PROCEEDINGS

OF THE

Biological Society of Washington

VOLUME 52
1939

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 1939-1940)

(ELECTED MAY 13, 1939)

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

I. N. HOFFMAN
E. G. HOLT
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—1939-1940

Committee on Communications

J. E. Shillinger, *Chairman*

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 (1939–1941)
M. B. Waite (1939–1941)

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.

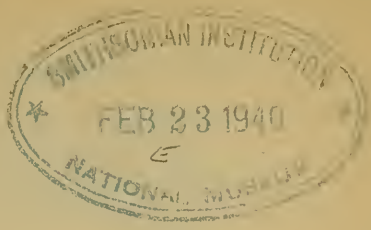


TABLE OF CONTENTS.

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 1939 (pp. v–xiii, 197–209) were issued on February 16, 1940. The title page and lists of officers and committees for 1939–1940 (pp. i–iv) were issued on December 15, 1939.

PLATES.

Vol. 52, pp. ix–xiii

PROCEEDINGS
OF THE
BIOLOGICAL SOCIETY OF WASHINGTON

PROCEEDINGS.

January 7, 1939—873d Meeting.

President Bell in the chair; 105 persons present.

President Bell was nominated a Vice-President of the Washington Academy of Sciences as a representative of the Biological Society.

Formal communications: L. L. Gardiner, Birding in Bololand; bird exploring trips in Philippine Islands; E. W. Brandes, Sugar cane: Biological aspects of the collapse and revival of the sugar cane industry in southern United States.

January 21, 1939—874th Meeting.

President Bell in the chair; 59 persons present.

New members: Wm. Robinson, G. Steiner.

Informal communication: F. Thone, Exhibition of fossil fern specimens from Illinois prepared by a new method developed by George Longworth.

Formal communications: J. F. Preston, Farm forestry as practiced under the Soil Conservation program; J. M. Cooper, Trapping methods of the Canadian woodland Indians.

February 4, 1939—875th Meeting.

President Bell in the chair; 60 persons present.

New member: L. C. Stuart.

Informal communications: M. B. Waite, Exhibition of an English translation of Michaux's Travels; J. S. Wade, Exhibition of new books of biological interest.

Formal communications: C. P. Clausen, Parasites of insects and their economic importance; M. L. Bomhard, Palms—around the world.

February 16, 1939—Special Meeting.

Special joint meeting with Washington Academy of Sciences.

Formal communication: W. L. Schmitt, The Galapagos Islands.

March 4, 1939—876th Meeting.

President Bell in the chair; 85 persons present.

New member: William Hard.

Informal communications: F. Thone, Exhibition of new books of biological interest; M. B. Waite, Exhibition of specimen of Gyrophora dillenii; A. V. Smith, Exhibition of specimens of Buxbaumia aphylla; T. Ulke, Note on early flowering of Chrysosplenium americanum.

Formal communications: R. Cook, contributions of genetics to plant breeding; H. O'Neill, Central America through a moving picture camera.

March 18, 1939—877th Meeting.

President Bell in the chair; 32 persons present.

The deaths of S. P. Baldwin, S. T. Danforth, and W. C. Rives were announced.

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

Formal communications: R. S. Bray, Preliminary notes on the Cladocera of the District region; J. A. Reyniers, Germ-free laboratory animals.

April 1, 1939—878th Meeting.

President Bell in the chair; 29 persons present.

New members: W. S. Long, R. W. Smith.

Informal communications: F. Thone, Exhibition of new books of biological interest; W. R. Van Dersal, Announcement of biological work in several regions.

Formal communications: E. H. Walker, Dust, books, men, and Chinese plants; V. Bailey, Trapping animals humanely and handling them intelligently.

April 14, 1939—879th Meeting.

Joint meeting with Botanical Society of Washington.

Formal communication: Lois Jotter, A botanical trip down

the Colorado River from Greenriver, Utah, through the Grand Canyon to Boulder City, Nevada, August, 1938.

April 29, 1939—880th Meeting.

President Bell in the chair; 41 persons present.

New members: W. H. Armstrong, D. R. Coburn, R. H. McCauley, Jr., L. C. Wheeler.

Informal communications: T. Ulke, Original record in the Washington Star of the formation of the Biological Society; F. Thone, Exhibition of new books of biological interest.

Formal communications: E. R. Sasscer, Foreign plant quarantine enforcement; J. Brosnan, Moths, butterflies, and their larvae.

May 13, 1939—881st Meeting.

SIXTIETH ANNUAL MEETING.

President Bell in the chair; 14 persons present.

Reports were received from the Recording Secretary, Corresponding Secretary, Treasurer, and Committee on Publications. An informal report was made for the Trustees of Permanent Funds.

The following officers and members of the 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, I. N. Hoffman, J. E. Benedict, Jr., Frank Thone, H. B. Humphrey, E. G. Holt.

October 7, 1939—882d Meeting.

President Bell in the chair; 58 persons present.

Informal communications: J. S. Wade, Exhibition of new books of biological interest; T. Ulke, Exhibition of herbarium specimens; P. H. Oehser, Notice of a new biography of Thoreau; C. C. Presnall, Notice of a series of photographs of Olympic National Park; S. F. Blake, Notice of a hummingbird caught by flying into wire mosquito netting; L. W. Saylor, Note on mosquito control without harm to wild life.

Formal communications: F. J. Stevenson, Breeding for disease resistance in plants; V. H. Cahalane, Sand, birds, and ships—the Cape Hatteras seashore.

October 21, 1939—883d Meeting.

President Bell in the chair; 47 persons present.

New members: Phoebe J. Beall, M. D. Bryant, I. Grodstein, W. A. Koelz.

Informal communications: J. S. Wade, Report on the annual meeting of the National Association of Audubon Societies; F. Thone, Exhibition of new books of biological interest.

Formal communications: C. W. Knox, Man's modification of the wild jungle fowl; E. L. Green, The development of aquatic life in the C. & O. Canal.

November 4, 1939—884th Meeting.

President Bell in the chair; 34 persons present.

New members: W. Greenwood, W. J. Howard.

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

Formal communications: L. K. Couch, Research into wildlife refuge administration; R. G. Richmond, Economic aspects of large scale insect-control programs.

November 18, 1939—885th Meeting.

President Bell in the chair; 52 persons present.

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

Formal communications: E. A. Dennis, The Development of the sex color pattern in the common fence lizard; D. B. Beard, Bird life in the Dry Tortugas.

December 2, 1939—886th Meeting.

Vice-President Walker in the chair; 45 persons present.

Informal communications: F. Thone, Note of the observation of possible fossil algae in a limestone doorstep; E. P. Walker, Note on the poor acorn crop as menacing the food supply of squirrels.

Formal communications: E. A. Trager, Camera hunting with the biologist off the beaten trails; G. R. Stewart, Primitive conservation practises among the southwestern Indians.

December 16, 1939—887th Meeting.

President Bell in the chair; 25 persons present.

New members: N. Hartweg, Mrs. C. H. Howland, R. E. Stewart.

Informal communications: H. B. Humphrey, Note on the exhibition of intelligence by gray squirrels; J. S. Wade, Exhibition of new books of biological interest.

Formal communications: H. B. Humphrey, Wheat and its major biological enemies; F. A. Davidson, Salvaging the Columbia River salmon.

Vol. 52, pp. 1–2 February 4, 1939

PROCEEDINGS

OF THE

BIOLOGICAL SOCIETY OF WASHINGTON

A NEW SKINK (*LEIOLEPISMA HAWAIIENSIS*) FROM HONOLULU.

BY ARTHUR LOVERIDGE.

The presence of three species of skinks on the Hawaiian Islands has been known for many years; the occurrence of a fourth appears to have been overlooked on account of its affinities to *Leiolopisma noctua*. Four examples of the new species were received during my absence abroad in 1934, and were put on one side until they might receive proper attention. Recently I have explored all the possibilities and seeming impossibilities of introduction; that they are not the young of *noctua* appears obvious by comparison with young *noctua* which do not differ from the adults appreciably in shape of snout or coloration. For this apparently undescribed skink I suggest the name

Leiolepisma hawaiiensis sp. nov.

Type.—Museum of Comparative Zoölogy, No. 44,234, from near Honolulu, Oahu, Hawaiian Islands.

Paratypes.—Museum of Comparative Zoölogy, Nos. 44,235–44,237, from Wahiawa, Oahu, Hawaiian Islands.

Diagnosis.—

Snout blunt; frontonasal much broader than long; frontoparietal entire; no light spot on occiput; no light vertebral band edged with brown spots ..... *hawaiiensis*

Snout acuminate; frontonasal as broad as long; frontoparietals paired, rarely entire;[1] a light spot on occiput continuous with a light vertebral band edged with brown spots ..... *noctua*

Description.—Habit lacertiform; the distance between the end of the snout and the fore limb is contained about once and one-fifth times in the distance between axilla and groin; the toes of the adpressed hind limb attain

[1] In only one specimen of a good series in the Museum of Comparative Zoölogy.

to the wrist of the backpressed fore limb; tail once and a half times as long as distance from snout to anus.

Snout moderate, blunt; nostril pierced in a single nasal; no supranasal; frontonasal much broader than long, forming a long suture with the rostral and a shorter one with the frontal; latter shield nearly as long as the frontoparietal and interparietal together, in contact with the first and second supraoculars; supraoculars 4, second broadest; supraciliaries 6; frontoparietal single; interparietal small, distinct; parietals forming a suture behind the interparietal; nuchals form one or two pairs; upper labials 7 (rarely 6), the fifth (rarely fourth) entering the orbit; ear-opening roundish, smaller than the eye-opening, without projecting lobules. Midbody scales smooth, in 26 (sometimes 25) rows, dorsals larger than the laterals; 2 (sometimes 1) pairs of preanals enlarged. Digits cylindrical at the base, compressed distally; subdigital lamellae smooth, 22 or 23 (20 to 22 in paratypes) under the fourth toe.

Coloration.—Above, head and dorsum greenish bronze (spotted with darker in young) minutely flecked with bluish white, such flecks tending to form a light dorsolateral line from supraocular region to base of tail, accentuated by being bordered below by a dark brown band (this band is bordered with white both above and below in young) three scales wide, sharply defined above, but merging into the lighter coloring of the flanks below. Below, belly uniform white; tail white with three parallel series of dark spots along its entire length.

Measurements.—Type. Head and body 30 mm., tail 48 mm.

Vol. 52, pp. 3–6 February 4, 1939

PROCEEDINGS
OF THE
BIOLOGICAL SOCIETY OF WASHINGTON

FOUR NEW RACES OF SITTIDAE AND CERTHIDAE FROM MEXICO.

BY A. J. VAN ROSSEM.

The following descriptions of three nuthatches and a creeper were originally drawn up from specimens in the British Museum and later modified slightly to accommodate the characters shown by additional specimens in the collections of the U. S. National Museum.

The situation regarding the white-breasted nuthatches of Mexico is very comparable to that which existed in western North America a generation or so ago when all western birds were lumped under the name of *aculeata*, but which now are known to belong to several easily distinguishable races. Until very recently all of the Mexican birds similarly have been included under the name of *Sitta carolinensis mexicana* Nelson and Palmer, the type locality of which is Mount Orizaba in Puebla near the southern end of the Mexican plateau. Herbert Brandt (Auk, 55, April, 1938, p. 269) has recently separated the birds of Coahuila and the Chisos Mountains of Texas as *Sitta carolinensis oberholseri*. The present writer has two other Mexican races to propose at this time and believes that at least two more can be defined when additional material is collected. The two here named represent the smallest and the largest of the races of *Sitta carolinensis* in point of wing measurement.

Sitta carolinensis kinneari, subsp. nov.

Type.—Male adult in complete, fresh, fall plumage, 92.3.1.63 British Museum; Amula (Tixtla), Guerrero, August, 1888, altitude 6000 feet; collected by Mrs. H. H. Smith.

Subspecific characters.—Smallest of the races of *Sitta carolinensis;* coloration similar to *Sitta carolinensis mexicana* Nelson and Palmer ventrally, but dorsally very much paler.

Range.—Mexico in the States of Guerrero (Chilpancingo; Omilteme; Amula) and Oaxaca (Oaxaca; Cerro San Filipe).

Remarks.—As long ago as 1859, Sclater (Ibis, 1859, pp. 363 and 373) called attention to the very small size of a specimen from Cinco Señores, Oaxaca, in comparison with those from Vera Cruz but until now no one seems to have been sufficiently interested to investigate the matter further.

The characters of *kinneari* are best shown in Guerrero. Oaxaca specimens tend to be intermediate toward *mexicanus* in color but are included here because of their small size.

MEASUREMENTS.

	WING	TAIL	EXP. CUL.	TARSUS	MID. TOE MINUS CLAW
9 male *kinneari*	82–88	41–44	14.6–16.0	16.5–16.8	13.3–14.2
	(*84*)	(*43*)	(*15.3*)	(*16.7*)	(*13.8*)
5 female *kinneari*	82–84	41–43	14.7–15.0	15.5–15.8	13.0–13.1
	(*83*)	(*42*)	(*14.8*)	(*15.7*)	(*13.1*)

Sitta carolinensis umbrosa, subsp. nov.

Type.—Male adult, 164053 Biological Survey collection; Sierra Madre, near Guadalupe y Calvo, southern Chihuahua, Mexico, September 1, 1898; collected by E. W. Nelson and E. A. Goldman.

Subspecific characters.—Similar to *Sitta carolinensis mexicana* of the south-central part of the Mexican plateau, but dorsal coloration darker; wing longer, in fact longer than in any other race of the species.

Range.—Mountains of northern Jalisco (Bolaños), Nayarit (Santa Teresa), western Zacatecas (Sierra Valparaiso; Plateado), Durango (El Salto; Ciudad), southern Chihuahua (many localities north to Pinos Altos and El Carmen) and southeastern Sonora (Mina Abundancia on the Chihuahua boundary).

Remarks.—The largest specimens are from Chihuahua;—those from the southernmost points are a little smaller but are equally dark colored. Thanks to the authorities of the United States National Museum and the Bureau of Biological Survey, I have been able to examine a series of seven topotypes (including the type) of *mexicana.* These prove to be typical of the race of the southern and central parts of the plateau region in general, including eastern Zacatecas and southern Jalisco. Typical *mexicana,* while dark below like all the Mexican races of *Sitta carolinensis,* is not particularly dark dorsally; in fact is but little darker than Rocky Mountain specimens of *nelsoni.* This same fact was noted by Ridgway (Birds of North and Middle America, Part 3, 1904, p. 448) who considered the short bill and dark underparts the only characters by which to distinguish *mexicana* from *nelsoni.* As to the newly described *oberholseri* Brandt, I have seen no material. It is said to be slightly darker above than *mexicana* (in which case it must closely resemble *umbrosa*) but the measurements are entirely too small for the latter form.

MEASUREMENTS.

	WING	TAIL	EXP. CUL.	TARSUS	MID. TOE MINUS CLAW
21 male *umbrosa*	89–98	43–52	16.5–18.5	16.5–20.0	14.0–16.5
	(*95.5*)	(*47.2*)	(*17.4*)	(*17.6*)	(*15.4*)
16 female *umbrosa*	87–97	44–49	16.0–17.7	16.5–19.3	14.3–16.4
	(*92.4*)	(*45.5*)	(*16.7*)	(*17.7*)	(*14.9*)

Some nine years ago the writer (Proc. Biol. Soc. Wash., 42, 1929, pp. 175–178) reviewed the races of the pygmy nuthatch (*Sitta pygmaea* Vigors) and left in abeyance the status of specimens from southern Mexico. Since that time he has had access to considerable series in the British Museum and the collections of the United States National Museum and has found that there is an additional race from the southern part of the Mexican plateau. This is described as follows:

Sitta pygmaea flavinucha, subsp. nov.

Type.—Male adult, 142763 Bureau of Biological Survey; Huitzilac, Morelos, Mexico, December 31, 1892; collected by E. W. Nelson.

Subspecific characters.—A relatively large race of *Sitta pygmaea,*—about the size of *Sitta pygmae chihuahuae* van Rossem of northwestern Mexico,—and with long wing, short bill, and brownish head coloration. Differs from the geographically nearest race (*chihuahuae*) and from all other races in having the concealed or semi-concealed nape patch clay color or yellowish cream instead of white or creamy white.

Range.—Highlands of central and southern Mexico.

Remarks.—35 specimens of *flavinucha* have been examined from Mexico (Mt. Popocatapetl; Mt. Iztaccihuatl; Valley of Mexico), Puebla (Mt. Orizaba), Morelos (Huitzilac), Vera Cruz (Cofre de Perote; Jalapa), Michoacan (Mt. Tancitaro), and Jalisco (San Sebastian; Sierra Nevada de Colima).

Two specimens from Santa Teresa, Nayarit, are intermediate but are nearest to *chihuahuae.*

MEASUREMENTS.

	WING	TAIL	CULMEN FROM BASE
13 adult male *flavinucha*	66–71	36–39	14.0–15.0

Ludlow Griscom (Ornithology of Guerrero, 1934, p. 303) has previously commented on the small size and brown coloration of the single Guerrero specimen of *Certhia familiaris* at his disposal. The series from the State of Guerrero in the British Museum verifies Griscom's observation and the race is named as

Certhia familiaris guerrerensis, subsp. nov.

