise similar to male.

Length, 16–17 mm. Width, 7–8 mm.

The type series, of 13 males and 2 females, from Venodio, Sinaloa, Mexico, was collected June 12, 1915, by A. Kusche, and given to the United States National Museum by B. P. Clark. The *holotype* male and *allotype* female and *paratypes* are in the National Museum, and paratypes in the collection of the writer.

This interesting species, which has asymetrical male genitalia, is nearest to *P. testaceipennis* Moser, but differs especially in color, male abdominal structure, and the position of the tarsal claw tooth in the female.

Phyllophaga (Listrochelus) mimicana, new species.

Male.—Elongate, subparallel, rufocastaneous above, thorax more rufous, apparently glabrous dorsally. Head, including clypeal disc, exceedingly coarsely, confluently, and rugosely punctured; clypeal apex moderately reflexed, slightly but widely emarginate medially, angles rounded. Antennae 10-segmented, club a little shorter than funicle. Thorax polished, with lateral margins roundly dilated and scarcely or not at all crenulate, nor ciliate, the margins nearly straight before and behind the lateral dilations, base and apex strongly margined; disc finely and sparsely punctured; punctures much closer together and coarser along the front margin; front and hind angles obtuse but evident. Elytra with striae, except sutural, weakly developed, moderately-coarsely, and sparsely punctured. Scutellum impunctate and smooth, except for that part normally hidden by the pronotum. Pygidium polished, semi-convex, with very sparse and fine punctures, and short, inconspicuous hair. Abdomen highly polished, with a mere suggestion of a longitudinal sulcation; 5th and 6th sternites plane, shining, sparsely punctured, 6th a little longer than the 5th, its apical fourth more densely punctured. All tarsal claws very finely pectinate or serrate along a *single* margin, without larger teeth intermixed. Upper tooth of front tibia nearly obsolete. Hind spurs free, unequal. Length, 11 mm. Width, 4 mm.

Holotype and *paratype*, both males, are in the author's collection, and were collected by Howard Gentry at San Bernardo, Rio Mayo, Sonora, Mexico, in July, 1935.

Closely related to *P. timidus* (Horn) from Arizona, but has much larger and quite different genitalia, the thorax and pygidium less densely punctured, the size a little larger, and the pectination of the tarsal claws much more obvious.

Phyllophaga (Listrochelus) obliquestriata, new species.

Male.—Robust oval, shining, rufocastaneous, nude above except for a very few minute hairs at base of elytra and the erect frontal hairs. Head with front coarsely and rugosely punctate, with an obvious transverse carina on vertex; clypeus long, its apex greatly reflexed, subtruncate, the angles broadly rounded; disc flat, moderately densely, shallowly, but not coarsely, punctured. Antennae 10-segmented, rufous, club testaceous, about one-sixth longer than funicle. Thorax semicrenulate at sides, front angles semi-rounded, hind angles very obtuse, disc very densely but not coarsely punctate, the punctures closer together each side of median line and near center of front margin. Elytra finely but not densely punctured; first or sutural stria large, abbreviated near base; 2nd stria oblique and almost 3 times wider at apex (where it fades out just before the declivous elytral apex) than at base; 3rd stria scarcely indicated. Pygidium very convex, shining, nude, very sparsely and finely punctured, apex widely subtruncate. Abdomen with 2nd segment at middle, and all of the segments at the sides, pruinose; middle polished, widely, but shallowly canaliculate, and very sparsely, setigerous-punctate; 5th sternite similar to 4th, but a little longer; 6th two-thirds the length of the 5th, slightly flattened, somewhat rugose, finely and sparsely punctured, the apex a little thickened and very slightly raised. Hind spurs free, one three-fourths as long as the other. All claws pectinate on a *single* margin, the pectinations of more or less similar size throughout. Length 15 mm.

Holotype in the author's collection, from "Mexico." This species seems nearest to *P. culminata* Bates, which is known from the female only; however, *P. obliquestriata* lacks a semicircular clypeus and a frontal tubercle as described for that species and has a strong transverse carina on the vertex not mentioned in the description of *P. culminata.*

Phyllophaga (Listrochelus) foralita, new species.

Male.—Robust oval, rufotestaceous, thorax and head strongly rufous, shining, elytra densely pruinose and sparsely hirsute, otherwise glabrous above. Front flattened, coarsely and densely punctured, vertex with a prominent, obtuse transverse, carina; clypeus long, moderately coarsely and densely punctate, apex subtruncate, the angles broadly rounded, margin markedly reflexed. Antennae 10-segmented, rufotestaceous, club testaceous, slightly longer than funicle. Thorax crenulate at sides, especially on posterior half, ciliate, hind angles obtusely subangulate, front angles rounded, front margin strongly thickened; disc very finely, sparsely and rather regularly punctured, the punctures separated by distances equal to 1 to 3 times their diameters, averaging a little closer near sides. Elytra finely and sparingly punctured, with very sparse, moderately long, erect hair scattered over the surface. Pygidium convex, shining, finely and sparsely punctured, with moderately long suberect hairs, apex subtruncate and ciliate. Abdomen polished at middle, pruinose at sides, disc shallowly and widely concave from sternites 2 to 5 inclusive, the 5th a little more densely punctured, center of apex narrowly and angularly, but not deeply

incised, the 6th sternite much shorter, strongly setigerously punctured. Claws *bipectinate*, front and hind claws with a somewhat larger tooth near center of outer pectinate margin, middle claws much less obviously toothed. Length, 16 mm.

The *holotype* male from Saltillo, Coahuila, Mexico, collected by H. F. Wickham in July, 1933, is in the United States National Museum; a male *paratype* from the same locality is in the author's collection.

P. foralita is not closely related to any of the Mexican species, but is a member of the *P. mucorea* group of the United States, from all species of which it differs in the form of the male genitalia.

Phyllophaga (Phytalus) rugithorax, new species.

Male.—Oblong-oval, shining, head and thorax nigrocastaneous, remainder yellow-brown. Front flat, with a suggestion of a concavity, coarsely densely punctured, not scabrous, the punctures contiguous at sides, separate at middle, a small area just in front of the clypeal suture impunctate; disc with moderately long, suberect hair; clypeus very long, sides subparallel, and angles narrowly rounded, front margin distinctly and evenly reflexed, making the clypeus appear deeply concave, apex slightly rounded to subtruncate, disc sparsely punctured basally, rather densely punctate apically, with sparse, short, erect hair. Antenna 9-segmented, nigrotestaceous, with the club darker, segments 3 and 4 slightly longer than 2, club equal to, or very slightly longer than the entire stem. Thorax laterally very convex near middle, margin finely crenulate, with long cilia, front angles subrectangular, hind angles obtusely angular, front margin ciliate and thickened, base traversed by a single row of closely set punctures; disc slightly wrinkled medially, sparsely punctured, the punctures small and separated by distances equal 1 to 3 times their diameters, much sparser near middle of front margin and in areas laterad of disc, glabrous except for half a dozen short erect hairs just behind middle of front margin. Elytra glabrous, striae subobsolete, finely and regularly punctured near sides, smooth in middle. Pygidium convex, shining, sparsely punctate, the punctures fine and separated by one to one and one-half times their diameters, sparser at apex, denser at base; with very short, scattered erect hair; apex subangularly rounded. Scutellum very finely punctured near sides, smooth in middle. Abdomen shining, sparsely and finely, setigerous-punctate; 5th sternite with a few punctures at middle and with short semi-erect hair; 6th one-half as long as 5th, sparsely setigerous-punctate, the hairs short; surface slightly convex and seemingly not at all impressed, either longitudinally or transversely. Hind spurs free. Claws narrowly cleft, upper claw tooth shorter and broader and much less acute than apical tooth, base obtusely angulate-dilated. Front tibia distinctly tridentate. First two segments of hind tarsus subequal. Length, 10 mm.

Type and paratype, both males, labelled "L. Cruzes, Mexico, June 13, 1934," collected and presented to the author by H. E. Hinton, are in the writer's collection.

P. rugithorax is a member of the difficult *P. aegrota* group and is close to

P. omiltemia and *aegrota var.* of Bates; it differs from *P. omiltemia* in the unicolorous thorax, and in the differently shaped clypeus; from *aegrota var.* the present species may be distinguished by the much less densely punctured pygidium, shorter antennal club, and differently shaped clypeus (clypeus in *aegrota var.* reflexed mostly at the middle). This new species also seems close to *P. hirtifrons* Moser, but differs in many details: the color of head and thorax is piceocastaneous and not at all red; the front is not scabrous; the clypeus is not short and its anterior margin is not sinuate but rounded or subtruncate; antennal segments 3 and 4 are only slightly elongate, the thorax is rugose; the pygidium is only moderately densely punctate; and the last abdominal segment is not impressed.

Phyllophaga (Phyllophaga) bowditchi, new species.

Male.—Oblong oval, somewhat wider behind, rufotestaceous, thorax rufous and usually shining, elytra pruinose and opaque, with very fine hairs or glabrous. Front rugosely and coarsely punctured, with erect, short hair; clypeus very transverse, coarsely punctured, broadly, almost semicircularly rounded apex, subtruncate at middle, margin but slightly reflexed. Antennae 10-segmented, unicolorous, rufotestaceous, segments 2–7 short, club longer than funicle, not quite as long as the entire stem. Thorax slightly crenulate behind dilation, margin ciliate; disc very irregularly, sparsely punctured at center, the umbilicate punctures moderately coarse and separated by a distance equal to from 2 to 4 times their diameters, much denser at sides and near front margin, either glabrous or with very minute hairs. Elytra densely but not coarsely punctured, glabrous or with minute hair as in the thorax. Pygidium strongly rugose and densely, coarsely punctate at base, somewhat smooth at apex, disc with minute hair, apex with long cilia. Abdomen strongly shining, shallowly and widely sulcate at middle and sparsely, setigerous-punctate; 5th sternite coarsely, but sparsely punctured at sides, middle with a densely and finely granulated patch and with long erect hairs, 6th sternite not quite so long as 5th, very coarsely punctured, with long erect hair, and a suggestion of a longitudinal sulcus in some specimens. Hind spurs free. Claws strongly cleft, almost as in *Phytalus*, the upper tooth a little broader than, but of the same length as, the apical tooth, *finely* denticulate on lower edge, base of claw scarcely dilated.

Female.—Antennal club equal to funicle; abdomen convex, polished, 5th and 6th sternites densely setigerous-punctate; claws more widely cleft; otherwise as in male.

Length, 12.5 to 16 mm.

Type and *paratypes* are in the Museum of Comparative Zoology at Harvard, and are all from "M-tee Dist." British Honduras, March 1906, collected by F. C. Bowditch. *Paratypes* in the author's collection.

An interesting species related to *P. testaceipennis* and *P. heynei;* from the latter it may be separated by the shorter antennal club and the much sparser thoracic hair. It has the same type of genitalia as *P. testaceipennis*, differing only in detail, while the tarsal claws are of the same odd type found in that species; the present species, however, is much smaller, the

thorax is more densely and coarsely punctured, and the 5th sternite in the male is straight and *not* deeply emarginate at center of apex.

Phyllophaga (Phyllophaga) elenans, new species.

Male.—Elongate oval, castaneous, head and thorax rufous, shining, with a faint pruinose elytral sheen, pilose above. Front and clypeus coarsely, variolately, and rather regularly, but not densely punctured, front with a few erect hairs; clypeal apex narrowly but not deeply emarginate at center, angles very broadly rounded, margin but slightly reflexed. Antenna 10-segmented, club shorter than funicle, but slightly longer than segments 3–7 combined, segments 6 and 7 slightly dentate on the inner side. Thorax with sides subarcuate, front angles suberectangular, hind angles obtusely angulate, disc with a small longitudinal impunctate area at center, moderately densely, subcoarsely, variolately-punctate, the punctures separated by 2–4 times their diameters, somewhat closer together at sides, each puncture with a short but fairly prominent, suberect hair. Elytra punctured like thorax, with short erect hairs and several much longer hairs along and near the elytral suture on the basal three-fourths. Pygidium convex, punctation like that of thorax but slighly more dense, with short erect hairs, apex ciliate. Abdomen subconvex, polished; 5th sternite with scattered transverse granules at center, subdeclivous in apical fourth at middle of apex; 6th one-third the length of the 5th, transversely carinate at base and apex, sparsely punctured. Hind tibia with one spur fixed, long and narrow (about three-fourths as long as the other), not unciform. Claws with a strong median tooth, which is as long as the apical tooth, base obtusely and not conspicuously dilated. Length, 17 mm.

The unique male *type*, loaned for study by Ferd. Nevermann and in his collection, is from Santa Elena, Guanacaste, Costa Rica, Tassman Collector, June 1924.

This species belongs to the difficult *P. rorulenta* complex, but may be separated by the following combination of characters: hairy upper surface, long and not unciform fixed tibial spur, and shining surface; it is otherwise closely related to *P. rorulenta* and allies in all characters, including the genitalia, the latter, however, being specifically distinct.

Vol. 51, pp. 191–196 November 3, 1938

PROCEEDINGS

OF THE

BIOLOGICAL SOCIETY OF WASHINGTON

NOTES ON "NECTOPHRYNE."

BY T. BARBOUR.

I doubt whether there has ever been a more unnatural assemblage than the toads which have been assigned to this genus. Two species, occurring together in Cameroon and Spanish Guinea, are alike and obviously related and one of these is the type of the genus, *Nectophryne afra* Buchholtz and Peters. The other is *N. batesi* Boulenger. These differ from all the others in the structure of fore and hind extremities.

Nectophryne parvipalmata Werner, which its describer suspected also to come from Cameroon and which may have, though there is no certainty of this, is obviously no Nectophryne at all. It is probably a *Cardioglossa* but Werner's figure leaves much to be desired.

The status of *Nectophryne werthi* Nieden is equally unsatisfactory and, while the allocation is by no means certain, it may as well continue to rest in the synonymy of *Nectophrynoides tornieri* (Roux). (Cf. Barbour and Loveridge, Mem. Mus. Comp. Zool. 51, no. 2, December 1928, p. 188.)

Noble helped greatly in clarifying the whole situation when he showed that *Nectophryne gardineri* Boulenger from the Seychelles Islands was really a *Sooglossus*. (Amer. Mus. Novit. 212, 5 May 1926, p. 12.) This leaves for consideration two species from India, and others from the Malayan region proper and from the Philippine Islands. These are surely more closely related, one to another, than they are to the African species. Nevertheless these fall into two genera, a fact which I had never suspected until I asked my generous friend Mr. H. W. Parker of the British Museum to examine the types under his care. He was good enough to have X-ray photographs made of seven of these, as well as of a specimen of "*N.*" *misera* Mocquard. He points out in his letter, and the sciagraphs abundantly support his statement, that these fall into two groups.

For the first of these the name Pedostibes is available, based on *Pedostibes tuberculosus* Günther (P. Z. S. 1875, p. 576, pl. 64, type locality Malabar, India, Beddome Coll. 2 types in British Museum).

Allied to this form are

Pedostibes hosii (Boulenger).

(P. Z. S. 1892, p. 508, pl. 30, fig. 2, from Mt. Dulit, types in British Museum.)

A large wide-ranging species represented in the Museum of Comparative Zoology from Langkat on the east coast of Sumatra and from several localities in Siam, M. Smith Coll. It is also known from the Malay Peninsula and a number of localities in Borneo. For list of specimens in the British Museum *cf.* Roux on "Toads of the Genus Nectophryne" (P. Z. S. 1906, vol. 1, p. 59).

Pedostibes everetti (Boulenger).

(Ann. Mag. Nat. Hist. (6), vol. 17, 1896, p. 450.)

This form was based on a single female specimen in the British Museum from Mt. Kinabalu. It was not found by Chasen during his intensive collecting on that mountain in 1929 nor by Griswold, of the M. C. Z., who made very large and complete collections there in 1937. Also known from Mt. Penrisen, *fide* Roux. (l.c. p. 62, pl. 2, fig. 2.)

Pedostibes altitudinis (Malcolm Smith).

(Bull. Raffles Museum, Singapore, no. 5, August 1931, pl. 14.)

The type is now in the British Museum, from 7,000 to 10,000 feet altitude on Mt. Kinabalu, also unique so far as I know.