Type.—Male adult, 99.1.11.56 British Museum; Omilteme, Guerrero, Mexico, July, 1888; collected by Mrs. H. H. Smith.

Subspecific characters.—A member of the small, west-Mexican group of creepers (wings of males averaging about 63 mm.). Coloration browner

than *Certhia familiaris jaliscensis* dorsally and slightly darker as well as browner (less purely gray) ventrally. Compared with the distinctly larger *Certhia familiaris alticola* Miller of south-central Mexico, coloration browner dorsally and darker ventrally.

Range.—The Sierra Madre del Sur of Guerrero.

Remarks.—Unfortunately, although there is a considerable series of this race in the British Museum, the notes on the exact number seem to have been lost. In the extensive series of *alticola* in that institution there is a series of nine specimens from the Cofre de Perote in the State of Vera Cruz which are *very much* darker below and slightly darker dorsally than typical *alticola*. I hesitate to name them only because the series of *alticola*, while extensive, is not strictly comparable seasonally.

Vol. 52, pp. 7–8 February 4, 1939

PROCEEDINGS
OF THE
BIOLOGICAL SOCIETY OF WASHINGTON

A RACE OF THE RIVOLI HUMMING BIRD FROM ARIZONA AND NORTHWESTERN MEXICO.

BY A. J. VAN ROSSEM.

The writer has long been aware that there were two races of *Eugenes fulgens* in Mexico but has delayed publication for several reasons. For one, Swainson's description, while favoring the resident form of the region whence it was described, is not too certain and it seemed best to await examination of his type were it still in existence; for another I wished to make certain that the series in the British Museum showed the same characters that were evident in collections in American institutions.

In 1933 and 1938 I made a search in the collection at Cambridge University for the type of *Trochilus fulgens* Swainson, described from Temascaltepec, in the State of Mexico, on both occasions without success and it seems likely that this type is no longer in existence. This being the case, the resident form must be taken to represent typical *fulgens*. The one which occurs in northwestern Mexico and southern Arizona is named as

Eugenes fulgens aureoviridis, subsp. nov.

Type.—Male adult, No. 23772 Dickey collection; Chiricahua Mountains, Cochise County, Arizona, July 1, 1908; collected by H. H. Kimball, original number, 426.

Subspecific characters.—Males, both adult and immature, with throat yellowish green instead of bluish green or emerald green; both sexes with posterior underparts slightly paler and more purely (less brownish) gray, and with upperparts slightly duller and paler green.

Range.—Mountains of southcentral and southeastern Arizona, south through the mountains of Sonora, Chihuahua, Durango, and Nayarit to northern Jalisco.

Remarks.—Specimens from southern Jalisco (Sierra Nevada de Colima;

Volcan de Nieve), Michoacan, and Guerrero are more or less intermediate between *aureoviridis* and *fulgens*. Oaxaca specimens are certainly *fulgens*, as are those from Tamaulipas and Vera Cruz; in fact the extreme accentuation of *fulgens* characters seems to be reached in these two latter states.

In considering Central American specimens I believe that Berlioz (L'Oiseau et la Rev. Francaise Orn., 8, 1938) is correct in recognizing them as a distinct race. The 35 examples I have examined from Guatemala and El Salvador differ from *fulgens* in the more violaceous crowns and less blackish underparts of the males, in the more brownish gray posterior underparts of both sexes, and in slightly longer and distinctly stouter bill. For this race there is the name of *Eugenes viridiceps* Boucard, based on an aberrantly colored specimen from "Coban," Guatemala.

At one time or another I have examined all the material in the collections of the Bureau of Biological Survey, the United States National Museum, the Museum of Comparative Zoology, and the British Museum. To the authorities of these institutions my thanks are due for the courtesies extended.

Vol. 52, pp. 9–10 February 4, 1939

PROCEEDINGS
OF THE
BIOLOGICAL SOCIETY OF WASHINGTON

A NORTHWESTERN RACE OF THE MEXICAN CORMORANT.

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

During a collecting trip by van Rossem and Robert Hannum in southern Sonora in the early summer of 1937, three Mexican cormorants were taken at Tesia in the lower Mayo River Valley. The species was common in that locality and it is regrettable that more specimens were not collected; however, it was only later and on comparison with true *mexicanus* that it was realized that an undescribed race was present. We are indebted to the authorities of the Bureau of Biological Survey and the United States National Museum for the privilege of examining their series of this species from southern Mexico, Texas, and Louisiana, as well as two specimens of the new race from Sinaloa.

Phalacrocorax olivaceus chancho, subsp. nov.

Type.—Male adult, just losing the last of the breeding plumes, number 31893 Dickey collection; Dow Ranch, 7 miles east of Tesia on the lower Mayo River, Sonora, Mexico, June 20, 1937; collected by A. J. van Rossem and Robert Hannum.

Subspecific characters.—Similar to *Phalacrocorax olivaceus mexicanus* (Brandt) of eastern and southern Mexico and northern Central America but black of underparts, head, and neck glossed with brownish instead of greenish or violaceous; upper parts duller, paler, and more grayish slate, with the feather margins duller black and distinctly narrower. Size, particularly of bill, tarsi, and feet, distinctly smaller.

Range.—Northwestern Mexico in the States of Sinaloa (Mazatlan) and Sonora (Tesia).

Remarks.—Although Brandt's description gives no measurements other than the total length, his statement as to the color of the underparts, "vix paulisper virescentia," would seem to associate his type with the eastern race. Furthermore, his type did not come through any of the Pacific

expeditions conducted by early Russian explorers but from the dealer-naturalist Brandt of Hamburg. This being the case we feel safe in designating Vera Cruz as a restricted locality for *mexicanus*.

We are under obligations to Mr. Herbert Deignan of the United States National Museum for a transcription of Brandt's diagnosis of *Carbo mexicanus* and his appended remarks as to the source of his type. The work which contains these (Bull. Sci. publié par l'Acad. Imp. des Sci. de St. Pétersbourg, tome 3, 1838, col. 56 [read Oct. 6, 1837]) is, so far as we know, not available on the Pacific Coast.

Since we can discern no size differences due to sex we include all adult specimens in the following measurements.

MEASUREMENTS.

	WING	TAIL	CULMEN	TARSUS	OUTER TOE MINUS CLAW
18 *mexicanus*	250–265	160–195	43–50	52–56	66–73
5 *chancho*	245–260	155–175	38–43	48–50	63–68

Vol. 52, pp. 11–12 February 4, 1939

PROCEEDINGS

OF THE

BIOLOGICAL SOCIETY OF WASHINGTON

DESCRIPTIONS OF TWO NEW SUBSPECIES OF BIRDS FROM WESTERN MEXICO.

BY A. J. VAN ROSSEM.

The present paper offers descriptions of two more of the numerous undescribed subspecies of birds discovered during the writer's studies of the collections of Mexican birds in the British Museum. In this case the genera *Vireo* and *Vermivora* are dealt with.

Vireo solitarius repetens, subsp. nov.

Type.—Male adult, just finishing the annual moult; No. 91.11.3.357 British Museum; Tixtla (Amula), Guerrero, Mexico, August, 1888, alt. 6000 feet; collected by Mrs. H. H. Smith.

Subspecific characters.—A relatively large, predominantly gray race which most closely resembles *Vireo solitarius plumbeus* Coues of the southern Rocky Mountain region of the United States; differs, however, in longer wing, shorter tail, and greener lower back and rump; differs from *Vireo solitarius pinicolus* van Rossem of northwestern Mexico in paler and grayer (less greenish) upperparts and flanks, and in decidedly shorter tail.

Range.—The Sierra Madre del Sur in Guerrero (Amula; Omilteme; Rincon), south to Oaxaca (Sola), and north to southern Jalisco (Volcan de Colima; Zapotlan).

Remarks.—Although readily distinguishable in series, *repetens* is much more like *plumbeus* than the intervening *pinicolus*, which is darker, greener, and slightly larger than either. The series of 10 specimens from Guerrero contains two juveniles which show the same comparative characters as the adults. As to the range outside of Guerrero, there is a single April specimen from Sola, Oaxaca. A single midwinter specimen (December 19) from the Volcan de Colima in extreme southern Jalisco is apparently typical also. Three rather worn and presumably resident birds from Zapotlan, Jalisco (March 28 to April 16) are nearer to *pinicolus* in color but have the short tail of *repetens*.

Since I have never been able to discern any size differences between the sexes of any race of *Vireo solitarius*, both sexes are included in the following

measurements. Actually, six of the *repetens* are sexed as male, two as female, and five are not marked.

		WING	TAIL
13 *repetens*		78–83 (82)	54–57 (55)
13 *pinicolus*	(average)	(83)	(59)
12 *plumbeus*	(average)	(77)	(58)

Several years ago the writer called attention (Bull. Mus. Comp. Zool., 77, No. 7, Dec., 1934, p. 469) to certain differences between a large series of *Vermivora superciliosa* from Chihuahua and a more limited amount of material from central and eastern Mexico, but since the two series were seasonally not comparable no name was given to the western birds. The series in the British Museum confirms the color differences previously noted but nullifies the supposed character of the larger bills of the western birds. Indeed after measuring 32 *Vermivora superciliosa superciliosa* from El Salvador, Guatemala, and Chiapas; 43 *Vermivora superciliosa mexicana* from eastern and central Mexico, and 26 of the new race, I can detect no diagnostic size differences between any of these races.

Vermivora superciliosa palliata, subsp. nov.

Type.—Male adult, No. 92.4.1.338 British Museum; Sierra Nevada de Colima Jalisco, Mexico, April 7, 1889; collected by W. B. Richardson.

Subspecific characters.—Similar to *Vermivora superciliosa mexicana* (Cabanis) of south-central and eastern Mexico but coloration paler throughout; the yellow abdominal area more restricted, and the flanks grayer (less greenish) as well as paler.

Range.—The Sierra Madre del Sur, Guerrero, north through Jalisco and Durango to southwestern Chihuahua.

Vol. 52, pp. 13–14 February 4, 1939

PROCEEDINGS
OF THE
BIOLOGICAL SOCIETY OF WASHINGTON

A RACE OF THE MILITARY MACAW FROM SONORA.

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

Although the Military Macaw is a common species and well known to aviculturists, specimens with authentic data are far from numerous in collections. It is undoubtedly due to this latter fact that the extreme northern race described below has, until now, escaped detection by systematic ornithologists. It is only fair to say that aviculturists have for some years been aware of the situation and it was due entirely to the statements of one of these, our friend Mr. W. J. Sheffler of Los Angeles, that we were led to investigate the matter. We take pleasure in naming the new race as

Ara militaris sheffleri, subsp. nov.

Type.—Male adult, preparing to breed, 31896 Dickey collection; Guirocoba, southeastern Sonora, Mexico, May 23, 1937; collected by A. J. van Rossem and Robert Hannum.

Subspecific characters.—Similar to *Ara militaris mexicana* Ridgway of southwestern Mexico but tail very much shorter; rump slightly darker and less greenish blue.

Range.—Arid Tropical Zone foothills in southeastern Sonora (Guirocoba; Chinobampo; Alamos; Quiriego; Soyopa), extreme southwestern Chihuahua (San Francisco Cañon) and extreme northeastern Sinaloa (San Francisco Cañon).

Remarks.—In typical *mexicana* the tail averages very much longer than the wing, whereas in *sheffleri* it averages slightly shorter. The measurements given by Ridgway (Birds of North and Middle America, Part 7, 1916, p. 133, footnote) for *mexicana* are typical for that race since there were, of course, no northern specimens at his disposal. We have examined what are presumably the same seven individuals (including the type) whose measurements he has recorded. In addition to these we have examined five *mexicana* in the collection of the Bureau of Biological Survey and five in the British Museum.

Specimens from southern Sinaloa, Nayarit, and western Zacatecas are intermediates which (on the basis of twelve skins) are closer to *mexicana*.

MEASUREMENTS.

		WING	TAIL
5 *mexicana*	from southern Jalisco, Colima, and Michoacan	360–395	405–430
12 *mexicana*	from southern Sinaloa, Nayarit, and Zacatecas	355–385	365–430
7 *sheffleri*	from Sonora	355–375	345–370

Vol. 52, pp. 15–16 February 4, 1939

PROCEEDINGS

OF THE

BIOLOGICAL SOCIETY OF WASHINGTON

NOTES ON TWO WOODHEWERS FROM MEXICO.

BY A. J. VAN ROSSEM.

When looking over the old Swainson collection at Cambridge in June of the present year, the type of *Xiphorhynchus flavigaster* attracted immediate attention because of its extrordinarily large bill. The authorities at that institution very kindly forwarded this type (among others) to me at the British Museum where there was more than ample comparative material for a proper determination. As a result, it was found that the type of *flavigaster* is an extreme example of the race previously known as *Xiphorhynchus flavigaster megarhynchus* Nelson. It is typical of "*megarhynchus*" in color and, as above stated, is even larger in size than the average of that race. The measurements are as follows: wing, 110; tail, 92; culmen from base, 47.0; bill from nostril, 37.5; tarsus, 22.5; middle toe minus claw, 18.5. The specimen is a typical Bullock skin and the only one of the species in the Swainson collection. The old tag reads "Xiphorhynchus S./flavigaster Sw./Bullock Mexico."

Whether this individual was a straggler to Temascaltepec, or whether Bullock collected it at, or received it from, another locality will probably never be known. At any rate, *megarhynchus* of Nelson is a synonym of *flavigaster* Swainson. The next available name for the race formerly known as *flavigaster* is *Xiphorhynchus flavigaster eburneirostris* "Lesson" (Des Murs) (Icon. Orn., livr. 9, pl. 52, and in synonymy of *Dryocopus flavigaster*), the type locality of which is Realejo, Nicaragua. I have examined the types (cotypes) of *eburneirostris* in the Museum d'Histoire Naturelle in Paris and find them to be typical representatives of the race in question.

Lepidocolaptes souleyetii guerrerensis, subsp. nov.

Type.—Adult, sex not recorded, 99.1.6.104 British Museum; Rincon, Guerrero, Mexico, October, 1888; collected by Mrs. H. H. Smith.

Subspecific characters.—Similar to *Lepidocolaptes souleyetii insignis* Nelson of southeastern Mexico and northern Central America but coloration paler throughout; upper parts lighter red, particularly on wings and tail and posterior parts of body; underparts grayer as well as paler; size slightly larger.

Range.—Known only from the Sierra Madre del Sur in Guerrero.

Remarks.—This is apparently a very uncommon woodhewer for Mrs. Smith secured only two specimens and none of the recent collectors seem to have encountered it at all. Both specimens are in fresh, complete fall plumage. One, an adult male, measures: wing, 103; tail, 93; exposed culmen, 30; the other (type, sex not recorded) measures: wing, 105; tail, 90; exposed culmen, 34 mm.

I agree with Hellmayr that no significant differences are to be found between Guatemalan and Mexican specimens of *insignis.*

Vol. 52, pp. 17–18 February 4, 1939

PROCEEDINGS

OF THE

BIOLOGICAL SOCIETY OF WASHINGTON

TWO NEW TROPICAL AMERICAN SPECIES OF ACANTHACEAE.[1]

BY E. C. LEONARD.

The present paper contains descriptions of two new plants of the family Acanthaceae, one a *Mendoncia* received from the National Herbarium of Venezuela, the other a Mexican *Elytraria* in the herbarium of the Field Museum of Natural History.

Elytraria macrophylla Leonard, sp. nov.

Caulescens, caulibus pilosis; lamina foliorum grandis, obovata, obtusa, basi angustata, pilosa vel supra subglabra; petioli pilosi; pedunculi terminales vel subterminales; squamae acuminatae, albo-marginatae, ciliatae; bracteae rhombeo-ovatae, acuminatae, extus glabrae, intus appresso-puberulentae, ciliatae; bracteolae lanceolatae, obliquae, subhyalinae, carina et margine ciliatis; calycis segmenta superiora et inferioria concava, elliptica, obtusiuscula, segmenta lateralia lanceolata, acuminata, marginibus subhyalinis.

Stems woody, about 5 mm. in diameter, pilose; leaf blades obovate, up to 30 cm. long and 11 cm. wide, obtuse at apex, narrowed at base, pilose or subglabrous above, the hairs up to 1.5 mm. long; petioles about 3 cm. long, white-pilose, the hairs up to 3 mm. long; peduncles several, terminal or subterminal, up to 35 cm. long, the scales ovate, about 7 mm. long, acuminate, clasping, glabrous, ciliate, green with white margins; spikes 2 cm. long, about 5 mm. in diameter, the bracts rhombic-ovate, 4.5 mm. long, 4 mm. wide, acuminate, ending in a minute spiniform tip, glabrous without, appressed-puberulent within, ciliate, the margins whitish; bractlets lanceolate, 3.5 mm. long, 1 mm. wide, oblique, subhyaline, the margins and keel ciliate; posterior and anterior calyx segments elliptic, 5 mm. long, 2 mm. wide, concave, obtusish, the anterior segment minutely bidentate at apex, the lateral segments lanceolate, 4 mm. long, barely 2 mm. wide, acuminate, the margins subhyaline, all faintly nerved, glabrous, or with a few hairs at tip; corollas and capsules not seen.