To these four species, of which I have sciagraphs, thanks to Doctor Parker, it is probable that another should be added.

Pedostibes kempi (Boulenger).

(Rec. Indian Museum, vol. 16, 1919, p. 207, found at Tura in the Garo Hills of Assam, type not mentioned by Parker as being in the British Museum, hence probably still preserved in Calcutta.)

It has never been figured and so far as I know has been collected this once only.

The four species of Pedostibes first mentioned and possibly this fifth one as well are alike in all having eight presacral vertebrae and in having the coccy articulated by two small but distinctly separated condyles.

For certain other forms I propose the generic name of

Pelophryne, gen. nov.

the genotype *P. albotaeniata* from Palawan (*vide infra*).

In this form, as in certain others, there are usually seven and perhaps occasionally six presacral vertebrae, the coccyx is fused to the sacrum, and Mr. Parker notes also the presence of coccygeal expansions more or less similar to those figured by Noble for Oreophrynella (cf. Biology of the Amphibia 1931, p. 505, figure 164). These, however, are difficult to observe in the sciagraphs.

Besides this new form *Pelophryne* is to include

Pelophryne misera (Mocquard).

(Nouv. Arch. Mus. d'Hist. nat. (3), vol. 3, 1890, p. 161, pl. 11, fig. 7, types three badly preserved in the Paris Museum, simply labelled North Borneo.)

Chasen, however, took a large number on Mt. Kinabalu in 1929 between 7,000 and 10,500 feet. Parker's sciagraph is not quite clear but it looks very much as if there were only six presacral vertebrae in this species.

Pelophryne macrotis (Boulenger).

(Ann. Mag. Nat. Hist. (6), vol. 16, 1895, p. 171, types in the British Museum, two specimens taken by Charles Hose on the Akar River in northern Sarawak).

It apparently has not been found since.

Pelophryne guentheri (Boulenger).

(Cat. of Batrachia Salientia 1882, p. 280, pl. 18, fig. 3).

The holotype was one of the cotypes of Günther's *Bufo leptopus*, which came from Matang in Borneo. The species is represented in the M. C. Z. by a series of five specimens received from the Sarawak Museum in 1913 and presumably taken in the vicinity of Kuching. Van Kampen, in his "Amphibia of the Indo-Australian Archipelago" (Brill, Leiden 1923, p. 69) records this species also from Sipora in the Mentawei Islands, from Sumatra, from Serasan in the Natuna Group, from Singapore, and the Philippines; the latter locality, however, is based on the hopelessly inaccurate catalogue of d'Elera and the record certainly need not be considered.

Pelophryne signata (Boulenger).

(P. Z. S. 1894, p. 645, pl. XL, fig. 1, based on two specimens in the British Museum from Mt. Robong in the Kapuas District, Dutch South Borneo, A. Everett Coll.)

Of these species, as of the three preceding, I have sciagraphs made at the British Museum.

The allocation is by no means certain but the following may also belong here:

Pelophryne maculata (Mocquard).

(Nouv. Arch. Mus. d'Hist. nat. (3), vol. 3, 1890, p. 162, pl. 11, fig. 8, apparently known only from the three cotypes in the Paris Museum from Mt. Kinabalu.)

As this form is said to have a hidden tympanum it may turn out not to be congeneric with any of the others.

It is more probable that here also belong these two:

Pelophryne lighti (Taylor).

(Philippine Jour. of Science, vol. 16, pt. 3, March 1920, p. 339, pl. 7, figs. 7 and 32.)

Apparently known only from the type taken at Bunawan, Aguasan, Mindanao.

Pelophryne brevipes (Peters).

(Monatsb. Berlin Mus., 1867, p. 37.)

This species has long been considered a Bufo, apparent.y known only from Semper's two cotypes taken years ago at Zamboanga, Mindanao. It is, however, represented in the M. C. Z. by a specimen which Taylor secured 18 Oct. 1923, at Abung Abung on the Island of Basilan.

Van Kampen concluded that *Nectophryne sundana* Boulenger was probably a Kaloula, but Parker, however, has, upon excellent evidence, set up the genus Metaphrynella to include this species and what has been called *Phrynella pollicaris* (The Microhylidae, British Museum, London, 1934, p. 108).

Malcolm Smith's *Nectophryne picturata* (Jour. Fed. Malay States Mus. vol. 10, 1921, p. 199, pl. 2, fig. 2) I had already allocated as being the same as *Microhyla leucostigma* Boulenger, but Parker (loc. cit. p. 103) has shown that this form should be called *Chaperina fusca.*

The genotype, which is from Palawan, may be called

Pelophryne albotaeniata, sp. nov.

Type.—Mus. Comp. Zool. no. 23291; taken at an altitude of 4500 ft. on Thumb Peak, Palawan, 17 October 1923, by Edward H. Taylor.

Diagnosis.—A small species with long and slender limbs and a heavily tuberculate dorsum, a white line along each side of the middorsal area and a heavy black midventral blotch. The toes are extensively webbed and the fingers are thick, flat, somewhat webbed and with large, flat tubercles beneath.

Description.—Habit rather slender; head as broad as long; snout rather short, truncate, but with a distinct and rather sharp median projection; canthus rostralis ill defined; loreal region vertical but deeply concave; interorbital space more than twice as broad as the upper eyelid; tympanum large, very distinct, round, about half the diameter of the eye. Forelimbs long and slender; fingers flattened, not swollen at the tips, which are slightly rounded, slightly webbed at base; hind limbs long and slender; toes flattened, extensively webbed with unexpanded tips; plantar surface with a large, flat, ill-defined tubercle; subarticular tubercles flat and ill defined; a well-defined tarsal fold; the tarso-metatarsal articulation reaches the tip of the snout; top of head, dorsum and sides and upper surfaces of limbs coarsely granular or warty; warts of the back mostly small and tending to be conical but not spinose, those of sides larger and flatter; a small, round, rather ill defined parotoid gland on each side above the insertion of the forelimb.

Fore and hind limb of *Pelophryne albotaeniata.*

Color.—Rich mahogany brown above with a white dorsolateral line extending from above the eye almost to the groin, broken up anteriorly but continuous and broader from the nuchal region backward; limbs more mottled above than cross-barred; ventral surfaces white with a large, dark brown midventral spot and several other smaller blotches along the sides of the belly.

Measurements.—Snout to vent 18.5 mm.; breadth of head 5 mm.; forelimb 14.5 mm.; hind limb 21.5 mm.

I have to thank my colleague, Mr. Arthur Loveridge, for suggesting that I go into the Nectophryne question before describing Taylor's new form. I should have insisted that he do this himself had he not been on the point of leaving for Africa to be absent a year. My friendly colleague, Mr. H. W. Parker of the British Museum, has, of course, played a more important part in settling this rather knotty question than I have myself, for without his shrewd observations on the splendid series of types in the British Museum, it would not have been possible to come to the conclusions that I have drawn.

Vol. 51, pp. 197–200 December 23, 1938

PROCEEDINGS
OF THE
BIOLOGICAL SOCIETY OF WASHINGTON

TWO NEW POCKET MICE, GENUS PEROGNATHUS, FROM WEST-CENTRAL CALIFORNIA.

BY JACK C. VON BLOEKER, JR.

A study of the *californicus* group of pocket mice, based chiefly on materials in the California Museum of Vertebrate Zoology and supplemented by specimens generously loaned by Mr. O. P. Silliman, the California Academy of Sciences, and the Los Angeles Museum of History, Science and Art, has revealed the existence of two hitherto unrecognized subspecies inhabiting the west-central portion of California. Dr. Seth B. Benson, of the Museum of Vertebrate Zoology, has also studied most of this same material and is agreed with the writer in the opinion that the forms herein described merit racial recognition. The two races may be known and diagnosed as follows:

Perognathus californicus bensoni, subsp. nov.

BENSON POCKET MOUSE.

Type.—♂ subadult, skin and skull, no. 81579, Museum of Vertebrate Zoology, from Stonewall Creek, 1300 feet altitude, six and three-tenths miles northeast of Soledad, Monterey County, California, June 16, 1937, collected by Jack C. von Bloeker, Jr., orig. no. 7771.

Distribution.—Gabilan-Diablo Range from Herrero Canyon, Merced County, south through San Benito, eastern Monterey and western Fresno counties onto Carrizo Plains, San Luis Obispo County. Altitudinal range extends from 200 feet up at least to 4400 feet.

Diagnosis.—A medium-sized (see measurements), pale-colored race of the *californicus* group of pocket mice; skull short and broad, with widely inflated cranium and large smoothly contoured mastoid bullae.

Comparisons.—Compared with *Perognathus californicus californicus*, about equal in external measurements, color paler; skull broader, with wider and more inflated cranium; mastoid bullae larger and extending farther posteriorly. Compared with *Perognathus californicus dispar*, total length and tail length about equal, hind foot averages smaller and ear averages larger; color lighter; skull shorter and broader, cranium more widely inflated in parietal region; mastoid bullae longer and projecting

farther posteriorly. Compared with *Perognathus californicus ochrus*, externally larger throughout; color averages slightly darker; skull longer and broader posteriorly; mastoid bullae larger, extending farther posteriorly.

Color (using color terms from Ridgway, *Color Standards and Color Nomenclature*, 1912).—Type: Dorsal hairs with basal portions pale neutral gray, broad subterminal bands pale ochraceous buff, terminal portions black; hairs of lateral stripes pale neutral gray basally, broadly tipped with light pinkish cinnamon; ventral body hairs and hairs of upper surface of feet and ventral surface of tail entirely white; hairs of dorsal tail stripe and at base of vibrissae mummy brown; hairs on upper (internal) rim of ear whitish.

Measurements (in millimeters).—Averages and extremes of ten adults and subadults (5 males and 5 females), paratypes: Total length, 203 (197–212); tail, 111 (103–117); head and body, 92 (86–99); hind foot, 25 (24–26); ear, from notch, 12 (11–13). Skull: Basilar length, 23.3 (22.0–23.8); greatest length, 26.7 (25.2–27.1); fronto-nasal length, 17.8 (17.2–18.4); nasal length, 10.0 (9.8–10.2); greatest width across mastoids, 13.8 (13.6–14.0); width across mastoids behind external auditory meatus, 13.2 (13.1–13.3); greatest length of mastoids, 9.8 (9.7–9.9); distance between stylomastoid foramina, 10.5 (10.3–10.7); interorbital breadth, 7.0 (6.9–7.1); interparietal width, 8.8 (8.7–8.9); interparietal length, 4.2 (4.1–4.3); alveolar length of maxillary tooth row, 4.0 (3.9–4.1).

Specimens examined.—Unless otherwise indicated, specimens are in the Museum of Vertebrate Zoology. One hundred and fifty-one, from the following localities in California: Merced County: Sweeney's Ranch, 1200 feet, Herrero Canyon, 22 miles south of Los Banos, 13. Stanislaus County: Ten miles west of Gustine (Merced Co.), 3. San Benito County: Cook's P. O., 1300 feet, Bear Valley, 11; Butt's Ranch, 3000 feet, 5 miles north-northeast of San Benito, 4; six miles east-southeast of San Benito, 1600 feet, 17; two miles north-northeast of New Idria, 1900 feet, 5; one mile south of New Idria, 3700 feet, 2; Laguna Ranch, 4000 feet, 4 miles south of Hernandez, 3; one mile southeast of summit of San Benito Mountain, 4400 feet, 2. Monterey County: Stonewall Creek, 1300 feet, 6.3 miles northeast of Soledad, 13[1]; mouth of Stonewall Creek, 300 feet, 4 miles northeast of Soledad, 2[2]; east base of Sierra de Salinas, 250 feet, 2½ miles west of Soledad Mission, 1[2]; Paraiso Springs, 1400 feet, Sierra de Salinas, 14[2]; Abbott's Ranch, 670 feet, Arroyo Seco, 1; Jorgensen Ranch, 1000 feet, Arroyo Seco, 4[2]; mouth of Vaqueros Canyon, 200 feet, 7[2]; San Lorenzo River, 1500 feet, Peachtree Valley, 2; Lewis Creek, 1750 feet, Diablo Range, 5[2]; Priest Valley, 2500 feet, Diablo Range, 4[2]; Jolon, 1100 feet, 1[3]; San Ardo, 450 feet, Salinas Valley, 6[2]; Salinas Valley, 500 feet, 5 miles south of San Ardo, 1[2]. Fresno County: Waltham Creek, 1850 feet, 4½ miles southeast of Priest Valley, 7. San Luis Obispo County: Nacimiento River, 1000 feet, Santa Lucia Mountains, 1[2]; San Diego Joe's

[1] Eight in O. P. Silliman collection.
[2] O. P. Silliman collection.
[3] Los Angeles Museum.

(=Santiago Springs), 2600 feet, 3; Carrizo Plains, 2000 feet, 7 miles southeast of Simmler, 2; Santa Margarita, 996 feet, 17.

Perognathus californicus marinensis, subsp. nov.

MARINA POCKET MOUSE.

Type.—♂ adult, skin and skull, no. 81550, Museum of Vertebrate Zoology, from Indian Harbor, 50 feet altitude, one and one-half miles south of Marina, Monterey County, California, May 27, 1937, collected by Jack C. von Bloeker, Jr., orig. no. 7496.

Distribution.—In so far as known, occurs throughout the narrow humid coastal belt of the Pacific drainage slope of the Santa Cruz and Santa Lucia Mountains, California, from Bear Creek, Santa Cruz County, south at least to Morrow Bay, San Luis Obispo County. Ranges altitudinally from near sea-level up at least to 4600 feet.

Diagnosis.—A medium-sized (see measurements), long-tailed, darkly colored pocket mouse of the *californicus* group; skull long and narrow, with somewhat flattened cranium and long, narrow mastoid bullae.

Comparisons.—Compared with *Perognathus californicus californicus*, head and body length and tail length about equal, hind foot smaller, ear larger; color much darker; skull longer and relatively narrower, with more flattened cranium; mastoid bullae longer and narrower. Compared with *Perognathus californicus dispar*, total length and tail averages shorter, head and body length averages longer, ear much longer; color darker; skull longer, with more flattened cranium and longer mastoid bullae. Compared with *Perognathus californicus bensoni*, total length and tail averages shorter, head and body length and length of hind foot about equal, ear averages longer; skull actually and relatively longer and narrower, with much more flattened cranium and longer, narrower mastoid bullae; color darker.

Color.—Type: Dorsal hairs with basal portions neutral gray, narrow subterminal bands pinkish cinnamon, broadly tipped with black; hairs of lateral stripe neutral gray basally, broadly tipped with pinkish cinnamon; hairs of ventral surface of body and tail entirely white; hairs of upper surfaces of feet pale pinkish buff; hairs of dorsal tail stripe, at base of vibrissae, and on upper (internal) rim of ear bone brown.

Measurements.—Averages and extremes of twelve adults and subadults (7 males and 5 females), paratypes: Total length, 200 (197–205); tail, 108 (101–112); head and body, 92 (89–94); hind foot, 25 (24–26); ear, from notch, 13 (12–14). Skull: Basilar length, 24.0 (23.4–24.3); greatest length, 28.2 (27.8–29.0); fronto-nasal length, 19.0 (18.6–19.4); nasal length, 11.1 (10.9–11.3); greatest width across mastoids, 13.4 (13.3–13.5); width across mastoids behind external auditory meatus, 12.8 (12.5–13.0); greatest length of mastoids, 10.5 (10.2–10.7); distance between stylomastoid foramina, 10.8 (10.6–11.1); interorbital breadth, 6.7 (6.5–6.9); interparietal width, 8.4 (8.1–8.5); interparietal length, 4.0 (3.8–4.1); alveolar length of maxillary tooth row, 4.2 (3.9–4.4).