Type in the herbarium of the Field Museum of Natural History, no.

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

918960, collected at Tamazunchale, San Luis Potosí, Mexico, Nov. 27, 1937, by L. A. Kenoyer (no. 856).

Readily distinguished from other caulescent species by its greater size, the green subglabrous upper surface of its large leaf blades, and its elliptic, concave, obtusish anterior and posterior calyx segments, these similar to each other except for the bidentate tip of the former.

Mendoncia Cardonae Leonard, sp. nov.

Frutex volubilis, caulibus subteretibus, sparse et minute strigosis; lamina foliorum ovata ad elliptica, breviter acuminata, saepe mucronata, basi acuta vel rotundata, in petiolum decurrens, minute strigosa; petioli sparse et minute strigosi; pedicelli graciles, minute et sparse strigosi; bracteae oblongo-ovatae, acutae ad obtusae, basi rotundatae, coriaceae, intus glabrae, extus sparse et minute strigosae; corolla angusta; drupa minute strigosa.

Scandent; stems subterete, minutely and sparingly strigose; leaf blades ovate to elliptic (sometimes asymmetrical), up to 14 cm. long and 6.5 cm. wide, short-acuminate (the tip itself blunt and often mucronate), acute or rounded at base and decurrent on the petiole, sparingly strigose, the hairs above arising from a stellate base; petioles 1–2.5 cm. long, minutely and sparingly strigose; flowers 4 or 5 in the axils of the upper leaves; pedicels about 4 cm. long, slender, minutely and sparingly strigose; bracts oblong-ovate, up to 23 mm. long and 14 mm. wide, acute to obtuse, mucronate, rounded at base, chartaceous, glabrous within, sparingly and minutely strigose without; corolla 3 cm. long, 5 mm. broad at base, narrowed above ovary to 2.5 mm., thence enlarged to 4.5 mm. and slightly narrowed again at throat, the upper half subcylindric, the lobes obovate, 3 mm. long; ovary densely pubescent; drupe 15 mm. long, 10 mm. broad, minutely strigose.

Type in the National Herbarium of Venezuela, collected "en las lomas arriba del sitio de Guanajaña," Merevari, Venezuelan Guyana, 420 meters, March 20, 1937, by F. Cardona (no. 19). Pittier's no. 13517, collected at Aragua, on the trail between El Limón and Colonia Tovar, Venezuela, 1700 meters, May, 1934, is of this species.

The present species resembles *M. Sprucei* in the size and shape of the leaf blades, in the nature of the pubescence, and in the shape, size, and texture of the bracts, but differs markedly in its very narrow corolla. In *M. Sprucei* the corolla is funnelform and about 8 mm. in diameter at throat. The color of the flowers is scarcely apparent in the dried material of the specimens cited, but is probably red or purple.

Vol. 52, pp. 19–22 March 11, 1939

PROCEEDINGS

OF THE

BIOLOGICAL SOCIETY OF WASHINGTON

A NEW OWSTONIID FISH FROM DEEP WATER OFF THE PHILIPPINES.

BY GEORGE S. MYERS.

In the course of studies on the Owstoniid fishes in the United States National Museum, the following apparently undescribed species was discovered:

Sphenanthias pectinifer, new species.

Holotype.—U. S. N. M. 93455, standard length 141 mm., parchment tag 1859, *Albatross* dredging station 5255, latitude 7° 03′ N., longitude 125° 39′ E., off Dumalag Island, Davao Bay, Mindanao, Philippines, 100 fathoms, May 18, 1908.

Description.—Dorsal with 4 soft, slender, unarticulated spines, and 23½ articulated rays, the first few of which are unbranched. It is very difficult to determine which soft ray is the first to be branched at its slender, flabby tip, but it is certain that all rays posterior to the middle of the fin are branched. Anal with 2 short, slender, sharp, rather rigid, unarticulated spines, and 16½ articulated soft rays, the first four or five of which are unbranched. Caudal with 13 principal rays, all branched; supporting these are 4 unbranched, articulated rays above, and 5 unbranched articulated rays below. The most anterior of these supporting rays are very tiny. Pelvics with one rather stout spine; a very elongate, unbranched, soft ray, and 4 branched rays. Pectorals each with 19 articulated rays, the upper two and the lower two unbranched, all the others branched. Fins placed and shaped like those of *S. sibogæ*, the pectorals short and rounded, the first soft pelvic ray greatly elongated, and the middle caudal rays greatly produced.

Scales very large and thin, rounded apically, roughly squared or convex basally, the apical border faintly to rather strongly crenulated into weak points, the spaces between the points concave. Nucleus a little apicad of center. Basal border crenulated into rounded projections, the intervals between them being the starting points of radial lines which converge toward the nucleus. The apical or visible sector thus has no radii, as shown in Weber's figure of a scale of *S. sibogæ*. Circuli very fine, especially across the basal radii; they follow the apical crenulations in their course.

Lateral line reaching to end of dorsal base, its anterior part reaching the dorsal at the base of the fourth spine. No loop around front of dorsal fin.

Longitudinal scales from upper end of gill slit to end of hypural 30. Transverse scales between mid-series of belly and dorsal fin 10, the last

upper row being the lateral line series. Transverse scales between lateral line series and origin of anal fin 7½. Preventral area and front of base of pelvics scaled. Caudal with an elongate, acuminate patch of smaller scales on its basal part. Vertical fins scaleless. Cheek with 7 to 9 scales, the largest at the angle of the preopercle. Opercles with scales, mostly lost on this specimen. Top of head and maxillary scaleless.

Gill rakers long, setiform, with minute prickles, 18 on upper limb and 27 on lower limb, or 45 in all on first arch. Gills 4, a short slit behind last. Pseudobranchiae well developed. Branchiostegals 6. Gill membranes free from each other and from isthmus.

Teeth small, uniserial except towards symphysis of mandible, where they are biserial, the outer row flaring strongly outward. All jaw teeth flaring outward slightly, except ones of inner row near tip of mandible, which curve inward. A short space at mandibular and premaxillary symphyses toothless. No teeth on tongue, vomer, palatines, or pterygoids.

Mouth nearly vertical. Lower jaw rather shallow, its ramus upraised and deep at posterior end. Upper jaw with a shallow notch at symphysis. Maxillary very broad and flat posteriorly, its end squarely truncated. No spines on opercle. Vertical limb of preopercle smooth. Angle of preopercle and its lower edge with a row of 13 or 14 strong spines, projecting downward and forward.

Depth 4.7 in standard length, head 5.22. Eye 2.25 in head. Interorbital 2.40 in eye. Dorsal origin over upper end of gill slit. Anal origin under base of seventh soft dorsal ray, its end slightly before base of last dorsal ray.

Colorless in alcohol except for the "Owstoniid mark," a jet-black, hidden blotch on the membrane connecting the maxillary and premaxillary (see Myers, *Smithsonian Misc. Coll.*, vol. 91, no. 23, 1935, p. 2).

Measurements in millimeters.—Standard length 141. Total length 234. Depth 30. Head 27. Eye 12. Interorbital 5. Caudal 93. Pectoral 32.5. Least depth caudal peduncle 12. Length caudal peduncle (end dorsal base to first upper supporting ray of caudal) 17.

Discussion.—I am not at all sure that the figures and descriptions of *Sphenanthias sibogæ* (Weber, *Fische der Siboga*, 1913, p. 211, pl. 2, fig. 4; Weber and de Beaufort, *Fishes Indo-Austr. Arch.*, vol. 6, 1931, pp. 114–116, fig. 20) are correct in the representation of articulated *versus* unarticulated dorsal and anal spines and rays; the total count, at least, is lower than in *pectinifer*. According to the figures and descriptions, *sibogæ* has but a single cheek scale, and the lateral line rises to the dorsal fin at the base of the second spine (rather than the fourth). Dr. de Beaufort has very kindly examined Weber's types for me. He finds that the holotype has 38 rakers on the entire first arch, and 3 paratypes each 39 (12 on upper limb and 27 on lower). *S. pectinifer* has 45. The body is more slender and less tapering than that of *sibogæ* and various minor proportions differ. Weber figures 15 branched caudal rays, an important difference if the figure is correct.

An example of *Sphenanthias tæniosoma* (Kamohara, *Annot. Zool. Japonen.*, vol. 15, 1935, p. 136) from off Kochi, Tosa, generously sent me by Prof. Kamohara, has 52 rakers (14 + 38) and the lateral line reaches the dorsal between the fourth and fifth spines. This is an exceedingly elongate species, with depth 6.4, head 5.6, and ten or twelve scales on the cheek.

Vol. 52, pp. 21–22 March 11, 1939

PROCEEDINGS

OF THE

BIOLOGICAL SOCIETY OF WASHINGTON

NATURAL HISTORY OF PLUMMERS ISLAND, MARYLAND.

VII. HEPATICAE.[1]

BY E. C. LEONARD AND M. E. PIERCE.

The present list contains 18 species of hepatics from Plummers Island, Montgomery County, Maryland, and the adjacent "mainland" property of the Washington Biologists' Field Club. Three of them, marked with an asterisk, are known at present only from the mainland. Dr. A. W. Evans of Yale University has assisted in the identification of some specimens.

RICCIACEAE.

Riccia crystallina L. Muddy shore of river.
Riccia fluitans L. Floating. Rare.
Riccia sullivantii Austin. Flood-swept land along channel.
Ricciocarpus natans (L.) Corda. Floating in channel near Island shore. One record.

REBOULIACEAE.

Asterella tenella (L.) Beauv. On rocks; also on soil of abandoned garden on mainland.

RICCARDIACEAE.

Metzgeria conjugata Lindb. Shaded rocks and cliffs.

LOPHOZIACEAE.

Lophocolea heterophylla (Schrad.) Dumort. On decayed branches and in soil at base of trees.

CEPHALOZIACEAE.

**Cephalozia connivens* (Dicks.) Lindb. Moist bank. One record.

[1] The following numbers of this series have been published previously: I (Introduction), Proc. Biol. Soc. Wash. 48 : 115–117. 1935; II (Flowering plants and ferns), *op. cit.* 118–134; III (Mosses), *op. cit.* 135–137; IV (Birds), *op. cit.* 159–167; V (Fungi), *op. cit.* 49 : 123–131. 1936; VI (Reptiles and Amphibians), *op. cit.* 50:137–139. 1937.

PORELLACEAE.

Porella pinnata L.' On rocks subject to inundation.
Porella platyphylla (L.) Lindb. On tree trunks and logs.

LEJEUNEACEAE.

Leucolejeunea clypeata (Schwein.) Evans. On rocks.
**Cololejeunea biddlecomiae* (Austin) Evans. Rock outcrop. Rare.
Frullania asa-grayana Mont. On rocks, rarely on trees. Common.
Frullania brittoniae Evans. On tree trunks. One record.
Frullania eboracensis Gottsche. On tree trunks. Common.
Frullania inflata Gottsche. On rocks and occasionally on red cedar. Common.
Frullania squarrosa (Nees) Dumort. On tree trunks. Occasional.

ANTHOCEROTACEAE.

**Anthoceros laevis* L. Grassy field of farmland. One record.

Vol. 52, pp. 23–26 March 11, 1939

PROCEEDINGS

OF THE

BIOLOGICAL SOCIETY OF WASHINGTON

NATURAL HISTORY OF PLUMMERS ISLAND, MARYLAND.

VIII. Lichens.

BY E. C. LEONARD AND E. P. KILLIP.

The accompanying list of lichens from Plummers Island and the adjacent property of the Washington Biologists' Field Club in Montgomery County, Maryland, is based upon the collections in the United States National Herbarium. Much of this material was worked over by Professor Bruce Fink in connection with the preparation of his book, "The Lichen Flora of the United States," these specimens having been mostly collected by Professor Fink and by Dr. William R. Maxon. The collections of the senior author, made more recently, have been studied in part by Mrs. Joyce Hedrick Jones, of the University of Michigan, and in part by Edward C. Berry, of the Missouri Botanical Garden, to whom we are very grateful for the identifications. The nomenclature adopted in the present paper is that of Professor Fink, except in *Cladonia*. Some of the earlier collections of that genus from Plummers Island were reviewed by C. A. Robbins[1] and the recent ones have been studied by Dr. A. W. Evans, of Yale University. Their identifications form the basis of the present treatment.

There are included here 91 species, with 4 additional varieties and 18 forms. Of these, 4 species are known only from the "mainland" property and are indicated by an asterisk.

DERMATOCARPACEAE.

Dermatocarpon aquaticum (Weis) Zahlbr. Rock outcrop, exposed to high water.

Dermatocarpon miniatum (L.) Mann. On rocks above water-line. Rare.

Var. *fulvofuscum* (Tuck.) Zahlbr. Rock slope.

[1] See C. A. Robbins & S. F. Blake, Cladonia in the District of Columbia and vicinity. Rhodora 33: 145–159, *pl. 210–212*. 1931.

PYRENULACEAE.

Arthopyrenia alba (Schrad.) Zahlbr. On hickories.
Arthopyrenia cerasi (Schrad.) Mass. On young oaks.
Arthopyrenia quinqueseptata (Nyl.) Muell. On hickories.
Pyrenula nitida (Weig.) Ach. On trees.

TRYPETHELIACEAE.

Trypethelium virens Tuck. On trees.

ARTHONIACEAE.

Arthonia dispersa (Schrad.) Nyl. On trees.
Arthonia lecideella Nyl. On trees.
Arthonia radiata (Pers.) Ach. On trees.
Arthothelium spectabile Mass. On trees.

GRAPHIDACEAE.

Opegrapha varia Pers. On trees; frequent.
Opegrapha vulgata Ach. On trees.
Graphis scripta (L.) Ach. Common on trees.

COLLEMACEAE.

Synechoblastus rupestris (Sw.) Trev. On rocks and trees. Occasional.
Leptogium pulchellum (Ach.) Nyl. On shaded rocks.
Leptogium tremelloides var. *azureum* (Sw.) Nyl. On shaded rocks and in crevices of rocks. Occasional.

PANNARIACEAE.

Pannaria leucosticta Tuck. On mossy rocks.
Coccocarpia incisa Pers. On shaded rocks.

PELTIGERACEAE.

Nephroma helveticum Ach. On mossy rocks.
Peltigera canina (L.) Willd. Common on soil and mossy rocks.
Peltigera horizontalis (Huds.) Baumg. Rock outcrop.
Peltigera rufescens (Weis) Humb. On mossy rocks.
Peltigera sorediata (Schaer.) Fink. Shaded soil.

LECIDEACEAE.

Lecidea albocaerulescens (Wulf.) Ach. Rock outcrop. Abundant.
Lecidea coarctata (J. E. Sm.) Nyl. ? On rocks. Our specimen doubtfully referred to this by Fink.
**Lecidea leucophaea* (Floerke) T. Fries. Rock outcrop.
Lecidea leucophaeoides Nyl. On rocks.
Bacidia atrogrisea (Hepp) Koerb. On trees.
Bacidia fuscorubella (Hoffm.) Bausch. On trees.
Bacidia rubella (Hoffm.) Mass. On trees.
**Bacidia schweinitzii* (Tuck.) Schneid. On trees.
Rhizocarpon albineum (Tuck.) Fink. On shaded rocks.

CLADONIACEAE.

Cladonia apodocarpa Robbins. Dry soil or rocks.
Cladonia bacillaris (Del.) Nyl. On logs.
Cladonia caespiticia (Pers.) Floerke. On shaded rocks.
Cladonia chlorophaea (Floerke) Spreng. Rock outcrop and on thin soil.
Forma *lepidophora* (Floerke) Sandst. On rocks. Rare.
Forma *simplex* (Hoffm.) Arn. On damp ground and shaded rocks.
Cladonia clavulifera Wain. Thin soil on rocks.
Forma *nudicaulis* Evans. Rock outcrop.
Forma *pleurocarpa* Robbins. Thin soil.
Forma *subvestita* Robbins. In soil.
Cladonia coniocraea f. *ceratodes* (Floerke) Wain. Rock outcrop.
Forma *truncata* (Floerke) Wain. Rock outcrop.
Cladonia cristatella Tuck. Soil, and occasionally on trees.
Forma *beauvoisii* (Del.) Wain. Exposed roots of red cedar.
Forma *vestita* Tuck. Rock outcrop.
Cladonia furcata (Huds.) Schrad. Thin soil or shaded rocks.
Var. *pinnata* (Floerke) Wain. Rock outcrop.
Forma *foliolosa* (Del.) Wain. On rocks.
Forma *turgida* (Scriba) Sandst. Rock outcrop.
Var. *racemosa* (Hoffm.) Floerke. Rock outcrop.
Forma *squamulifera* Sandst. Open rocky slope.
Cladonia grayi Merr. Open slopes and rock outcrop.
Forma *squamulosa* Sandst. Rock outcrop.
Cladonia impexa Harm. On mossy rocks.
Cladonia macilenta f. *styracella* (Ach.) Wain. Rock outcrop.
Cladonia mitrula Tuck. Logs and shaded soil. Common.
Forma *imbricatula* (Nyl.) Wain. Thin soil. Common.
Cladonia piedmontensis Merr. Rocky hill.
Forma *obconica* Robbins. On rocks.
Forma *squamulosa* Robbins. On rocks.
Cladonia pityrea (Floerke) Fries. On logs.
Cladonia pleurota (Floerke) Schaer. Among rocks in woods and on rock outcrop. Rare.
Forma *decorata* (Wain.) Evans. Rock outcrop.
Var. *cerina* (Nagel) Th. Fries. Rare.
Cladonia pyxidata var. *neglecta* (Floerke) Mass. On partially shaded rocks.
Cladonia subcariosa f. *evoluta* Wain. Deciduous woods.
Cladonia tenuis (Floerke) Harm. Rock outcrop.
Forma *setigera* Sandst. Rock outcrop.
Cladonia verticillata (Hoffm.) Schaer. Thin soil.
Forma *phyllophora* (Ehrh.) Flot. On rocks. Rare.

ACAROSPORACEAE.

Biatorella clavus (Lam. & DC.) T. Fries. On partly exposed rocks.
Biatorella simplex (Dav.) Branth & Rostr. On partly exposed rocks.
Acarospora cervina (Ach.) Mass. On rocks near water.

PERTUSARIACEAE.

Pertusaria leioplaca (Ach.) Lam. & DC. On tree.
Pertusaria pertusa (L.) Tuck. On trees and rocks.

LECANORACEAE.

Lecanora muralis var. *saxicola* (Poll.) Tuck. On rocks near water.
Lecanora subfusca var. *campestris* Rabenh. Rock outcrop.
Lecanora varia (Hoffm.) Ach. On tree.
Ochrolechia pallescens (L.) Mass. On branches.

PARMELIACEAE.

Parmelia aurulenta Tuck. On trees and shaded rocks.
Parmelia borreri Turn. Rock outcrop.
Parmelia caperata (L.) Ach. Rock outcrop and on trees.
Parmelia centrifuga (L.) Ach. Rock outcrop.
Parmelia cetrata Ach. On red cedar.
Parmelia conspersa (Ehrh.) Ach. On rocks.
**Parmelia crinita* Ach. Rock outcrop.
Parmelia perforata (Wulf.) Ach. On red cedar.
Parmelia perlata (L.) Ach. On rocks.
Parmelia rudecta Ach. On trees and rocks.
Parmelia quercina (Willd.) Wain. On rock outcrop and trees.
Parmelia sulphurata Nees & Flot. On trees.

USNEACEAE.

Usnea barbata (L.) Wigg. On red cedar.

CALOPLACACEAE.

Caloplaca aurantiaca (Lightf.) T. Fries. On rocks near water.
Caloplaca modesta (Zahlbr.) Fink. On rocks near water.

BUELLIACEAE.

Buellia parasema var. *triphragmia* (Nyl.) T. Fries. On trees.
Buellia spuria (Schaer.) Anzi. On rocks.
Rinodina ascociscana Tuck. Rock outcrop.
Rinodina biatorina Koerb. On rocks near water.
Rinodina oreina (Ach.) Mass. On exposed rocks. Rare.
Rinodina sophodes (Ach.) Mass. On rocks and trees.

PHYSCIACEAE.

Physcia caesia (Hoffm.) Hampe. Rock outcrop.
Physcia lithotodes Nyl. On trees.
Physcia obscura (Ehrh.) Hampe. On rocks.
Physcia stellaris (L.) Nyl. On trees and rocks. Rare.
Physcia teretiuscula (Ach.) Lynge. Rock outcrop.
**Physcia tribacia* (Ach.) Nyl. On dead wood.
Anaptychia aquila (Ach.) Mass. On rocks.
Anaptychia speciosa (Wulf.) Mass. On shaded rocks.

LEPRARIACEAE.

Amphiloma lanuginosum (Hoffm.) Nyl. On wet rocks.

Vol. 52, pp. 27–28 March 11, 1939

PROCEEDINGS
OF THE
BIOLOGICAL SOCIETY OF WASHINGTON

TWO NEW SPECIES OF PILEA, FROM MEXICO AND PANAMA.[1]

BY ELLSWORTH P. KILLIP,
U. S. National Museum.

In the course of recent studies of *Pilea*, of the family Urticaceae, I have found two undescribed species, one from Veracruz, the other from the Province of Chiriquí, Panama. They may be described as follows:

Pilea botterii Killip, sp. nov.

Herba, dioica, glaberrima; folia jugi similia, aequalia vel inaequalia, petiolata, elliptico-lanceolata vel anguste oblanceolata, attenuato-acuminata, ad basin angustata, serrata, trinervia, membranacea, cystolithis minutis, linearibus; inflorescentia ♂ in axillis superioribus, paniculata, dichotoma, pedunculata, perianthio globoso; inflorescentia ♀ in axillis fere omnibus, sessilis, compacta, petiolo multo brevior.

Plant herbaceous, glabrous throughout, the stem repent at base, at length erect, 25 cm. or more high, simple; stipules minute, soon deciduous; leaves of a node similar and subequal, or one somewhat smaller than the other and with a shorter petiole, the petioles slender, 1 to 5 cm. long, the blades elliptic-lanceolate or narrowly oblanceolate, 3 to 6 cm. long, 1 to 1.5 cm. wide (smaller), 6 to 15 cm. long, 1.5 to 2.5 cm. wide (larger), attenuate-acuminate at apex, narrowed to an acute or subauricular base, sharply serrate (teeth strongly ascending) except at the very base, trinerved (lateral nerves extending to apex of blade), membranous, dark green above, usually pale beneath, with much darker nerves and veins, the cystoliths numerous, faint, minute, linear; plants dioecious; staminate inflorescence borne at the upper axils, paniculate, dichotomous, pedunculate, subequaling or exceeding the adjacent petioles, the perianth subglobose, nearly 2 mm. in diameter, bearing conspicuous cystoliths toward the apex, the lobes apiculate; pistillate inflorescence borne in most of the axils, the flowers in sessile, compact, subglobose cymes much shorter than the petioles, the perianth segments unequal, the achenes about 0.8 mm. long, smooth.

Type in the U. S. National Herbarium, no. 59,662, collected at Orizaba, State of Veracruz, Mexico, by M. Botteri (no. 19).

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

Additional specimens examined:

Mexico: Without locality, *Sessé & Mociño* 4524 (Boissier, Madrid). Coscomatepec, Veracruz, *Matuda* S–152 (Univ. Michigan).

The type was distributed as *P. mexicana* Wedd., a species based on Linden's 651, of which a specimen has generously been lent me by the Jardin Botanique, Brussels. From *P. mexicana* the proposed species differs in having thinner, more prominently toothed leaves, with much longer petioles and different cystoliths. The leaves of *P. mexicana*, moreover, are noticeably thickened at the margin, and the staminate inflorescence is much shorter than the petioles.

The Sessé and Mociño specimen at the Boissier Herbarium bears the name *Pilea anomala* Wedd. var. nov., the varietal name apparently never having been published. The species is only remotely allied to *P. anomala*, of Bolivia, which is indistinguishable from *P. multiflora* (Poir.) Wedd.

Pilea rugosissima Killip, sp. nov.

Herba dioica, caule foliisque dense appresso-strigosis; stipulae magnae, persistentes; folia petiolata, ovata vel ovato-lanceolata, acuminata vel subacuta, serrata, subtriplinervia, rugosissima; flores ♂ in capitulis densis longipedunculatis, perigonii segmentis in parte superiore subulatis.

Plant herbaceous, 30 to 100 cm. high, the stem densely appressed-strigose with ascending hairs; stipules oblong, 6 to 7 mm. long, 3 to 4 mm. wide, obtuse, membranous, bearing longitudinally on the outside long, linear cystoliths, persistent; petioles slender, pubescent as the stem, up to 5 cm. long, those at a node sometimes very unequal; leaf blades at a node similar and subequal, ovate or ovate-lanceolate, 1.5 to 6 cm. long, 1.5 to 3 cm. wide (the lower pairs smaller than the others and more nearly ovate-orbicular), acuminate at apex, rounded or cordulate at base, sharply serrate, subtriplinerved (lower lateral nerves scarcely more prominent than the upper nerves and extending only halfway to the apex), strongly rugose, reticulate-veined, dark green above, paler beneath, appressed-strigose *between* the veins on the upper surface and *on* the nerves and veins on the under surface; plants dioecious, the staminate inflorescence (only one known) borne in the upper axils, the peduncles slender, 3 to 3.5 cm. long, glabrous, the flowers sessile, in a single dense head, the perianth about 2 mm. in diameter in bud, the segments at length spreading, cucullate, with a long, subulate tip.

Type in the herbarium of the Field Museum of Natural History, no. 918,555, collected in rain-forest at Bajo Chorro, District of El Boquete, Province of Chiriquí, Panama, altitude about 1,800 meters, Feb. 27, 1938, by M. E. Davidson (no. 335).

The nearest relative of this new species is apparently *P. fasciata* Wedd., endemic to the Chocó region of northwestern Colombia, the shape and texture of the leaves and the indument being very similar. The leaves of *P. fasciata* are much larger, and their lower lateral nerves extend nearly to the apex of the blade. The leaf serration in *P. rugosissima* is much more prominent than in its relative. *Pilea fasciata* is known only from pistillate plants, so that comparison of the inflorescence of the two is impossible.

Vol. 52, pp. 29–32 March 11, 1939

PROCEEDINGS

OF THE

BIOLOGICAL SOCIETY OF WASHINGTON

TWO NEW POCKET GOPHERS FROM LOWER CALIFORNIA.

BY E. A. GOLDMAN.

In reviewing the pocket gophers of southern Lower California I have noted two small series of specimens from the Magdalena Plain, close along the Pacific coast, and one from the low plain near La Paz on the Gulf of California that were referred by me to *Thomomys bottae anitae* many years ago, but now seem worthy of separation as western and eastern peninsular geographic races. The new forms may be known by the following description:

Thomomys bottae incomptus, subsp. nov.

MAGDALENA PLAIN POCKET GOPHER.

Type.—From San Jorge, near Pacific coast west of Pozo Grande and about 25 miles southwest of Comondú, southern Lower California, Mexico (altitude 50 feet). No. 140671, ♂ adult, skin and skull, U. S. National Museum (Biological Survey collection), collected by Nelson and Goldman, November 12, 1905. Original number 18546.

Distribution.—Magdalena Plain from the type locality south at least to Matancita, near Soledad. Probably ranging farther south over the plains along the Pacific coast.

General characters.—Similar in general to *Thomomys bottae anitae* of low elevations in the vicinity of San José del Cabo, Lower California, but larger; ground color of upper parts paler, near "pinkish buff" instead of "cinnamon" (Ridgway, 1912); cranial details distinctive. Very similar to and probably intergrading with *Thomomys bottae russeolus* of the Vizcaino Desert to the north, but decidedly larger and color usually darker. Resembling *Thomomys magdalenae* of Magdalena Island, but smaller; color darker, ears encircled by deep black (ears with only a trace of black in *magdalenae*); skull much smaller, lighter, and differing in detail.

Color.—*Type* (acquiring fresh pelage): Upper parts presenting a somewhat patched appearance, the fresh pelage on anterior part of dorsum "pinkish buff" moderately mixed with and the general tone modified by

black, giving way abruptly to "cinnamon-buff" in worn pelage on rump; flanks, forearms, thighs, and under parts pinkish buff; ears encircled with deep black; feet and tail all around white.

Skull.—Very similar to that of *anitae*, but larger and relatively lighter in structure; maxillary arm of zygoma slenderer; auditory bullae usually more inflated, and tending to bulge farther below level of basioccipital; dentition similar but somewhat lighter, the upper incisors slightly more procumbent. Similar to that of *russeolus* in general features, but decidedly larger. Compared with that of *magdalenae* the skull is smaller, less massive; nasals less wedge-shaped, broader posteriorly; rostrum narrower across base, the premaxillae narrower with outer edges less upturned in front of zygomata; interorbital region less constricted; palatopterygoid processes narrower, lacking the lateral wings present in *magdalenae;* auditory bullae more swollen, bulging farther below level of basioccipital; upper incisors procumbent, projecting beyond anterior ends of nasals, instead of strongly recurved as in *magdalenae*.

Measurements.—Type: Total length, 247 mm.; tail vertebrae, 79; hind foot, 34. Average of three adult male topotypes: 238 (230–246); 81 (75–88); 32.1 (31–34). Average of four adult females from Matancita: 224 (210–230); 77 (73–82); 31.4 (30–32). *Skull* (type [♂] and an adult female from Matancita, respectively): Greatest length (occipital condyles to front of incisors), 43.9, 41.1; occipitonasal length, 42.1, 39.9; zygomatic breadth, 27.5, 22.2; width across squamosals (over mastoids), 21.6, 20.6; interorbital constriction, 7, 6.2; length of nasals, 14, 13; maxillary toothrow (alveoli), 8.5, 8.1; width of upper incisors (cutting edge), 4.7, 4.5.

Remarks.—The topotypes of *incomptus* present a wide range of individual variation in color, especially the amount of black admixture in the pelage of the upper parts. One in the first pelage of the young is nearly as pallid as in older examples of the smaller subspecies *russeolus*, and as in the neighboring species *magdalenae* which inhabits dunes of whitish sand on Magdalena Island. Specimens from Matancita shade toward "cinnamon" in color and in this respect suggest gradation toward *anitae;* but in cranial characters they are nearer the present form.

Specimens examined.—Total number 11, all from Lower California, as follows: Matancita, 6; San Jorge (type locality), 5.

Thomomys bottae imitabilis, subsp. nov.

LA PAZ POCKET GOPHER.

Type.—From La Paz, southern Lower California, Mexico, No. 146839, ♂ adult, skin and skull, U. S. National Museum (Biological Survey collection); collected by Nelson and Goldman, February 16, 1906. Original number 19163.

Distribution.—Known only from the type locality. Probably limited to the low, basin-like, desert plain bordering the southern end of La Paz Bay, and forming a gap between the Sierra de la Giganta and the high mountains of the Cape Region of Lower California.

General characters.—Closely allied to *Thomomys bottae anitae* of Santa

Anita, near San José del Cabo, Lower California, but smaller; color usually duller, less rufescent; skull shorter, with relatively broader rostrum, and differing in other details. Similar to *Thomomys bottae incomptus* of the Magdalena Plain along the Pacific coast, but smaller; ground color of upper parts usually near "cinnamon" instead of "pinkish buff"; skull shorter, with relatively broader rostrum, and differing in other details. Similar in size to *Thomomys bottae alticola* of the upper slopes of the high mountains of the Cape Region, but paler, the upper parts much less extensively mixed with black, and cranial features distinctive.

Color.—Type (pelage somewhat worn): Upper parts from top of head to rump near "cinnamon" (Ridgway, 1912), with scarcely a trace of black-tipped hairs, becoming "pinkish buff" on flanks, forearms, and thighs; under parts about like flanks; middle of face and muzzle brownish; ears narrowly encircled with black; feet and tail all around whitish. In a specimen in partly fresh pelage hairs with very short black points are admixed on dorsum. In worn specimens the color varies to near tawny.

Skull.—Similar to those of *anitae* and *incomptus*, but shorter; more evenly convex in upper outline, the frontal region less depressed; rostrum relatively broader; upper incisors more strongly recurved, not projecting anteriorly beyond ends of nasals as usual in *anitae* and *incomptus*. Compared with that of *alticola* the skull agrees closely in general form, but is shorter; rostrum broader; upper incisors narrower, recurved as in *alticola*.

Measurements.—Type: Total length, 225 mm.; tail vertebrae, 78; hind foot, 30. Two adult male topotypes, respectively, 234, 215; 82, 73; 32, 29. Average of three adult female topotypes: 208 (202–212); 71 (67–74); 28 26–30). *Skull* (type [♂] and an adult female topotype, respectively): Greatest length (occipital condyles to end of nasals), 39, 35.7; occipitonasal length, 38.3, 35.7; zygomatic breadth, 24.5, 21.8; width across squamosals (over mastoids), 20.4, 18.5; interorbital constriction, 6.6, 6.4; length of nasals, 12.8, 11.5; maxillary toothrow (alveoli), 8.5, 7.5; width of upper incisors (cutting edge), 4.3, 3.7.

Remarks.—Thomomys bottae imitabilis differs only slightly from *anitae* in color, but in cranial details is more like the much darker high mountain neighbor *alticola*. Its habitat is in a very arid desert region.

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

Vol. 52, pp. 33–36 March 11, 1939

PROCEEDINGS

OF THE

BIOLOGICAL SOCIETY OF WASHINGTON

A NEW POCKET MOUSE OF THE GENUS PEROGNATHUS FROM NEVADA.

BY E. A. GOLDMAN.