Specimens examined.—Seventy-seven, from the following localities in Californis: SANTA CRUZ COUNTY: Bear Creek, 650 feet, 2–4½ miles north-

east of Boulder Creek, 9.[4] Santa Clara County: Black Mountain, 4. San Benito County: north end of Gabilan Mountains, 500 feet, 3½ miles west of San Juan Bautista, 2.[4] Monterey County: Strawberry Canyon, 200–500 feet, 8[4]; Indian Harbor, 50–100 feet, 1½ miles south of Marina, 11[5]; Salinas Valley, 2 miles south of mouth of Salinas River, 1; Seaside, 1; Del Monte, 1; Monterey, 7[6]; mouth of El Toro Canyon, 100 feet, 2[4]; North Fork, Little Sur River, 2[7]; Big Sur River, 1; Partington Point Canyon, 3[7]; North Fork, Big Creek, 1[7]; Lime Kiln Creek, 100–250 feet, Santa Lucia Mountains, 4[4]; Nacimiento River, 2000 feet, Santa Lucia Mountains, 2[4]; Willow Creek, 1[7]; Santa Lucia Mountains, 3000 feet, 1¼ miles south of Chalk Peak, 9. San Luis Obispo County: San Carpoforo Creek, 7 miles north of Piedras Blancas, 6; four and one-half miles south of Morro, 2.

Bibliography.

Benson, S. B.

1930. Two new pocket mice, genus Perognathus, from the Californias. Univ. Calif. Publ. Zool., **32** : 449–454.

Merriam, C. H.

1889. Revision of the North American pocket mice. U. S. Dept. Agr., Div. Ornithology and Mammalogy, N. Am. Fauna, **1** : 1–36, 4 pls.

Osgood, W. H.

1900. Revision of the pocket mice of the genus Perognathus. U. S. Dept. Agr., Div. Biol. Surv., N. Am. Fauna, **18** : 1–72, 4 pls. (incl. 2 maps), 15 figs. in text.

1904. Two new pocket mice of the genus Perognathus. Proc. Biol. Soc. Wash., **17** : 127–128.

4 O. P. Silliman collection.

5 Ten in O. P. Silliman collection.

6 Two in California Academy of Sciences.

7 California Academy of Sciences.

Vol. 51, pp. 201–204 December 23, 1938

PROCEEDINGS

OF THE

BIOLOGICAL SOCIETY OF WASHINGTON

GEOGRAPHIC VARIATION IN NEOTOMA LEPIDA IN WEST-CENTRAL CALIFORNIA.

BY JACK C. VON BLOEKER, JR.

A study of the wood rats of the species *Neotoma lepida* inhabiting the Pacific drainage slope of California has been made recently at the Museum of Vertebrate Zoology by the writer. The results of this study indicate the existence of two separate geographic races in the Coast Range Mountains of west-central California, one in the Gabilan-Diablo Range and one in the Santa Lucia-Sierra de Salinas Range. The former of these was described in 1894 as *Neotoma californica* by W. W. Price but, presumably because of the lack of sufficient comparative material, has been since referred to *Neotoma lepida intermedia* by E. A. Goldman (1910 and 1932) and subsequent authors.

Field work in San Benito and Monterey counties in 1936 and 1937 has resulted in the acquisition of new material for comparison which, together with series of previously collected specimens in the Museum of Vertebrate Zoology, the California Academy of Sciences, the Stanford Museum, and the Los Angeles Museum, has provided the basis for the above-mentioned study. The two subspecies appearing to merit recognition may be described as follows:

Neotoma lepida californica Price.

CALIFORNIA WOOD RAT.

Neotoma californica Price (1894 : 154–156).
Neotoma intermedia Goldman (1910 : 42).
Neotoma lepida intermedia, Goldman (1932 : 64).

Type.—♂ adult, skin and skull, no. 335, Stanford University Museum, from Bear Valley, San Benito County, California, April 2, 1893, collected by C. H. Gilbert and W. W. Price.

Distribution.—Inner Coast Range from Mount Hamilton, Santa Clara County, east to Herrero Canyon, Merced County, and south through Gabilan-Diablo Range at least to Lewis Creek, Monterey County. Ranges altitudinally from 200 feet up to 4400 feet.

Diagnosis.—A medium-sized (see measurements), moderately light-colored wood rat of the *lepida* group, darker than *Neotoma l. gilva* and lighter than *Neotoma l. intermedia;* skull long, narrow, and relatively high; incisive foramina about equal to palatal bridge in length; auditory bullae broad.

Comparisons.—Compared with *Neotoma l. gilva,* total length shorter, tail actually and relatively shorter, hind foot and ear longer; skull longer and relatively narrower, with longer nasals and greater depth of skull, length of incisive foramina shorter, palatal bridge longer, auditory bullae broader; color darker dorsally. Compared with *Neotoma l. intermedia,* total length and tail shorter; skull relatively broader throughout, depth of skull greater, incisive foramina shorter and palatal bridge longer, auditory bullae broader; color lighter dorsally.

Color (using color terms from Ridgway's *Color Standards and Color Nomenclature,* 1912).—Type: Dorsal body hairs with basal portions dark plumbeous, broad subterminal bands ochraceous buff, and tipped with black; hairs of throat and belly deep plumbeous basally, broadly tipped with white; hairs of large area in both pectoral and pelvic regions, and upper surfaces of feet entirely white; tail bicolor, hairs of dorsal stripe ochraceous buff basally with long black tips, becoming increasingly black as apical portion of tail is approached, hairs of ventral surface of tail entirely cinereous.

Measurements (in millimeters).—Averages and extremes of ten adults and subadults (7 males and 3 females): Total length, 329 (306–345); tail, 154 (140–162); ratio, tail to total length, 46.8%; ratio, tail to head and body, 88.0%; hind foot, 34 (31–37); ear, 30 (26–33). Skull: Basilar length, 34.1 (32.6–35.0); ratio, basilar length to total length, 10.4%; greatest zygomatic breadth, 21.7 (21.0–23.0); ratio, zygomatic breadth to basilar length, 64.0%; length of nasals, 15.9 (15.2–16.7); ratio, length of nasals to basilar length, 46.4%; depth of skull, 15.2 (14.5–15.8); ratio, depth of skull to basilar length, 45.8%; ratio, depth of skull to zygomatic width, 70.1%; least interorbital breadth, 5.7 (5.4–6.1); length of incisive foramina, 8.1 (8.0–8.2); ratio, length of incisive foramina to basilar length, 23.8%; length of palatal bridge, 8.0 (7.8–8.4); ratio, length of palatal bridge to basilar length, 23.5%; ratio, length of palatal bridge to length of incisive foramina, 98.9%; breadth of bulla, 7.4 (7.2–7.8); alveolar length of maxillary tooth row, 8.0 (7.6–8.3); ratio, maxillary tooth row to basilar length, 23.2%; alveolar length of mandibular tooth row, 7.7 (7.5–7.9); ratio, mandibular tooth row to basilar length, 22.5%; ratio, mandibular tooth row to maxillary tooth row, 96.9%.

Specimens examined.—Unless otherwise indicated, specimens are in the collection of the Museum of Vertebrate Zoology. Thirty-eight, from the following localities in California: Santa Clara County: Mount Hamilton, 4[1]; Merced County: Sweeney's Ranch, 1200 feet, Herrero Canyon,

[1] Stanford University Museum.

22 miles south of Los Banos, 9; San Benito County: Gabilan Mountains, 4400 feet, 1 mile southeast of the summit of San Benito Mountain, 2; San Benito Valley, 1600 feet, 6 miles east-southeast of San Benito, 5; Diablo Range, 1900 feet, 2 miles north-northeast of New Idria, 3; Cook Post-office, 1300 feet, Bear Valley, 1; Bear Valley, 3[1]; Monterey County: Strawberry Canyon, 200 feet, 1[2]; Stonewall Creek, 1300 feet, 6.3 miles northeast of Soledad, 3[2]; mouth of Stonewall Creek, 300 feet, 4 miles northeast of Soledad, 5[2]; Diablo Range, 350 feet, 4 miles east of King City, 1[3]; Lewis Creek, 1750 feet, Diablo Range, 1.[2]

Neotoma lepida petricola, subsp. nov.

ARROYO SECO WOOD RAT.

Type.— ♀ adult, skin and skull, no. 30202, Museum of Vertebrate Zoology, from Abbott's Ranch, 670 feet altitude, Arroyo Seco, Monterey County, California, July 19, 1919, collected by H. G. White, orig. no. 3525.