Woodhouse (Acad. Nat. Sci. Philadelphia, vol. 6, p. 200, 1852) described *Perognathus penicillatus* as "procured in the San Francisco Mountain, New Mexico" [Arizona] without indicating exactly where the type was taken. He remarks: "Of the habits of this animal I know but little." As the rugged, volcanic mountain would be an unsuitable habitat for a member of this sand-loving species, it has been suggested that the type probably came from the Little Colorado Desert to the northeast. Efforts to obtain additional specimens in the general region have thus far been unsuccessful; but four other species of the genus have been taken in limited numbers, and more thorough field work may still reveal the true habitat of typical *penicillatus*.

The type was not designated by number and was not entered in the National Museum catalog until April 7, 1857, but seems to have been the specimen referred to by Baird (Mammals of North America, 1857, p. 419). The specimen was formerly mounted with the skull inside, but the skull was removed and cataloged under a separate number, June 4, 1898. The skin is now so faded that the original color can not be determined. In describing the animal Woodhouse (l. c.) says: "* * * top of head and back dark yellowish brown * * *." The measurements given by him, especially that of the hind foot, one inch (= 25.5 millimeters), are about the same as those of specimens from Wickenburg and Big Sandy River, which are the nearest of those now available to the type locality, and are currently referred to *penicillatus*. The skull of the type is rather large

but is equaled by those of the larger individuals assumed to represent the typical form. Pocket mice varying somewhat in color, but deviating little in size or cranial details, inhabit southwestern Arizona and the western side of the Colorado River valley north to extreme southern Nevada. Farther north in the Vegas and Virgin valleys these give way to the hitherto unrecognized geographic race here described.

Perognathus penicillatus seorsus, subsp. nov.

VIRGIN VALLEY POCKET MOUSE.

Type.—From sand flat along Virgin River, 7 miles above Bunkerville, Clark County, Nevada. No. 27598/39697, ♂ adult, skin and skull, U. S. National Museum (Biological Survey collection); collected by Vernon Bailey, May 9, 1891. Original number 2743.

Distribution.—Vegas and Virgin River valleys, Nevada, and doubtless extending up along the Virgin River into extreme northwestern Arizona.

General characters.—A large subspecies, closely allied to *Perognathus penicillatus penicillatus* of Arizona; general size about the same; upper parts more strongly suffused with pinkish buff, less grayish; skull narrower across mastoids and differing in other details. Very similar in color to *Perognathus penicillatus angustirostris* of the Colorado Desert, and to *Perognathus penicillatus stephensi* of Death Valley, California, but larger than either—much larger than *stephensi;* cranial features distinctive.

Color.—Type (unworn pelage): Ground color of upper parts in general "pinkish buff" (Ridgway, 1912), finely and inconspicuously mixed with black; under parts in general, forearms, and feet white, a sharp line of demarcation on cheeks, shoulders, and along sides; ears thinly clothed with short, fine, brownish hairs, a small basal white spot present as usual in the species; tail light brownish above, white below. Color quite uniform in all specimens examined.

Skull.—Very similar in size and general form to that of typical *penicillatus*, but narrower across mastoids (mastoid width in adult male, 13.5; mastoid width in type of *penicillatus*, 14.3); maxillary arm of zygoma broader, the lateral wing more strongly developed; upper surface of nasals slightly more depressed between premaxillae; mastoid and auditory bullae smaller. Similar to that of *angustirostris*, but larger; rostrum broader, the sides less evenly tapering anteriorly, owing to more swollen premaxillae over roots of incisors; maxillary arm of zygoma broader, the lateral wing more strongly developed; mastoid and auditory bullae relatively smaller; upper incisors broader, a character correlated with swelling of premaxillae over roots of these teeth. Compared with that of *stephensi* the skull differs in much larger size, and otherwise in about the same details as from *angustirostris*.

Measurements.—Type: Total length, 202 mm.; tail vertebrae, 102; hind foot, 26. Two adult topotypes, respectively: 192, 196; 105, 105; 24.5,

24.5. Average of 10 adults from Colorado River, near mouth of Vegas Wash, Nevada: 203.6 (186–215); 112 (102–129); 25 (23.5–26).

Skull.—(type [♂] and an adult male from Colorado River, near mouth of Vegas Wash, Nevada, respectively): Occipitonasal length, 27.6, 28.1; zygomatic breadth, 14.2, 14.2; mastoid breadth, 13.5, 13.5; length of interparietal, 3.2, 3.5; width of interparietal, 7.5, 6.9; interorbital constriction, 6.4, 6.7; length of nasals, 11.1, 11.3; maxillary toothrow (alveoli), 4, 4.3.

Remarks.—The present form is distinguished from subspecies *penicillatus* as now understood, by a combination of rather slight but fairly constant characters. The species as a whole favors sandy or soft alluvial soils along stream bottoms, and it is, therefore, not surprising that a single form should range across the lower part of the Colorado River Valley, where shifting river channels may transfer colonies from either side to the other.

Specimens examined.—Total number, 39, all from Nevada, as follows: Colorado River (near mouth of Vegas Wash), 23 (7 skulls only); Vegas Valley, 13; Virgin River, 7 miles above Bunkerville (type locality), 3.

Vol. 52, pp. 37–40 March 11, 1939

PROCEEDINGS

OF THE

BIOLOGICAL SOCIETY OF WASHINGTON

A NEW RED-BACKED MOUSE FROM KENTUCKY AND VIRGINIA.

BY REMINGTON KELLOGG.

The identification of mammals secured during the past two years in Tennessee and Kentucky by field parties from the United States National Museum has resulted in the recognition of a new geographic race of the red-backed mouse. This form may be known as:

Clethrionomys gapperi maurus, subsp. nov.

Type specimen.— ♀ adult, skin and skull, no. 267826, U. S. National Museum; Black Mountains, 4½ miles southeast of Lynch, altitude 4100 feet, Harlan County, Kentucky; collected by Watson M. Perrygo and J. Cole; June 23, 1938; original number 705.

Range.—From Black Mountains, Harlan County, Kentucky, eastward to Big Stone Gap, Cumberland Mountains, Wise County, Virginia, and northward along Walker Mountains at least to Mountain Lake, Giles County, Virginia.

General characters.—Similar in size to *Clethrionomys gapperi carolinensis* of eastern Tennessee, but pelage noticeably darker, dorsal stripe Mars brown and more perceptibly overlain with black-tipped hairs; sides duller and darker; and tail less distinctly bicolor. Somewhat larger than *Clethrionomys gapperi gapperi* and decidedly darker, the upperparts lacking the rich ochraceous wash of the latter.

Color.—Summer pelage: Mass effect of upperparts rich Mars brown (Ridgway, 1912), the broad dorsal stripe extending from top of head to base of tail being noticeably darkened by numerous black-tipped hairs; sides of face and body dull buffy, the individual light colored hairs ranging from buff to light ochraceous buff; underparts grayish white washed by buff; feet silvery cinnamon drab; tail unicolored or indistinctly bicolored, thickly haired, with upper surface and pencil black, and with under surface on occasional specimens having a frosted appearance owing to lighter tips of dark hairs.

Young.—When half grown, similar to adults, but mass effect of upperparts is duller and the coloration of the sides is darker,

Skull.—About like that of *Clethrionomys gapperi carolinensis* in size, general form, and length of cheek tooth row, but with zygomatic arches less widely spreading anteriorly. Similar to skull of *Clethrionomys gapperi gapperi*, but somewhat larger and with bullae more noticeably inflated.

Measurements.—Type: Total length, 172; tail, 39; hind foot, 20. Skull. condylobasal length, 26.3; rostral length, 7.2; rostral breadth, 4.6; interorbital breadth, 4.4; zygomatic breadth, 14.7; incisive foramina, 5.2; height of skull at bullae, 9.5; and alveolar length of cheek teeth row, 5.9.

Average of 6 adult female topotypes, including type: Total length, 153.8 (147–172); tail, 37.8 (36–41); hind foot, 19.5 (19–20). Skull, condylobasal length, 24.8 (24.1–26.3); rostral length, 6.8 (6.4–7.2); rostral breadth, 4.6 (4.5–4.8); interorbital breadth, 4.2 (4–4.4); zygomatic breadth, 14.1 (13.5–14.7); length incisive foramina, 4.7 (4.4–5.2); height of skull at bullae, 9.4 (9.2–9.6); and alveolar length of cheek tooth row, 5.4 (5–5.9).

Of 2 adult male topotypes, respectively: Total length, 155, 146; tail, 42, 35; hind foot, 20, 19. Skull, condylobasal length, —, 25.2; rostral length, 7, 7.2; rostral breadth, 4.9, 4.5; interorbital breadth, 4, 4.3; zygomatic breadth, 14.4, 13.8; length incisive foramina, 5, 5; height of skull at bullae, —, 9.5; and alveolar length of cheek tooth row, 5.3, 5.3.

Remarks.—This race is distinguished from other forms of *Clethrionomys gapperi* by the darker coloration of the upperparts and by the duller buff color of the sides. Six specimens of *Clethrionomys gapperi carolinensis* from 6000 to 6300 feet altitude on Roan Mountain, Carter County, Tennessee, which were taken during September, 1937, by W. M. Perrygo and H. Schaefer, are darker than the average, but are readily distinguishable from the new race. The darker coloration of these Roan Mountain specimens indicates, however, that intergradation between the two races may be expected to occur in the southern Allegheny Mountains along the northeastern border of Tennessee. One specimen (No. 267836, U. S. N. M.) in the series from the Black Mountains approaches the above mentioned specimens of *carolinensis* in general coloration of the upperparts and in the presence of a lighter colored dorsal stripe.

The specimens allocated to the new race *maurus* have a pelage coloration that is quite unlike the color phase represented by the dark backed specimens of *Clethrionomys gapperi*, which J. A. Allen (1894, Bull. Amer. Mus. Nat. Hist., vol. 6, p. 103) named *Evotomys fuscodorsalis* or which G. S. Miller, Jr. (1897, Proc. Boston Soc. Nat. Hist., vol. 28, p. 16) referred to as the "brown phase" and V. Bailey (1897, Proc. Biol. Soc. Washington, vol. 11, p. 123) called the "gray animal." A series of 51 *gapperi* collected by Miller during the months of August, September and October in Ontario on the north shore of Lake Superior comprised 46 in the red phase and 5 in the brown phase. Miller concluded that *gapperi* assumes these dichromatic pelages "independently of age, sex, or season." These specimens from Ontario, New Brunswick, and elsewhere in British America are not, however, grayish, but are characterized by the replacement of the usual russet dorsal stripe by a sharply defined blackish brown [1] (Ridgway, 1912) stripe which is strongly contrasted with the lighter sides of the body, the light colored hairs being nearer either cream buff or yellowish olive.

Most of the specimens obtained by Perrygo and Cole in the Black Mountains were taken in large size Schuyler traps nailed to the trunks of spruce trees 5 or 6 feet above the ground. These traps were set for flying squirrels and were baited with bird bodies. The others were taken in runways in moss growing among rocks and the roots of spruce trees. Three specimens were trapped by Arthur H. Howell on July 28–29, 1908, in damp shady ravines among rocks and fallen timber on the slope of the gap in the Cumberland Mountains about a mile west of Big Stone Gap. These mice were partially devoured by other animals while caught in the traps. A male belonging to the Mountain Lake Biological Station of the University of Virginia, which was submitted for identification by Maurice Brooks, was trapped among rocks at the north end of the lake.

Specimens examined.—Fifteen, from the following localities: Kentucky—Harlan County, Black Mountains, 4½ miles southeast of Lynch, altitude 4000 to 4100 feet, 11. Virginia—Wise County, Big Stone Gap, altitude 1800 to 2000 feet, 3; Giles County, Mountain Lake, altitude 4000 feet, 1.

Vol. 52, pp. 41–56 March 11, 1939

PROCEEDINGS
OF THE
BIOLOGICAL SOCIETY OF WASHINGTON

A SYNOPSIS OF PHILIPPINE LAND MOLLUSKS OF THE SUBGENERA LAMARCKIELLA AND PARARYSSOTA OF THE GENUS RYSSOTA.

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

In 1932 I transmitted a fully illustrated manuscript on the genus *Ryssota* to the United States National Museum for publication. Shortness of funds has made it impossible to have this issued to date.

Last year I published a synopsis of the subgenus *Ryssota* in these Proceedings, and I am now giving the same treatment to the other two subgenera, namely, *Lamarckiella* and *Pararyssota*. I am practically compelled to do this, in spite of my antipathy to publish such an abbreviated treatise, by the fact that we have many calls for determination of these species, and it seems unsatisfactory to give out manuscript names or merely the statement that a new species or subspecies is represented.

To give, therefore, the names in question a status I am resorting to this method.

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*
Aperture not produced at the peripheral angle.....*Pararysotta*

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

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

spirally incised lines, which renders the upper surface granulose, and whose periphery is sharply angulated.

He mentions *Rhysota lamarckiana* as type.

KEY TO THE SPECIES OF THE SUBGENUS *Lamarckiella.*

Shell very rough.
- Periphery rounded ..... *balerana*
- Periphery not rounded.
  - Periphery angulated ..... *nigrescens*

Shell not rough.
- Periphery weakly angulated.
  - Upper surface of last whorl chestnut brown ..... *hepatica*
  - Upper surface of last whorl not chestnut brown.
    - Upper surface of last whorl pale brown ..... *negrosensis*
    - Upper surface of last whorl not pale brown.
      - Upper surface of last whorl horn-colored ..... *bulla*
- Periphery not weakly angulated.
  - Periphery carinated.
    - Upper surface of last whorl fulgurated.
      - Outer and basal lips strongly inpinched, strongly contracting the aperture ..... *semperi*
      - Outer and basal lips not strongly inpinched, not strongly contracting the aperture ..... *zeus*
    - Upper surface of last whorl not fulgurated.
      - Upper surface of last whorl marbled ..... *deveyrai*
      - Upper surface of last whorl not marbled.
        - Upper surface of last whorl malleated ..... *carinata*
        - Upper surface of last whorl not malleated.
          - Axial sculpture of last whorl very strong ..... *oweniana*
          - Axial sculpture of last whorl not strong ..... *lamarckiana*

Ryssota (Lamarckiella) balerana, new species.

Shell very large, helicoid. Upper surface chestnut brown, excepting a narrow zone immediately anterior to the periphery. The base is pale horn-colored with a broad, superperipheral band which slowly fades to the rest of the basal coloration anteriorly. Aperture bluish white within, with a livid tint. Nuclear whorls 2.2; the first 1.2 marked by low, flattened, distantly spaced, retractively slanting, axial ribs; the rest by closely spaced, somewhat wavy, retractively slanting, axial riblets and numerous, spiral striations. Postnuclear whorls well rounded, marked by rather regular, retractively slanting, axial riblets, and rather regular, incised, spiral lines, the latter cutting the riblets into tubercles and giving to the surface of the whorls a granulose appearance. In addition to this there are, on the last whorl, rather feeble, oblique, scattered wrinkles. Periphery of the last whorl obsoletely angulated. Base well rounded, marked by the feeble continuations of the axial riblets, numerous spiral striations and fine oblique wrinkles which give, particularly to the posterior half of the base, a decidedly scratched-up appearance. Umbilical area slightly impressed.

Aperture large; peristome reinforced by a slight callus; outer lip decidedly protracted between the summit and periphery and somewhat inbent, and retracted from the periphery basally; the basal lip is almost straight; columella expanded and reflected as a broad callus which almost covers the umbilicus; parietal wall covered with a moderately thick callus.

The type, U. S. N. M. No. 311543, was collected by Quadras at Sitio Semento, Baler, Luzon. It has 4.8 whorls and measures: Height 35.2 mm.; greater diameter 64.4 mm.; lesser diameter 39.1 mm.

RYSSOTA (LAMARCKIELLA) NIGRESCENS Möllendorff.

Shell depressed-helicoid. The upper surface of the early whorls is chestnut brown, while that of the rest of the turns is paler. The basal portion is of a decidedly darker shade of chestnut brown. The first one and one-half nuclear turns flat, marked by strong, low, flat, broad, distantly spaced, retractively curved ribs only; the rest of the nuclear whorls are marked by closely spaced, irregular, somewhat wavy, retractively curved, sometimes anastomizing axial riblets, and numerous, strongly incised spiral lines, which render this portion of the nuclear turns finely granulous. Postnuclear whorls moderately rounded, marked by rather rough, irregularly developed, retractively curved, wrinkle-like axial riblets, and irregularly developed and irregularly spaced, incised spiral lines, the latter rendering the axial riblets interrupted, which gives to the upper surface of the whorls a somewhat granulose appearance, the long axis of the granules coinciding with the axial sculpture. In addition to this, there are irregularly developed and spaced, oblique wrinkles which increase the rough aspect of the shell. Periphery of the last whorl strongly angulated. The area immediately above and below the peripheral angle slightly inpinched. The rough sculpture described above extends upon the periphery. Base strongly rounded, slightly inflated, sometimes with an open umbilicus, while at others, in the same subspecies, this is closed by a callus. The sculpture of the base consists of poorly developed, obsolete, axial riblets and incised spiral lines of irregular strength and spacing, and numerous, oblique wrinkles, the combination lending the base a roughish appearance. Aperture large, oval; outer lip usually decending at the aperture, somewhat sinuous between the periphery and the summit, and slightly protracted in this region; from the periphery basally the outer lip is somewhat retracted; inner lip slightly curved; columella short and reflected over the umbilical area as a whitish callus; parietal wall covered with a thin callus; peritreme slightly thickened with a thin callus; interior of aperture bluish white.