Distribution.—Santa Lucia and Sierra de Salinas mountains, Monterey County, California, from Big Pines south at least to Mount Mars. Altitudinal range extends from 600 feet up to 5000 feet.

Diagnosis.—A small-sized (see measurements), moderately dark-colored wood rat of the *lepida* group, darker than either *N. l. gilva* or *N. l. californica,* but lighter than *N. l. intermedia;* skull short, broad, and relatively low; incisive foramina long and narrow; auditory bullae moderately broad.

Comparisons.—Compared with *Neotoma l. gilva,* total length shorter, tail actually and relatively shorter, ear smaller; skull relatively shorter and narrower; color darker. Compared with *N. l. intermedia,* total length shorter, tail relatively longer, hind feet and ears smaller; skull shorter and relatively broader; color lighter. Compared with *N. l. californica,* total length shorter, tail relatively longer, hind feet and ears smaller; skull shorter and relatively broader; color darker.

Color.—Type: Dorsal body hairs with basal portions blackish plumbeous, narrow subterminal bands ochraceous tawny, and tipped with black; hairs of throat, belly and ventral surfaces of legs slate color basally, narrowly tipped with white; hairs of small area in both pectoral and pelvic regions, on upper surfaces of feet and ventral surface of tail entirely white; tail bicolor, hairs of dorsal stripe ochraceous tawny basally, with long white tips, becoming brownish toward apical portion of tail.

Measurements.—Averages and extremes of nine adults and sub-adults (2 males and 7 females): Total length, 318 (314–325); tail, 152 (138–157); ratio, tail to total length, 47.8%; ratio, tail to head and body, 92.7%; hind foot, 33 (31–35). Skull: Basilar length, 33.4 (30.8–35.0); ratio, basilar length to total length, 10.5%; greatest zygomatic breadth, 22.0 (20.9–22.5); ratio, zygomatic breadth to basilar length, 65.6%; length of nasals, 15.7 (14.7–16.2); ratio, length of nasals to basilar length, 47.1%; depth of skull, 14.6 (13.3–15.2); ratio, depth of skull to basilar length, 43.8%; ratio, depth of skull to zygomatic width, 66.5%; least interorbital breadth, 5.6 (5.4–5.8);

[2] O. P. Silliman collection.

[3] Los Angeles Museum.

length of incisive foramina, 8.8 (8.1–9.3); ratio, length of incisive foramina to basilar length, 26.3%; length of palatal bridge, 7.8 (7.5–8.0); ratio, length of palatal bridge to basilar length, 23.3%; ratio, length of palatal bridge to length of incisive foramina, 86.4%; breadth of bulla, 7.0 (6.7–7.2); alveolar length of maxillary tooth row, 8.2 (7.8–8.5); ratio, maxillary tooth row to basilar length, 24.3%; alveolar length of mandibular tooth row, 7.6 (7.3–8.0); ratio, mandibular tooth row to basilar length, 22.8%; ratio, mandibular tooth row to maxillary tooth row, 92.7%.

Specimens examined.—Sixteen, from the following localities in California: Monterey County: Abbott's Ranch, 670 feet, Arroyo Seco, 4; Big Pines, 4000 feet, Santa Lucia Mountains, 1; Chew's Ridge, 5000 feet, Santa Lucia Mountains, 1[4]; China Camp, 4500 feet, Santa Lucia Mountains, 1[4]; Mal Paso Creek, south of Point Lobos, 2[5]; head of Big Creek, Santa Lucia Mountains, 2[5]; Willow Creek, Santa Lucia Mountains, 3[5]; Mount Mars, 2.[5]

Bibliography.

Goldman, E. A.

1910. Revision of the wood rats of the genus Neotoma. U. S. Dept. Agr., Bur. Biol. Surv., N. Am. Fauna, **31** : 1–124, 8 pls., 14 figs. in text.

1932. Review of wood rats of Neotoma lepida group. Jour. Mammalogy, **13** : 59–67.

Price, W. W.

1894. Description of a new wood rat from the Coast Range of central California. Proc. Calif. Acad. Sci., ser. 2, **4** : 154–156, 1 pl.

[4] O. P. Silliman collection.

[5] California Academy of Sciences.

Vol. 51, pp. 205–208 December 23, 1938

PROCEEDINGS
OF THE
BIOLOGICAL SOCIETY OF WASHINGTON

NEW DIPLOPODS.

BY RALPH V. CHAMBERLIN,
University of Utah.

The five new diplopods described below were found in collections recently submitted to me for identification, the more important of these collections being one from Texas, sent by Mr. Stanley Mulaik, and one sent by Professor J. A. Macnab from Oregon. All types are in the author's collection.

KLANSOLUS, gen. nov.

A juloid form characterized in not having the first body segment of the male enlarged and especially in the modification of the first legs thereof. These are three-jointed, the two basal joints being short and broad, and the distal one elongate, stout, strongly chitinized and with end distally rounded and produced into a hook-like process on the outer side. Second legs of male normal. Gonopods sunk in a pocket, only the distal portion free. Anterior gonopods without telopodite and without flagellum; distally branched. Posterior gonopods without flagellum; telopodite lamellate, distally branched.

Genotype.—Klansolus euphanus, sp. nov.

The type of this genus occurs in a general region in which parajuloids are the dominant julid form. Of these the genus *Taijulus*, new, of which *Parajulus tiganus* Chamberlin is the genotype, is abundantly represented by *T. furcifer* (Harger).

Klansolus euphanus, sp. nov.

Body and legs deep brown or black, the antennae and legs of the same color, but clypeal region of head pale.

Ocelli well-developed, in a patch composed typically of 5 series; e. g., 7,7,7,4,2. Head bearing a pair of long setae near level of anterior end of vestigial sulcus.

First tergite or collum smooth above but deeply sulcate at each loose end beneath. Ordinary segments with metazonites deeply longitudinally striate throughout. Repugnatorial pores widely separated from segmental suture.

Anal tergite caudally convex, exceeded by the anal valves. Anal scale with caudal margin nearly straight as seen in ventral view.

Anterior gonopod with main (outer) branch distally rounded, with a long, pointed, retrorse, spine-like process from its base on cephalic side toward inner edge; arising from mesal side above base of the retrorse spine a slender, furcate process projecting beyond end of outer process, the inner prong much exceeding the outer, finely pointed; a second process from inner edge below this furcate one, this curved, the apex acute, a somewhat retrorse tooth some distance proximad of it. Posterior gonopod with telopodite broadly lamelliform, the outer distal corner rounded, with two weak dentations, while from the inner portion of distal end arise four processes; of these processes the most proximal bears at its end three slender, parallel prongs; next to it on the outside is a curved lamellate process ending in two spinous processes, of which the more distal is long and geniculate; a third process, arising just distad of the preceding, bears an evenly curving spine which describes a semicircle; the fourth process is distal in position and ends bluntly, the apical portion curving mesad.

Number of segments, 69.

Diameter, 4.25 mm.

Locality.—Oregon: Boyer. Male holotype taken by Macnab June 13, 1936. Female allotype and male paratype taken by "K. F." 31 August, 1933.

Ethojulus bufonius, sp. nov.

Dorsum and sides dark brown or blackish with numerous yellow spots, the anterior part of prozonites clear yellow; venter and legs yellow, the tarsi dark; antennae blackish, clypeal region and mouth parts yellow.

Ocelli forming a black, subtriangular patch with anterior and posterior sides convex and extal side more weakly so; mostly in 9 or 10 transverse series. Cardo of mandibles of male excavated below, the excavation wide and shallow.

First legs of male crassate, flattened on mesal surface; penult article narrowed distad, this and the preceding article setose, especially on anterior face. Sternite of second segment with chitinous processes elongate, contiguous, projecting forward, distally translucent and subtruncate.

Anterior gonopods of male with anterior lamina clavate and setose, the branch angled just below distal expansion; the posterior branch a broad, chitinous lamina, somewhat twisted and with free end somewhat expanded and distally convex. Posterior gonopod a curved or sickle-like blade with apical position a little curved ventrad and sperm duct opening at end of ventral projection, the blade transversely wrinkled and corrugate proximad of this tip.

Anal tergite projecting free a little beyond base of valves, but the latter exceeding it at the middle portion.

Number of segments, 47.

Diameter, 1.5–2 mm.

Locality.—Florida: Gainesville. Many specimens, male and female, taken from stomach of the spadefoot toad by A. J. Can, Jr., in 1932.

Orthoporus texicolens, sp. nov.

General color nearly black, with a broad yellow or ferruginous band encircling each segment over caudal portion. Head and collum lighter. Legs light brown or somewhat ferruginous. Collum with four complete and an incomplete fifth, deep striae running obliquely over lower part on each side. Repugnatorial pores beginning on sixth segment, each located at about one-third the distance from the sulcus to caudal margin of segment; sulcus widely excurved opposite the pore; smooth. Segments smooth above; striae distinct below level of pore and a few incomplete over caudad of sulcus just above the pore. Last tergite much exceeded by the anal valves. Anal valves compressed and elevated. Anal scale broadly subtriangular, the caudal angle rounded. Gonopods of male much as in *O. punctilliger* Chamb. in general structure but disto-ectal spine of anterior gonopod bent abruptly distad instead of extending caudad.

Number of segments, 73.

Length, 118 mm.

Locality.—Texas: Edinburg. One male taken in March, 1936, by S. Mulaik.

Nannaria ursa, sp. nov.

General color of dorsum brown, the metazonites narrowly bordered laterally and posteriorly with yellow. Venter, legs and antennae yellow.

Coxae and sternites in the male without processes.

Characterized especially by the structure of the gonopods of the male. In these the proximal article bears a conspicuous sickle-shaped hook from the mesal side. The telopodite with principal branch projecting ventrad and ending in a smooth abruptly more slender apical portion which bends mesad at an angle and has the tip bent proximad; mesal branch arising toward base as a smooth curved process much shorter than the main branch. Below the mesal branch of telopodite a depression or pit bordered with setae.

Width of male, 3.5 mm.; of female, 4 mm.

Locality.—New Mexico: Bear Canyon, Camp Mary White. One male (holotype) and one female taken in August, 1934, by S. Mulaik.

APORIARIA, gen. nov.

Characterized primarily by the structure of the gonopods in which the telopodite extends ventrad in line with axis of proximal joint and is but slightly curved, not coiled, and bears below middle on mesal side a single spine or process. Proximal joint glabrous or nearly so, bearing from mesal side at distal end a single uncate process the apex of which lies in a pit or furrow on the mesal side of those of the telopodite.

Genotype.—A. texicolens sp. nov. *Fontaria tepanicus* H. &. S., *F. acolhuus* H. & S., and several other Mexican species also seem to belong in this group.

Aporiaria texicolens, sp. nov.

General color of head and dorsum brown with a transverse band across

anterior portion of each tergite, including the collum, of yellow. Antennae brown and legs yellow.

Body parallel sided over middle portion, gradually narrowing over caudal portion and more abruptly anteriorly.

Lateral carinae large, behind middle curving more and more caudad as usual.

Coxae and sternites in the male smooth, without processes.

Basal article of gonopods of male glabrous. Telopodite narrowing abruptly distad of mesal spine and again narrowed part way to tip, thereby leaving a spine-like apical portion which curves mesad and ends in an acute point, proximad of which is a denticle. The telopodite shortly setose on caudal surface to base of apical spine.

Width of male, 7–7.25 mm.

Locality.—Texas: Edinburg, May 1–12, 1937. S. Mulaik, collector.

KEWANIUS, gen. nov.

A study of additional species of *Eurymerodesmus* from the Southwest evidences a high degree of uniformity in the characters of the gonopods with the exception of those of the species described by the author as *E. simplex.* This divergence is now regarded as necessitating the creation of a new genus differing from *Eurymerodesmus,* sens. str. in the larger basal division of the gonopod and the entirely glabrous telopodite, etc.

Genotype.—*Eurymerodesmus simplex* Chamberlin.

Vol. 51, pp. 209–210 December 23, 1938

PROCEEDINGS
OF THE
BIOLOGICAL SOCIETY OF WASHINGTON

A NEW FRESHWATER SNAKE (*CHERSYDRUS GRANULATUS LUZONENSIS*) FROM THE PHILIPPINES.

BY ARTHUR LOVERIDGE.

Some years ago Dr. Thomas Barbour acquired and presented to the Museum of Comparative Zoölogy, the fine representation of the Philippine herpetofauna known as the Taylor Third Collection. Among the snakes was one which Dr. Taylor thought might be an undescribed form. Its unusual habitat, taken in conjunction with its strikingly different color pattern, makes it seem worthy of subspecific recognition as:

Chersydrus granulatus luzonensis, subsp. nov.

Type.—Museum of Comparative Zoölogy, No. 25,608. A semiadult ♂ taken in freshwater near Laguna de Bay, Los Banos, Laguna Province, Luzon, Philippine Islands. Collected by Dr. Edward H. Taylor, 1923.

Diagnosis.—A freshwater color form of the semimarine *granulatus*, with which it agrees in essential scale characters but is distinguished by its particolor pattern.

Above, body and snout dark olive or blackish with numerous light annuli usually interrupted on the vertebral line; sometimes scarcely distinguishable in old individuals.....*g. granulatus*

Above, body blackish on dorsum; uniform white on snout, sides and belly.....*g. luzonensis*

Description.—Midbody scales in 95 rows, *i. e.*, within the range of the typical form which occurs in adjacent Manila Bay, Luzon Island; upper labials 12.

Coloration (in alcohol).—Above purplish black except end of snout which, together with sides, belly, and undersurface of tail, is uniformly white.

Measurements.—♂, Length from snout to anus 550 mm., tail 70 mm.

Remarks.—In view of the presence in a lake on Luzon of *Hydrophis semperi* Garman, the sole member of its family known to occur in freshwater, it does not appear unreasonable to recognize subspecifically so distinctly colored an example of the semimarine *Chersydrus granulatus*, even though the latter is said to ascend tidal rivers to a distance of several miles. The Museum of Comparative Zoölogy possesses a good series of *granulatus* from Manila Bay and other localities. All of these differ from the new race in the manner indicated in the key given above.

Vol. 51, pp. 211–212 December 23, 1938

PROCEEDINGS
OF THE
BIOLOGICAL SOCIETY OF WASHINGTON

A NEW POCKET GOPHER OF THE GENUS ZYGOGEOMYS.

BY E. A. GOLDMAN.

When *Zygogeomys trichopus* was described by Merriam (North Amer. Fauna No. 8, p. 196, Jan. 31, 1895) the number of specimens available for study was 12. Of these 10 were from the type locality, Nahuatzén, Michoacan, Mexico, and the remaining two from near Patzcuaro, in the same state. The species was accorded an altitudinal range between 6,800 and 9,500 feet, but the specimen records were from 8,000 to 8,500 feet. The subsequent collection of 10 examples, five at from 11,000 to 11,500 feet on Mount Tancitaro, and five at from 11,000 to 11,800 feet on Mount Patamban, both localities also in Michoacan, materially extended upward the known altitudinal range of the species. The specimens from these high mountains along the crest of the Sierra Madre agree closely with topotypes in characters and bring into relief those from the somewhat isolated mountain mass near Patzcuaro, for which a separate name is proposed.

Zygogeomys trichopus tarascensis, subsp. nov.

TARASCO POCKET GOPHER.

Type.—From mountains six miles southeast of Patzcuaro, Michoacan, Mexico (altitude 8,000 feet). No. 34922/47187, ♀ adult, skin and skull, U. S. National Museum (Biological Survey collection), collected by Nelson and Goldman, July 24, 1892. Original number 2943.

Distribution.—Known only from the upper slopes of the mountains in the vicinity of the type locality.

General characters.—Closely allied to *Zygogeomys trichopus trichopus* of the high mountains (8,500 feet) near Nahuatzén, Michoacan, but size much smaller and color slightly darker than usual in typical *trichopus;* mammae, pectoral one pair, inguinal two pairs, total number six, as usual in the genus.

Color.—Type (acquiring fresh pelage): Upper parts in general between "benzo brown" and "fuscous" (Ridgway, 1912), slightly paler and nearer "benzo brown" on forearms, flanks, and thighs; under parts thinly overlaid with "cinnamon drab," the "mouse gray" under color showing through; a V-shaped, white patch on chin and throat extending into lining of cheek pouches; a narrow, dull whitish area bordering nasal pad; fore feet like flanks; hind feet white, except a narrow extension of dusky color of ankles a short distance along median line of left metatarsus; tail naked, the dried skin yellowish.