This species is a high mountain form, members of which occur in the Provinces of Rizal and Bulacan. I am recognizing three subspecies.

KEY TO THE SUBSPECIES OF *Ryssota* (*Lamarckiella*) *nigrescens* Möllendorff.

Greater diameter more than 65 mm.....*balacbacana*
Greater diameter less than 65 mm.
  Upper surface very rough.....*nigrescens*
  Upper surface not very rough.
    Upper surface only moderately rough.....*möllendorffi*

Ryssota (Lamarckiella) nigrescens balacbacana, new subspecies.

This race comes from Mount Balacbac, Luzon. The type, U. S. N. M. No. 382955, has 4.7 whorls and measures: Height 36.2 mm.; greater diameter 66.8 mm.; lesser diameter 51.6 mm.

Ryssota (Lamarckiella) nigrescens nigrescens Möllendorff.

This subspecies comes from the region of Morong, Luzon. A topotype, U. S. N. M. No. 184623, collected by von Möllendorff, has 4.5 whorls and measures: Height 28.2 mm.; greater diameter 58.0 mm.; lesser diameter 43.5 mm.

Ryssota (Lamarckiella) nigrescens möllendorffi, new subspecies.

This race occupies the region about Montalban, Luzon. The type, U. S. N. M. No. 195667, has 4.7 whorls and measures: Height 34.8 mm.; greater diameter 63.4 mm.; lesser diameter 49.3 mm.

RYSSOTA (LAMARCKIELLA) HEPATICA Reeve.

Shell helicoid. Upper surface pale chocolate brown. There is a narrow pale band at the angulated periphery, and a broad band of dark chocolate brown immediately anterior to this which gradually fades to the greenish horn-colored tint on the rest of the base. Interior of aperture livid, slightly paler toward the edge than within. Nuclear whorls 2.1; the first flattened, the rest slightly rounded. The first 1.5 turns are marked by rather distantly spaced, low, retractively slanting, axial riblets; the rest by numerous, closely spaced, retractively slanting, axial riblets and numerous, incised, spiral lines. The postnuclear whorls are moderately well rounded and marked by rather irregular and irregularly spaced, retractively slanting, axial riblets, and numerous, more or less regularly spaced, spiral lirations, the junction of these with the axial riblets, particularly the more slender ones, forming narrowly elongated tubercles, the long axis of which coincide with the axial sculpture. Periphery of the last whorl angulated. Base slightly inflated, well rounded, marked by the feeble continuations of the axial riblets, and a few, rather distantly spaced, spiral striations on the umbilical half, and numerous, very closely spaced, microscopic spiral striations. Umbilical area moderately impressed. Aperture large, oblique; the outer lip slightly protracted between the summit and the periphery and retracted from the periphery basally; the inner lip slightly sigmoid; columella short, broadly expanded, reflected over and covering half of the umbilicus; parietal wall covered with a thin callus.

Two specimens, U. S. N. M. No. 116574, topotypes or cotypes, were collected by Mr. Hugh Cuming at Bolinao, Pangasinan, Luzon. The one described has 4.8 whorls and measures: Height 26.1 mm.; greater diameter 46.3 mm.; lesser diameter 36.4 mm.

Ryssota (Lamarckiella) negrosensis, new species.

Shell of medium size, depressed-helicoid, very thin, translucent; all but the last whorl pale chestnut brown, the latter pale brownish. In the typical

species there is a narrow, light zone immediately posterior to the periphery. The base is marked by a narrow chestnut brown zone immediately anterior to the periphery. The rest of the base is either pale brown, corresponding in tone with the upper surface of the last whorl, or tending toward horn-colored on the last half of the turn. Interior of aperture pale brown, showing the light and dark zones at the periphery. Nuclear whorls a little more than 2, well rounded; the first with a few irregular, distantly spaced, retractively slanting wrinkles; the rest with closely spaced, slender, retractively slanting, axial threads which are crossed by numerous, spiral lirations, the combination forming a granular surface. Postnuclear whorls slightly rounded, marked by rather irregularly developed and distributed and poorly differentiated, retractively slanting, axial threads, as well as numerous, very slender, closely spaced, wavy, spiral lirations. The combination of these with the finer axial sculpture produces a finely granulose appearance. Periphery of the last whorl weakly angulated. Base well rounded, but hardly inflated, marked by the continuations of the axial riblets and numerous, microscopic, spiral striations. There are also a few wrinkles near the umbilical area. Aperture large, oblique; peristome slightly reinforced at the edge; outer lip protracted between the summit and the periphery and retracted from the periphery basally; inner lip slightly curved; columella short, expanded and reflected as a brownish callus over the umbilicus, half of which it covers; parietal wall covered by a moderately thick callus.

This species is nearest related to *Ryssota* (*Lamarckiella*) *bulla*, but differs from it in being much less inflated, larger, and of entirely different color. The species is known only from the Islands of Negros and Panay at the present time.

KEY TO THE SUBSPECIES OF *Ryssota* (*Lamarckiella*) *negrosensis*.

Narrow white zone posterior to chestnut subperipheral band present.....*negrosensis*
Narrow white zone posterior to chestnut subperipheral band absent.....*mcgregori*

Ryssota (Lamarckiella) negrosensis negrosensis, new subspecies.

This race comes from Negros Island. The type, U. S. N. M. No. 219306, has 4.0 whorls and measures: Height 20.2 mm.; greater diameter 35.7 mm.; lesser diameter 26.8 mm.

Ryssota (Lamarckiella) negrosensis mcgregori, new subspecies.

This subspecies comes from the Island of Panay. The type, U. S. N. M. No. 311533, has 4.0 whorls and measures: Height 22.3 mm.; greater diameter 40.2 mm.; lesser diameter 30.6 mm.

RYSSOTA (LAMARCKIELLA) BULLA Pfeiffer.

Shell small, helicoid. The early whorls pale brown, the rest straw-colored. The base is of about the same color as the last whorl on the spire. There is a narrow, deep, chestnut brown zone immediately anterior to the

periphery. Interior of aperture flesh-colored with a purplish tinge, showing the peripheral band. Nuclear whorls 2.3 to 2.5; the first 1.3 marked by a few, rather distantly spaced, low, broad, retractively slanting ribs; the rest with numerous, closely spaced, retractively slanting, axial riblets and well developed spiral striations. Postnuclear whorls well rounded, marked by rather irregularly developed and irregularly spaced, retractively slanting riblets and numerous, slender, spiral lirations, the intersection of which with the fine axial threads form tubercles. The last whorl has, in addition to this sculpture, a few oblique wrinkles which give to it a slightly malleated impression. Periphery of the last whorl angulated. Base strongly inflated and well rounded, marked by the continuations of the axial riblets, rather distantly spaced, spiral striations and oblique scratches. Umbilicus narrow and open. Aperture large, rather flaring; peritreme reinforced at the edge; outer lip protracted between the summit and periphery and retracted from the periphery basally; inner lip slightly curved, decidedly expanded at its insertion and reflected to cover about half the umbilicus; parietal wall glazed with a thin callus.

KEY TO THE SUBSPECIES OF *Ryssota* (*Lamarckiella*) *bulla* Pfeiffer.

Inconspicuous arrow marks present.....*salcedoi*
Inconspicuous arrow marks absent.
  Upper surface of last whorl rather roughly malleated.....*steerei*
  Upper surface of last whorl not roughly malleated.....*bulla*

Ryssota (Lamarckiella) bulla salcedoi, new subspecies.

This race comes from La Union, Luzon. The type, U. S. N. M. No. 311567, has 4.4 whorls and measures: Height 20.0 mm.; greater diameter 34.5 mm.; lesser diameter 26.8 mm.

Ryssota (Lamarckiella) bulla steerei, new subspecies.

This race comes from the Island of Cebu. The type, U. S. N. M. No. 309325, has 4.0 whorls and measures: Height 22.0 mm.; greater diameter 35.1 mm.; lesser diameter 27.0 mm.

Ryssota (*Lamarckiella*) *bulla bulla* Pfeiffer.

This race comes from the Albay Province, Luzon. A cotype, U. S. N. M. No. 116579, has 4.1 whorls and measures: Height 19.7 mm.; greater diameter 33.8 mm.; lesser diameter 26.1 mm.

Ryssota (Lamarckiella) semperi, new species.

Shell small, helicoid. Nuclear whorls chestnut brown. The early postnuclear whorls chestnut brown streaked with retractively curved lines of greenish yellow. These lines on the last whorl and a half become very irregular and send out lateral zigzag markings, giving to the upper surface of the shell a decidedly fulgurated appearance. On the last whorl the brown basal color and the paler areas are of equal extent. The base with a broad, subperipheral zone of brown, the anterior half being brownish horn-colored.

In addition to this, the zigzag markings described for the spire extend over the posterior half, sometimes more, of the base. The peristome is white. Interior of aperture pale brown with a purplish tinge, showing the external markings within. Nuclear whorls 2.7, well rounded, the first 1.5 marked by rather broad, low, retractively slanting, axial ribs, the rest by numerous, closely spaced, wavy, axial riblets which are crossed by numerous, slender, spiral lirations that render the surface finely granulose. Postnuclear whorls well rounded, marked by rather irregular and irregularly developed, retractively slanting, axial riblets and numerous, rather closely spaced, fine, spiral lirations, the latter forming in junction with the axial riblets fine granules, the long axis of which is parallel with the spiral sculpture. In addition to this sculpture, the last whorl has a few, oblique wrinkles which give to it a somewhat malleated appearance. Periphery of the last whorl angulated. Base depressed, well rounded, marked by the continuations of the axial riblets, rather distantly spaced, spiral striations, and numerous, rather strong, oblique wrinkles, the latter rendering the base decidedly rough, particularly on the posterior half. Umbilical area but shallowly impressed. Aperture broadly oval with the peristome slightly reinforced with a callus. The last portion of the outer lip descends below the periphery of the preceding whorl and is protracted between the summit and the periphery, and decidedly inbent. From the periphery basally it is slightly retracted and strongly rounded; inner lip evenly curved and inpinched. This brings the inner lip and the outer lip between the summit and the periphery into almost parallel lines. Columella short, expanded and reflected over the umbilicus, which it completely covers; parietal wall closed with a thin callus.

The type, U. S. N. M. No. 311545, comes from Badajos, Tablas. It has 4.6 whorls and measures: Height 24.5 mm.; greater diameter 41.7 mm.; lesser diameter 33.2 mm.

RYSSOTA (LAMARCKIELLA) ZEUS Jonas.

Shell large, depressed-helicoid, with the early whorls chestnut brown and sometimes the entire upper surface of that coloration. As a rule, the last whorl is horn-colored. The last whorl, or whorl and a half, or even a little more, are marked with numerous, zigzag, or fulgurated bands. In some of the forms these occupy more space than the darker ground color. These fulgurations also sometimes extend over at least the posterior half of the base. The base is marked by a broad, subperipheral, dark zone followed by a lighter area which may be horn-colored or horn-colored with an olivaceous tint, or even with a brownish tint. Peristome yellowish white. Interior of aperture bluish with the dark and light external colorations showing through and giving the interior a marbled effect. Nuclear whorls well rounded, the first marked by a few, broad, low, crowded, wavy, retractively slanting, axial threads and numerous, fine, spiral lirations. Postnuclear whorls moderately rounded. In some of the forms the last whorl becomes almost flattened near the aperture between the summit and the periphery, marked by retractively slanting, irregularly developed and distributed axial riblets

and numerous, spiral lirations which are of varying strength on the last turn. These lirations in crossing the riblets form slender nodules which are not quite as well expressed, as a rule, on the last turn as they are on the preceding whorl. In addition to this, the last whorl usually has rather strong, oblique wrinkles which give it a somewhat malleated appearance. Periphery strongly carinated. Base well rounded, but not inflated, marked by the feeble continuations of the axial sculpture, numerous, spiral lirations and oblique wrinkles. The spiral lirations and the oblique wrinkles vary in strength in the different forms, but regardless of their strength they render the base, particularly on the posterior half, decidedly scratched-up in appearance. Umbilical area moderately impressed. Aperture very oblique, large; the peristome is usually thickened at the edge; the outer lip is protracted from the summit to the periphery and rather strongly inbent; basal lip retractively curved from the periphery anteriorly; inner lip evenly curved; columella expanded and reflected over the umbilicus, which it almost covers; parietal wall covered with a thin callus.

Ryssota (*Lamarckiella*) *zeus* was described by Jonas as having been collected by Cuming on the Island of Mindoro. Subsequent collectors have visited various parts of the island until we consider it fairly well explored, but none of these have found this shell on Mindoro Island. It is therefore more than likely that a transposition of labels took place and that the type lot came from Tablas. Möllendorff states, or holds the same contention, and suggests that the fact that during Cuming's days Tablas, Romblon and Sibuyan formed part of the Province of Mindoro that this locality label "Mindoro" may have been attached to the shells in question. As far as known at the present time, *Ryssota* (*Lamarckiella*) *zeus* is restricted to this group of islands and we now recognize four subspecies, one from Tablas, one from Romblon and two from the Island of Sibuyan. One of these comes from the much visited locality of San Fernando, on the southwest coast of the island, while the other one comes from Cambulayan, which is on the east shore. The island being an exceedingly mountainous one, there are undoubtedly decidedly different climatic factors in these two localities, the extremely dark race having been developed on the east side and the paler on the west.

KEY TO THE SUBSPECIES OF *Ryssota* (*Lamarckiella*) *zeus* Jonas.

Dark chestnut coloration of spire predominating over the yellow.
  Spiral lirations of base coarse.....*bournsi*
  Spiral lirations of base fine.....*weberi*
Dark chestnut coloration of spire not predominating over the yellow.
  Spiral lirations of base coarse.....*zeus*
  Spiral lirations of base fine.....*subglobosa*

Ryssota (Lamarckiella) zeus bournsi, new subspecies.

This race comes from the Island of Romblon. The type, U. S. N. M. No. 311549, has 4.6 whorls and measures: Height 31.3 mm.; greater diameter 58.9 mm.; lesser diameter 43.2 mm.

Ryssota (Lamarckiella) zeus weberi, new subspecies.

This race comes from the region of Cambulayan, Sibuyan. The type, U. S. N. M. No. 311551, has 4.6 whorls and measures: Height 29.8 mm.; greater diameter 58.5 mm.; lesser diameter 43.4 mm.

Ryssota (Lamarckiella) zeus zeus Jonas.

This subspecies comes from the Island of Tablas. The specimen described, U. S. N. M. No. 311547, has 4.8 whorls and measures: Height 33.3 mm.; greater diameter 61.3 mm.; lesser diameter 44.8 mm.

Ryssota (Lamarckiella) zeus subglobosa Möllendorff.

This race comes from the Island of Sibuyan, from the region of San Fernando. A topotype, U. S. N. M. No. 311553, has 4.7 whorls and measures: Height 30.6 mm.; greater diameter 51.0 mm.; lesser diameter 39.1 mm.

Ryssota (Lamarckiella) deveyrai, new species.

Shell large, moderately elevated, rather strong. Nuclear whorls and the first postnuclear turn chestnut brown. The next half whorl is marked with somewhat numerous, lighter, zigzag lines on a chestnut brown background. On the succeeding turns these lighter lines become less irregular and more evenly retractively slanting, though while they still show flammulations, there is nevertheless a tendency toward a development into retractively slanting, varicial streaks. Base with a very narrow, light zone immediately anterior to the periphery, followed by a moderately broad, blackish brown band. The rest of the base is horn-colored with an olivaceous tinge, streaked at irregular intervals with varicial bands of pale brown. Nuclear whorls 2.3; the first 1.3 marked by rather low, distantly spaced, retractively slanting, axial riblets; the rest of the nuclear whorls strongly rounded, marked by rather closely spaced, retractively slanting, axial threads, and numerous, very closely spaced, spiral lirations, giving to the surface of this portion a finely granular appearance. Postnuclear whorls well rounded, marked by irregularly developed and irregularly spaced, retractively slanting, axial riblets, and numerous, closely spaced, spiral lirations. These are of the same strength and spacing as those on the terminal portion of the nuclear spire. The combination of the finer axial riblets and the spiral sculpture produces a granular surface. On the last whorl there are, in addition to this, a few irregular oblique wrinkles which give it a slightly malleated appearance. Periphery carinated. Base very weakly rounded, marked by the feeble continuations of the axial sculpture and numerous, rather well incised, spiral lines which are a little more closely spaced near the umbilicus than they are toward the periphery. There is scarcely any indication of malleation here, but the axial riblets and the finer spiral sculpture produce a granular surface, which is particularly well developed on the posterior portion of the base. The umbilical area is moderately impressed. Aperture rather large, very oblique; peristome very slightly thickened at the edge; outer lip strongly protracted between the summit

and the periphery and slightly inbent, being retracted from the periphery basally; inner lip evenly curved; columella expanded and reflected over the umbilicus, which it almost covers; parietal wall glazed with a thin callus.