Skull.—Closely resembling that of typical *trichopus*, but much smaller and lighter; rostrum and zygomata notably slender; dentition lighter, the incisors decidedly narrower.

Measurements.—Type.: Total length, 292 mm.; tail, 92; hind foot, 38. A young adult male topotype: 317; 109; 40. *Skull* (type [♀] and a young adult male topotype, respectively): Occipitonasal length, 50.4, 53.8; zygomatic breadth, 30.5, 31.3; breadth across squamosals (over mastoids), 29.2, 29.7; interorbital constriction, 8.4, 8.3; length of nasals, 18.9, 21.6; maxillary toothrow (alveoli), 11.6, 11.6; width of upper incisors (cutting edge), 6.6.

Remarks.—This subspecies is based on two specimens presenting cranial details that appear to be beyond the range of individual variation in typical *trichopus*. The narrowness of the incisors is a particularly distinctive character. The squamosal meets the maxilla over the jugal as in the typical form, the unique cranial feature from which the name of the genus was derived.

Vol. 51, pp. 213–214 December 23, 1938

PROCEEDINGS
OF THE
BIOLOGICAL SOCIETY OF WASHINGTON

A NEW FROG (*HYPEROLIUS POWERI*) FROM NATAL, SOUTH AFRICA.

BY ARTHUR LOVERIDGE.

In January of this year Mr. J. H. Power, of Kimberly, visited Stranger, near the mouth of Umvoti River, Natal, with a view to making a representative collection of the Polypedatidae of the region, thereby shedding light on the status of certain frogs described by Cope in 1862 (Proc. Acad. Nat. Sci. Philadelphia, pp. 341–343).

Through the courtesy of Dr. E. R. Dunn and the authorities at the Academy of Natural Sciences, I was permitted to examine the Umvoti collection with the exception of one of Cope's types, *coccotis*, which appears to be lost. I consider it a synonym of *tuberilinguis* Smith of which Mr. Power secured a fine series that may be regarded as topotypic of *coccotis*.

At this time, however, it is not proposed to discuss the interesting results of this study, but to describe a very small species which appears to be unnamed. It is not *pusillus* (Cope), of which a score were collected by Power, and which confirm my (1936, Bull. Mus. Comp. Zoöl., **79**, p. 407) conclusions (by direct comparison of types or paratypes of all except *microps*) that *pusillus*, *translucens*, *usaramoae* and *microps* are but a single species.

This new grass-frog is named after its discoverer, Mr. J. H. Power, in appreciation of his contributions to South African herpetology.

Hyperolius poweri, sp. nov.

Type.—Museum of Comparative Zoölogy, No. 23,110. An adult ♂ from vicinity of the Umvoti River, near Stranger, Natal, Union of South Africa. Collected by J. H. Power, Esq., January, 1938.

Paratypes.—Museum of Comparative Zoölogy, Nos. 23,111–23,114, being three males and two young with the same history as the type.

Diagnosis.—A small 20 mm. species related to *H. parkeri* Loveridge, of East Africa, but with markedly shorter hind limb, smaller size, and different markings. *H. poweri* is characterized by a light lateral band from nostril, through orbit, along flank to groin, and the absence of all other markings except the minute black punctations, visible through a lens, which impart a purplish-gray effect to the dorsum.

Description.—Snout obtusely acuminate, its length, from the anterior border of the eye, slightly greater than the diameter of the orbit; tympanum hidden. Fingers without webbing; 1st, 2d, 3d and 5th toes webbed almost to the disk on their inner aspect, on the 4th toe the disk and last two phalanges are free of web. The tibiotarsal articulation of the adpressed hind limb reaches to the eye (in males).

Skin smooth above, granular on the belly, no strong fold across the chest. Males with a large subgular vocal sack and strongly granular disk.

Coloration.—Above, purplish gray (produced by numerous minute black points), a light lateral band from nostril, through orbit, along flank to groin; except for a slight darkening of the ground color (produced by greater concentration of the black points) above and below the lateral line, no other markings are visible. Below, pure white, freely speckled, particularly on palms and soles, by minute black points.

Measurements.—Type ♂. Length from snout to anus 20 mm., the three paratype ♂ ♂ range from 18 to 20 mm.

Remarks.—The enlarged condition of the gonads, together with the well-developed gular disks, preclude the supposition that these are the young of some larger species. The fact that only males were taken suggests that they had just begun to assemble for breeding and that the females had not arrived as yet.

Vol. 51, pp. 215–216 December 23, 1938

PROCEEDINGS

OF THE

BIOLOGICAL SOCIETY OF WASHINGTON

A NEW VIBURNUM FROM MEXICO.[1]

BY C. V. MORTON.

In 1933 the writer published a revision of the Mexican and Central American species of *Viburnum*[2] in which 30 species were recognized. Since that time one more (*V. mendax* Morton) has been published.[3] The following additional species in the interesting collection of Mr. E. Matuda has been made available for study through the courtesy of the University of Michigan.

Viburnum Matudae Morton, sp. nov.

Disjuncta. Caules teretes, crassi, 6–7 mm. diam., dense lanato-tomentosi, pilis multiradiatis albis sessilibus vel breviter stipitatis, radiis adscendentibus vel suberectis; folia opposita, exstipulata, breviter petiolata, petiolo 1.7–2 cm. longo, crasso, ca. 3 mm. diam.; lamina foliorum orbiculari-ovata, ca. 14 cm. longa et 11 cm. lata, apice breviter acuminata, basi cordata, supra medium remote dentata, basi integra, supra submolliter velutina, pilis hyalinis unicellularibus simplicibus vel saepe 2–7-fasciculatis, non vero stellatis, subtus in mesophyllo glabra, in venis stellato-pubescens, pilis substipitatis, basi bulbosa flavescente, radiis 2–5 hyalinis suberectis, venis primariis 4- vel 5-jugis, adscendentibus, marginem attingentibus; inflorescentia terminalis, 11.5–13.5 cm. longa et 13–14 cm. lata, 4-plo composita, bracteata, bracteis caducis, longe pedunculata, pedunculo 4.5–5 cm. longo, crasso, 4–4.5 mm. diam., dense lanato-tomentoso, radiis primariis 7, tomentosis, 3–7 cm. longis, floribus sessilibus in radiis ultimis (ca. 3 mm. longis) aggregatis, bracteolatis, bracteolis oblongis, ca. 1.2 mm. longis, externe stellato-pilosulis; calycis tubus obconicus, ca. 1.5 mm. longus, densissime albo-tomentosus, lobis 5, ca. 1 mm. longis et latis, obtusis, liberis, externe sparse pilosulis, albo-ciliatis; corolla rotata, 3.5–4 mm. longa, limbo ca. 8 mm. diam., tubo 1.5–2 mm. longo, lobis 2 mm. longis, suborbicularibus rotundatis, margine papillosis, tubo et lobis externe strigosis, pilis albis simplicibus; filamenta ca. 4 mm. longa, exserta, glabra; antherae ca. 1.5 mm. longae; stylus glaber.

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

[2] Contr. U. S. Nat. Herb. **26**: 339–366. 1933.

[3] Proc. Biol. Soc. Wash. **49**: 154. 1936.

Type in the herbarium of the University of Michigan, collected at Siltepec, Chiapas, Mexico, Aug. 9, 1937, by E. Matuda (no. 1587).

The most nearly related species is *Viburnum jucundum* Morton, also from Chiapas, and still known only from the type specimen. That species has similarly thick, densely tomentose stems and petioles, but the lower leaf surface is densely stellate-tomentose, the hairs having many (more than 15) radiately spreading branches. In *V. Matudae* the lower leaf surface is glabrous, the hairs being confined to the veins and of a different type. They have a short, bulbous, yellowish stipe and 2 to 5 erect or suberect branches. In *V. jucundum* the corolla is stellately pubescent externally, in *V. Matudae* strigose with simple hairs.

INDEX

New Names are printed in **heavy type.**

C

D

U

V