The type, U. S. N. M. No. 310067, comes from the Island of Burias, without specific designation of locality. It has 5.1 whorls and measures: Height 31.1 mm.; greater diameter 55.4 mm.; lesser diameter 43.4 mm.

RYSSOTA (LAMARCKIELLA) CARINATA Möllendorff.

Shell helicoid, varying in thickness from very thin to rather strong. The early whorls may be pale chestnut or chestnut in color, and the last turn may be pale brown or horn-colored. There is also a narrow, lighter zone than the general tone, a little posterior to the periphery and a brown zone, which varies in width in the various races, immediately anterior to the periphery. The rest of the base may be horn-colored or olivaceous horn-colored. All the forms have arrow marks. Sometimes the arrow marks are of brown; in some of the forms they are very conspicuous, while in others they are less apparent. The interior of aperture may be bluish white or purplish brown. The first nuclear turn is marked by low, rather broad, distantly spaced, retractively slanting, axial riblets. The rest of the nuclear whorls are marked by numerous, closely spaced, somewhat wavy, retractively slanting, axial riblets and very many closely spaced, spiral threads. The postnuclear whorls are marked by retractively slanting axial riblets which vary in strength and spacing in the different races, and numerous spiral threads. The intersection of the axial and spiral sculpture forms granules which give to the entire surface a granulose appearance, even that of the last whorl. Periphery angulated. Base varying from slightly inflated to strongly inflated in the different races, always shining, marked by the continuations of the axial sculpture, numerous fine spiral striations and many oblique wrinkles, which are usually very fine. Aperture large and oblique, with the peristome usually slightly reinforced in adult shells; the outer lip is protracted between the summit and the periphery and retracted from the periphery basally; inner lip either evenly curved or slightly sinuous; columella broadly expanded and reflected over the umbilicus, half or more of which it covers.

This species appears to occupy northwestern Luzon, ranging from Ilocos Sur through Benguet to Lepanto.

KEY TO THE SUBSPECIES OF *Ryssota (Lamarckiella) carinata.*

Upper surface horn-colored.
- Shell inflated ..... *benguetana*
- Shell not inflated ..... *carinata*

Upper surface not horn-colored.
- Upper surface brown.
  - Greater diameter more than 35 mm ..... *cervantesana*
  - Greater diameter less than 30 mm ..... *lepantoana*

Ryssota (Lamarckiella) carinata benguetana, new subspecies.

This subspecies comes from Benguet, Luzon. The type, U. S. N. M. No. 382960, has 4.2 whorls and measures: Height 18.2 mm.; greater diameter 27.0 mm.; lesser diameter 21.9 mm.

Ryssota (Lamarckiella) carinata carinata Möllendorff.

This race comes from Mount Tila, Luzon. A topotype, U. S. N. M. No. 382962, has 4.3 whorls and measures: Height 19.7 mm.; greater diameter 35.1 mm.; lesser diameter 28.1 mm.

Ryssota (Lamarckiella) carinata cervantesana, new subspecies.

This subspecies comes from the region of Cervantes, Luzon. The type, U. S. N. M. No. 382963, has 4.5 whorls and measures: Height 20.1 mm.; greater diameter 35.8 mm.; lesser diameter 28.1 mm.

Ryssota (Lamarckiella) carinata lepantoana, new subspecies.

This subspecies comes from Balaca, Lepanto, Luzon. The type, U. S. N. M. No. 382964, has 4.5 whorls and measures: Height 17.7 mm.; greater diameter 29.8 mm.; lesser diameter 24.0 mm.

RYSSOTA (LAMARCKIELLA) OWENIANA Pfeiffer.

Shell small, depressed-helicoid, varying in color from dark chestnut brown to horn-colored on the upper surface, but no matter what the general coloration is, there is always a broad light zone immediately posterior to the periphery. Anterior to the periphery there is a broad chestnut colored band. The rest of the base, as a rule, is green, though sometimes it is horn-colored with a brownish or olivaceous tinge. Nuclear whorls 2.5, well rounded; the first is marked by rather closely spaced, retractively slanting, axial riblets; the rest by numerous, very fine, wavy, very closely spaced, retractively slanting, axial riblets and numerous, very fine, spiral lirations. Postnuclear whorls moderately well rounded and marked by retractively slanting, axial riblets and numerous, very fine, spiral lirations which give to the upper surface of the whorl a finely granulose appearance. On the last portion of the last whorl there are also a number of poorly developed malleations. Periphery strongly angulated. Base well rounded, marked by the continuations of the axial riblets, poorly impressed spiral striations, and numerous oblique wrinkles. These are very strong near the periphery but become evanescent toward the umbilical area. Aperture large, very oblique; peristome slightly reinforced at the edge; outer lip protracted between the summit and periphery and slightly retracted from the periphery basally; basal lip somewhat sinuous; columella expanded and reflected over half of the umbilicus; parietal wall glazed by a moderately thick callus.

This species appears to extend over the islands of Cebu, Negros and Panay.

The following key will help to differentiate the subspecies from these three islands.

KEY TO THE SUBSPECIES OF *Ryssota* (*Lamarckiella*) *oweniana*.

Incremental lines of last whorl very rough on upper surface.....*smithi*
Incremental lines of last whorl not very rough on upper surface.
  Last whorl rather strongly malleated on last one-fourth of upper surface.....*oweniana*
  Last whorl not rather strongly malleated on last one-fourth of upper surface.....*inflatula*

Ryssota (Lamarckiella) oweniana smithi Bartsch.

This subspecies comes from Passi, Iloilo, Panay. The type, U. S. N. M. No. 311021, has 4.5 whorls and measures: Height 25.3 mm.; greater diameter 43.0 mm.; lesser diameter 33.5 mm.

Ryssota (*Lamarckiella*) *oweniana oweniana* Pfeiffer.

This subspecies comes from the Island of Cebu. A topotype, U. S. N. M. No. 3S2967, has 4.5 whorls and measures: Height 20.9 mm.; greater diameter 40.3 mm.; lesser diameter 30.1 mm.

Ryssota (*Lamarckiella*) *oweniana inflatula* Möllendorff.

This race comes from the Island of Negros. A topotype, U. S. N. M. No. 256390, has 4.4 whorls and measures: Height 26.4 mm.; greater diameter 53.3 mm.; lesser diameter 44.1 mm.

RYSSOTA (LAMARCKIELLA) LAMARCKIANA Lea.

Shell large, helicoid. The early whorls pale chestnut brown, the rest pale brown, horn-colored, or horn-colored with an olivaceous tint on the upper surface. There is usually a narrow lighter zone immediately posterior to the periphery, and a broad chestnut brown band immediately anterior to the periphery. The rest of the base may be pale green horn-colored or horn-colored with a brownish tinge. There may also be present brownish varicial streaks of varying width. The interior of the aperture may be bluish white, or bluish white with a purplish tinge, the light super-peripheral zone and dark subperipheral zone showing within. Nuclear whorls a little more than 2; the first with a few broad, low, distantly spaced, retractively slanting, axial riblets and the rest with numerous, closely crowded, wavy, retractively slanting, axial threads. In addition to this there are numerous, closely spaced, spiral threads. Postnuclear whorls rather well rounded, marked by more or less regular, retractively slanting, closely spaced, axial threads, and numerous spiral lirations. The junction of these two elements renders the upper surface decidedly granulose, even on the last portion of the last turn. The last whorl also, on the upper surface, may have a few scattered malleations. Periphery strongly angulated. Base well rounded, marked by the feeble continuations of the axial riblets, incised spiral lines, which are of rather regular distribution, becoming a little more closely spaced toward the umbilicus, and numerous oblique fine wrinkles, which are particularly well developed toward the periphery. Aperture large, oblique;

peristome slightly reinforced at the edge; outer lip protracted between the summit and the periphery and slightly retracted between the periphery and the base; basal lip somewhat sinuous; columella broadly expanded and reflected over the umbilicus.

This species extends over the islands of Ticao, Masbate, Sibuyan, Panay, Cebu and Guimaras. The forms break up into the various subspecies, which the following key will help to differentiate.

KEY TO THE SUBSPECIES OF *Ryssota* (*Lamarckiella*) *lamarckiana* Lea.

Upper surface pale chestnut brown.
  Last half of last whorl malleated on upper surface.
    Granular sculpture coarse on upper surface of last whorl....*granulosa* [2]
    Granular sculpture not coarse on upper surface of last whorl.....
      lamarckiana
  Last half of last whorl not malleated on upper surface.
    Base horn-colored.....*ticaoensis*
    Base not horn-colored.
      Base olivaceous.....*granulosa* [2]
Upper surface not pale chestnut brown.
  Upper surface of last whorl greenish.
    Base of last whorl rather inflated.
      Oblique wrinkles of base strong.....*guimarasensis*
      Oblique wrinkles of base feeble.....*legaspii*
    Base of last whorl not inflated.....*sibuyanensis*

Ryssota (*Lamarckiella*) *lamarckiana lamarckiana* Lea.

The typical subspecies comes from the Island of Masbate. Lea's type, U. S. N. M. No. 116563, has 4.7 whorls and measures: Height 30.6 mm.; greater diameter 55.5 mm.; lesser diameter 43.5 mm.

Ryssota (Lamarckiella) lamarckiana ticaoensis, new subspecies.

This race comes from the Island of Ticao. The type, U. S. N. M. No. 256228, has 4.5 whorls and measures: Height 28.5 mm.; greater diameter 46.0 mm.; lesser diameter 37.2 mm.

Ryssota (*Lamarckiella*) *lamarckiana granulosa* Möllendorff.

Von Möllendorff cites this subspecies from Antique, Panay, and gives the measurements for it as: Height 33.2 mm.; greater diameter 58.6 mm. I have not seen specimens of it.

Ryssota (Lamarckiella) lamarckiana guimarasensis, new subspecies.

This subspecies comes from the Island of Guimaras. The type, U. S. N. M. No. 311569, has 5 whorls and measures: Height 29.0 mm.; greater diameter 49.2 mm.; lesser diameter 38.6 mm.

---

[2] Not having seen *granulosa* I have placed it in two positions.

Ryssota (Lamarckiella) lamarckiana legaspii, new subspecies.

This race comes from the Island of Cebu. The type, U. S. N. M. No. 311571, has 4.8 whorls and measures: Height 26.0 mm.; greater diameter 41.1 mm.; lesser diameter 33.0 mm.

Ryssota (Lamarckiella) lamarckiana sibuyanensis, new subspecies.

This subspecies comes from the Island of Sibuyan. The type, U. S. N. M. No. 311570, has 4.6 whorls and measures: Height 30.8 mm.; greater diameter 52.0 mm.; lesser diameter 40.8 mm.

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.

KEY TO THE SPECIES OF THE SUBGENUS *Pararyssota.*

Aperture broadly oval.....*maxima*
Aperture not broadly oval.
Aperture lunate.....*quadrasi*

RYSSOTA (PARARYSSOTA) MAXIMA Pfeiffer.

Shell very large, helicoid. Upper surface of the whorls, including the nucleus, brown, a little lighter at the apex than on the last turn. Nuclear whorls slightly rounded, marked on the first turn by rather distantly spaced, and on the succeeding turns by rather closely spaced, obsolete, retractively curved, axial threads. Postnuclear whorls marked by rather strong, irregular, retractively slanting lines of growth, and numerous, moderately strong, spiral lirations. The lines of growth and spiral lirations give to the surface of the shell a somewhat cloth-like texture. The postnuclear whorls are covered with a moderately thick periostracum, which consists of dark and light spiral zones. The light zones are hydrophanous and frequently break away in mature shells. This leaves exposed the flesh-colored shell below the periostracum and gives to the upper surface of the shell a decidedly banded appearance. Periphery more or less angulated. Base well rounded, chestnut brown, marked by strong, irregular, incremental lines and exceedingly fine, closely spaced, spiral striations. Aperture large, oval, oblique, not turned out at the periphery as in *Ryssota* proper; peristome thickened at the edge in adult shells, less so between the summit and the periphery than between the periphery and the base; inner lip strongly curved, thickened and reflected over at its insertion as a thick callus that almost covers the umbilicus; parietal wall covered by a moderately thick callus.

This species appears restricted to the Island of Mindanao.

KEY TO THE SUBSPECIES OF *Ryssota* (*Pararyssota*) *maxima* Pfeiffer.

Periphery strongly keeled.
  Shell broadly conic.
    Greater diameter more than 75 mm. ..... *maxima*
    Greater diameter less than 75 mm. ..... *mororum*
  Shell not broadly conic.
    Shell conic ..... *mearnsi*
Periphery not strongly keeled.
  Periphery obscurely angulated ..... *davaoana*

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

This race appears to occupy Agusan Valley, Mindanao. A specimen, U. S. N. M. No. 315623, has 7.2 whorls and measures: Height 65.2 mm.; greater diameter 95.3 mm.; lesser diameter 80.0 mm.

Ryssota (*Pararyssota*) *maxima mororum* Pilsbry.

This race comes from Misimis Province, Mindanao, opposite Camiguin Island. U. S. N. M. No. 311501, has 5.5 whorls and measures: Height 43.0 mm.; greater diameter 74.5 mm.; lesser diameter 59.4 mm.

Ryssota (Pararyssota) maxima mearnsi, new subspecies.

This race comes from the valley of the Baganga River. The type, U. S. N. M. No. 256263, has 6.9 whorls and measures: Height 58.0 mm.; greater diameter 80.5 mm.; lesser diameter 67.1 mm.

Ryssota (Pararyssota) maxima davaoana, new subspecies.

This race comes from the region of Davao. The type, U. S. N. M. No. 256398, is a broken specimen which measures: Greater diameter 77.2 mm.; lesser diameter 61.3 mm.

RYSSOTA (PARARYSSOTA) QUADRASI Hidalgo.

Shell of medium size, helicoid, rather elevated. The early whorls pale chestnut brown, the rest greenish horn-colored on the posterior half and brown on the anterior half between the summit and periphery. Base with a broad dark brown zone immediately anterior to the periphery and the rest pale brown or greenish horn-colored. In addition to this, the whorls are marked by irregular flammulations or zigzag, hydrophanous, more or less axial bands which sometimes extend below the periphery on to the base. Interior of aperture bluish white. Nuclear whorls 2.7, slightly rounded, marked by numerous, closely spaced, slightly zigzag, axial, threadlike riblets which are about half as wide as the spaces that separate them, and rather fine spiral striations. Postnuclear whorls inflated, well rounded, marked by numerous, coarse, wrinkle-like axial markings between which are fine lines of growth and numerous, closely spaced, fine, spiral lirations. The intersection of the fine axial and spiral sculpture gives to the surface of the shell a cloth-like texture. This fine sculpture is much more strongly

developed on the first three whorls than on the last turn where it becomes less conspicuous and where the periostracum becomes crinkly. Suture strongly impressed, which gives to the spire a somewhat broadly conic, bee-hive shape. Periphery obtusely angulated. Base well rounded but not inflated, marked by the continuation of the axial wrinkles and the finer axial lines of growth between these and numerous microscopic, closely spaced, spiral striations. Aperture narrowly oval, oblique; outer lip strongly arched between the summit and the periphery and considerably less so between the periphery and the base, which is rather flattened; the peristome is not thickened from the summit to the periphery and only moderately so from the periphery to the base, the basal portion, however, is conspicuously thickened; columella forming somewhat of an angle at its junction with the basal lip slightly curved, slightly sinuous and expanded at its insertion, where it is reflected to almost cover the umbilicus; parietal wall covered by a thin callus which allows the colors of the preceding whorl to shine through.

The specimen described, U. S. N. M. No. 311496, was collected by Quadras on Catanduanes Island. It has 7.2 whorls and measures: Height 47.5 mm.; greater diameter 72.8 mm.; lesser diameter 62.3 mm.

Vol. 52, pp. 57–60 April 27, 1939

PROCEEDINGS
OF THE
BIOLOGICAL SOCIETY OF WASHINGTON

A NEW RACE OF *CYNANTHUS LATIROSTRIS* FROM GUANAJUATO.

BY ROBERT T. MOORE,
California Institute of Technology.

A recent accession of specimens from the State of Guanajuato, Mexico, contains the new form, herein described.

Cynanthus latirostris propinquus,[1] subsp. nov.

BLUE-BELLIED CYNANTHUS.

Type.—Male adult in winter plumage, number 22386, collection of Robert T. Moore; 5 miles N. E. of Irapuato, Guanajuato, Mexico; January 9, 1939; altitude about 5600 feet; collected by Chester C. Lamb.

Subspecific characters.—Nearest to *Cynanthus latirostris magicus* (Mulsant and Verreaux) of northwestern Mexico, but darker above and below, the adult male having posterior underparts much bluer without any conspicuous break in coloration between throat and jugulum, Dark Myrtle Green[2] instead of Peacock Green; upper parts much darker green instead of golden green; crown and occiput more Metallic Green; size larger. The female of *propinquus* differs from *magicus* in being obviously darker above; somewhat darker below; median rectrices having a wide Dusky Blue tip instead of entirely green or nearly so.

Propinquus differs from *Cynanthus latirostris latirostris* (Swainson) of the Valley of Mexico in the same way it does from *magicus* except size, which is similar, but the difference in coloration is much greater, for true *latirostris* has the blue of the throat much more restricted and sharply contrasted with the bright green of the jugulum, while the abdomen, having little green, is decidedly grayish; the under tail coverts dark gray instead of white.

Range.—Seemingly confined to the state of Guanajuato and extreme northern Michoacan.

The three adult males from Lake Cuitzeo, northern Michoacan, sixty miles southeast of Irapuato, have greener posterior under parts and darker

[1] The Latin word *propinquus*, "near in point of relationship," is used here to indicate the approach of this race to *Cynanthus doubledayi* (Bourcier).

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

gray under tail-coverts than true *propinquus*, but have darker upper parts and less gray abdomens than *l. latirostris*. They are intermediates, closer to *propinquus*.

AVERAGE MEASUREMENTS OF *Cynanthus latirostris magicus*
Cynanthus latirostris latirostris.
Cyanthus latirostris propinquus.

	WING.[3]	TAIL.	EXPOSED CULMEN.
MALES.			
8 ads. *latirostris*, Valley of Mexico	54.8	33.0	21.1
7 ads. *propinquus*, Guanajuato & Michoacan	54.9	35.2	21.1
28 ads. *magicus*, Sin. & S. Sonora	49.6	29.8	19.6
13 ads. *magicus*, Ariz. & extreme N. Sonora	51.0	30.8	20.0
FEMALES.			
2 ads. *latirostris*, Valley of Mexico & Tam	53.2	31.1	21.3
3 ads. *propinquus*, Guanajuato & Michoacan	53.2	32.0	22.8
19 ads. *magicus*, Sin. & S. Sonora	47.9	27.5	20.1
7 ads. *magicus*, Ariz. & N. Sonora	49.9	28.4	21.6

Specimens examined.—Propinquus: Guanajuato: near Irapuato 4 ♂ 1 ♀, Rancho Enmedio 17 mi. N. E. Guanajuato 1 ♀; Michoacan: San Augustin Lake Cuitzeo 3 ♂ 1 ♀. *Magicus:* United States: Arizona: Santa Cruz Co.: Peña Blanca 1 Jv. ♂ 1 ♀; no county stated: Catalina Mills 1 ♂; Pima Co.: Ft. Lowell 6 ♂ 1 ♀; Cochise Co.: Portal 1 ♀. Mexico: Sonora: Saric 2 ♂ 4 ♀, Magdalena 1 ♂, Pesqueira 2 ♂ 2 ♀, Tesia 2 ♂ 1 ♀, Guaymas 1 ♂, San Javier 1 ♂ 1 Im. ♂ 1 ♀, Tecoripa 2 ♀, Camoa 1 ♀, Yaqui Riv. 1 Im. ♂, Agiabampo 3 ♂, Masocari Is. 1 ♂, Guirocoba 1 Im. ♂ 1 Jv. ♂ 2 ♀. Chihuahua: Urique Riv. bottom Baranca del Cobre 1 ♂. Sinaloa: Colmoa 1 ♂ 2 ♀, Huassa 3 ♀, Los Leones 1 Im. ♀, El Orito 1 ♀, La Guasimas 1 ♂ 1 ♀, Yecorato 1 ♂, Ahome 1 ♂ 1 ♀, Guamuchil 3 ♀, Culiacan 2 ♂ 2 ♀, El Molino 2 ♂, Badiraguato 2 ♂, San Ignacio 1 ♀, near Matatan 1 ♀, Elota 1 ♂, Rancho El Padre 1 ♀, Potrerillo 1 ♂, Sierra Palos Dulces 1 ♂, Rancho Picacho 1 ♂, Palmar 1 ♀, Arroyo Guayabito 1 ♂, Cacalotan 1 ♀, Palos Verde Mine 1 ♀, Rancho El Padre 1 ♂ 1 ♀, Rosario 1 ♂. Nayarit: Rio Las Canas 1 ♂, near Tepic 4 ♂ 1 Im. ♂ 1 ♀. Durango: Tamazula 1 ♂ 2 ♀, Rancho Guasimal 2 ♂. *Latirostris latirostris:* Mexico: District Federal: Valle de Mexico 8 ♂ 1 ♀. Tamaulipas: Santa Leonora 1 ♂ 1 ♀.

Remarks.—The description of *Cynanthus latirostris* Swainson (Philos. Mag., N. S., I, No. 6, June, 1827, 441) gives the locality as "Table land ? of Mexico." Swainson's references to the "Table land" usually refer to the region about Temascaltepec, but in this particular case, the query after the phrase "Table land" might indicate a doubt in Swainson's own mind regarding the exact locality of the bird he was describing. In 1934, Mr. W. W. Brown spent several months in Temascaltepec at the request of the author and took a large collection of birds. He did not secure a single

[3] Wing measured from anterior point of Metacarpus.

specimen of *Cynanthus latirostris!* He writes me he did not see it, and adds, "Where I was located, it must have been uncommon, or we would have taken it. Furthermore, Mr. Brown went for the express purpose of concentrating on the species which Swainson described. On the other hand, *Cynanthus latirostris* is still common in the Valley of Mexico, since the eight males and one female in my collection were all taken there since January, 1931, by two different collectors. Bullock, from whose specimens Swainson's descriptions were often made, was particularly interested in hummingbirds and brought back to England in 1822 "seventy in cages" (Bullock, Six months Residence and Travels in Mexico, p. 267). Furthermore, he particularly mentioned seeing hummingbirds "in great plenty" in the Botanical Gardens of Mexico City, and a common garden-frequenter like *Cynanthus* is likely to have been conspicuous.

It seems almost certain that Bullock secured *Cynanthus latirostris* somewhere in the vicinity of Mexico City. Therefore, I hereby designate the type locality of *Cynanthus latirostris* Swainson as the Valley of Mexico, near Mexico City.

Now we come to the status of the smaller bird of northwestern Mexico, which Ridgway (Birds of North and Middle America, part V, p. 371, footnote) with evident hesitation synonymized with *latirostris*. Ridgway calls attention to the fact that the "specimens from the State of Sinaloa average considerably smaller than those from other localities, . . ." But he could not take the appropriate action, for he had no specimens from the Valley of Mexico and only seven males from scattered localities in Nuevo Leon, Tamaulipas and San Luis Potosi to compare with seven males from Sinaloa. My much greater series from both northwestern and eastern Mexico proves that differences in size are considerably greater than even Ridgway supposed. Furthermore, the birds of northwestern Mexico are Darker Green above and below and have almost pure white under tail-coverts, instead of Dusky ones as in specimens from eastern Mexico. It is equally significant that the new race of *propinquus*, lying geographically between true *latirostris* on the east and the birds of northwestern Mexico, is by far the darkest of the three races, possesses the whiter under tail-coverts of the northwestern bird, and a dark bluish green abdomen instead of the gray one suffused with golden green of true *latirostris* from the Valley of Mexico.

Regarding the name to be used for the northwestern bird, Dr. Oberholser graciously writes in full detail, confirming my conviction that "*magica*" of Mulsant and Verreaux is the only one which can be applied to it. He states, "*Hylocharis lazula* Reichenbach is an erroneous identification of Reichenbach's bird with *Trochilus lazulus* Vieillot, which is certainly not *Cynanthus latirostris*, but some South American species. *Sapphironia circe* Bonaparte is a nomen nudum, subsequently applied by Reichenbach to the southeastern race of *Cynanthus latirostris*. *Hylocharis magica* Mulsant and Verreaux, where it was originally published, is also a nomen nudum, but a valid citation of it, not mentioned by Ridgway (Birds of N. & M. Amer. Part V, p. 373), was made by Mulsant and Verreaux (Annales Soc. Linn. Lyon, XVIII, January 31, 1872, p. 110, Mazatlan, "Basse Californie"), who

gives a "two-page description of this bird." This "is undoubtedly some form of *Cynanthus latirostris*" and they "mention the small size of the Mazatlan bird." Elliot's description of *Iache magicus* (Classif. and Synop. Troch., 1879, p. 23 Mazatlan, "Lower California"), is not the first description, as is generally supposed, and the fact that it follows closely the Type, discolored by immersion in chemicals, and is therefore not a good description of the northwestern bird, has no bearing on the problem. It follows that *magicus* must be used for the bird of northwestern Mexico and Arizona.

It would seem, then, that the names and ranges of the three races should read as follows:

Cynanthus latirostris latirostris ((Swainson) from the Valley of Mexico and Veracruz, probably through Hidalgo to Tamaulipas.

Cynanthus latirostris propinquus, Guanajuato, northern Michoacan and possibly portions of adjoining states in Central Mexico.

Cynanthus latirostris magicus, northwestern Mexico, from Sonora and Arizona south through Chihuahua, Sinaloa, Durango, Nayarit and probably to Colima and Guerrero.

As Ridgway noted on the basis of six adult males and six adult females from Arizona, these birds from southwestern United States are approximately the same size as the northwestern birds and the same coloration. The Arizona bird should take the name *magicus*. I have not seen specimens from Guerrero or Colima, but accept Ridgway's statement that these birds "are nearly as small" as the Sinaloa individuals.

The characters of the new race from Guanajuato show a definite approach to *Cynanthus doubledayi* (Bourcier) of Southern Mexico, with their more bluish abdomen and more Metallic Green pileum. Nevertheless, *propinquus* is closer to the *latirostris* group, nor am I suggesting that *latirostris* and *doubledayi* should be considered as conspecific. In conclusion, I should stress the extraordinary bluish green coloration below and dark greenish coloration above of *propinquus;* in fact it is considerably darker than either of the other two races to the east and west of its range; and slightly the largest.

Vol. 52, pp. 61–82 June 5, 1939

PROCEEDINGS

OF THE

BIOLOGICAL SOCIETY OF WASHINGTON

NEW BIRDS FROM ASIA, CHIEFLY FROM INDIA.

BY WALTER KOELZ.

While engaged in botanical pursuits in India and Afghanistan during the years 1936–1938, I had opportunity to make a collection of birds. On the basis of the study of these specimens, I am describing the following forms as new.

I am obligated to the authorities of the American Museum of Natural History, Field Museum of Natural History, Museum of Comparative Zoology, University of Michigan Museum of Zoology, and the U. S. National Museum, and to Mr. H. B. Conover, and to Mr. Hoyes Lloyd through the National Museum of Canada for the loan of specimens. I am especially indebted to the staff of the American Museum of Natural History and of the University of Michigan Museum of Zoology for privileges and assistance while studying their large and important collections. To Doctor Pierce Brodkorb, Doctor Ernst Mayr, and Doctor Josselyn Van Tyne, of these institutions, I am grateful for advice.

Unless otherwise indicated, the specimens on which the descriptions are based are in my collection.

Parus major stupae, new subspecies.

Type.—♂ (wing 66 mm.), collected at Sanchi, Bhopal, on January 2, 1938, by W. Koelz.

Topotypes.—3 specimens collected at about the same time.

Compared with specimens of *mahrattarum* from Ceylon in the Rothschild Collection this form differs in having shorter wing and tail, in having the outermost rectrices nearly all white, in having less extensive black on the throat and belly. The underparts are also whiter.

Compared with *nipalensis* from northern and eastern Bengal in my collection, the general tone is paler, especially on the sides. The central rectrix has much less blue-grey, the penultimate rectrix has much more white (the outer web is all white), the nuchal patch is more conspicuous.

Whistler (J. B. N. H. S. XXXV, p. 519), has shown that *cinereus* of Java differs from *nipalensis*. From an examination of Javan specimens in the Rothschild Collection, I find the bill of Javan birds is frailer, the nuchal patch whiter, and the black of the belly has a white edging.

Wing measurements:

stupae 2 ♂ 65.5, 66; 2 ♀ 62.5, 63 mm.
nipalensis 7 ♂ 60.5–64; 3 ♀ 60–63.5.
Whistler gives 5 ♂ 67–68; 2 ♀ 62.5, 65 mm.
cinereus 5 specimens 63–68 mm.

Parus major meinertzhageni, new subspecies.

Type.—Male (wing 69 mm.), collected at Balkh, Afghanistan, on November 28, 1937, by W. Koelz.

Paratypes.—One specimen from Tashkurghan on September 4, 1937; 8 from the type locality on September 18 and 19, 1937, and 6 from November 28 to 30, 1937.

Compared with specimens of *ziaratensis* in my collection from Kandahar and Herat, this form is paler and the wing is shorter. The two central rectrices are nearly entirely blue-grey.

Compared with specimens of *bokharensis* in the Rothschild Collection, the back lacks the sandy cast, is bluer; the wing bar is duller and the black of the throat is deeper.

Compared with specimens of *feraghensis* and *iliensis* in the Rothschild Collection this form has a shorter wing and tail and the sides are paler.

A series of specimens that I took at Rustak near the Russian border are much like *feraghensis*. The juveniles, unlike neighboring *caschmirensis*, have little green in the plumage.

Wing measurements:

meinertzhageni, 9 ♂ 64.5–69 (71); 6 ♀ 63.5–66 mm.
ziaratensis, 8 ♂ 70 –76; 9 ♀ 66.5–70 (73) mm.
bokharensis, ♂ 63 –70 mm.
feraghensis, ♂ 68 –77 mm. } ex Hartert, V.P.F., 2, 1933, p. 176–7.
iliensis, ♂ 68 –74 mm.

Parus major decolorans, new subspecies.

Type.—♂ (wing 78 mm.), collected at Jalalabad, Afghanistan, on December 18, 1937, by W. Koelz.

Paratypes.—5 specimens taken in the type locality at about the same time; 2 from Daulatshah, Afghanistan, on June 1, 1937, and two from Paetak, on June 4, 1937.

This form is different from *ziartensis* in that the light of the under parts is very smoky and the back is darker. It differs from *caschmirensis*, from Gilgit, Kashmir Vale, Baltistan, and Ladakh, in being smoky on the under parts, white being virtually absent, the innermost rectrix is more black, and the tail is shorter.

Strangely, specimens in fresh fall plumage from Lahul, Punjab, are nearly as discolored below.

Wing measurements:

decolorans 6 ♂ 73.5–78; 4 ♀ 70–72 mm.

ziaratensis 8 ♂ 70–76; 9 ♀ 66.5–70 (73) mm., Herat and Kandahar; 7 ♂ 73–78; 2 ♀ 70.5–71.5 mm., ex Whistler, J. B. N. H. S. XXXV, p. 518.

Machlolophus xanthogenys xanthonotus, new subspecies.

Type.—Adult ♂ (wing 74.5 mm.), taken at Londa, Bombay Presidency, on January 10, 1938, by W. Koelz.

Topotypes.—12 specimens taken from January 7 to March 10, 1938.

I have in my collection 7 specimens of *aplonotus* from Bhopal State and Mahendra Giri, Orissa, and of *travancoreensis* from Palni Hills. The new form is nearly as yellow as *aplonotus*. The light tips of the wing coverts are often conspicuously yellowish. In respect to other distinctive characters: large size, reduced white tips on the rectrices, extension forward of the supercilium, it is like *travancoreensis*.

Wing measurements:

xanthonotus 8 ♂ 74.5–79.5; 5 ♀ 70–74 mm.

aplonotus 5 ♂ 70–74; 2 ♀ 74, 75 mm.
♂ 70.5–77 mm. (ex Whistler).

travencoreensis 2 ♂ 75, 78; ♀ 74 mm.
♂ 76.5–82.5 mm. (ex. Whistler)

I follow Whistler (J. B. N. H. S. XXXV, p. 520) in not accepting Blyth's name *jerdoni*.

Sitta frontalis simplex, new subspecies.

Type.—♂ (wing 77.5 mm.) taken at Londa, Bombay Presidency, on January 31, 1938, by W. Koelz.

Topotypes.—Ten specimens taken from January 9 to March 10, 1938.

Compared with specimens of *frontalis* from Ceylon in the Rothschild Collection, these Indian specimens are less richly colored and without the strong lilac purple tone that characterizes the typical form. There are no significant size differences.

Compared with specimens of *corallina* in my collection and in the Rothschild Collection, the wing is longer. [Whistler (B. N. H. S. J., XXXV, p. 523) recognizes *corallina* on size only.]

Wing measurements:

simplex[1] 10 ♂ 74–82; 10 ♀ 72–76.5 mm.

corallina 8 ♀ 72–76.5; 4 ♀ 70–72 mm., ex. Whistler, partim.

Aegithina tiphia septentrionalis, new subspecies.

Type.— ♀ (wing 66.5 mm.) taken at Bhadwar, Kangra District, Punjab, 2000 feet altitude, on April 13, 1933, by W. Koelz, U. M. M. Z., No. 78871.

Topotypes.—4 specimens taken March 31 to April 13, 1933. None have black in the body plumage.

Compared with specimens of *tiphia* from Dacca and the Sevok Forest

[1] Including specimens from the Nilgiris, the Palnis, and Southern Orissa.

near Darjeling, these specimens are much yellower on the crown and on the rest of the upperparts, more gold on the throat and upper breast. The outermost rectrices often have broad edges of yellow and the black inner rectrix of males is washed broadly on the distal end with green-yellow. The bill averages larger and the wing longer.

Wing measurements:

septentrionalis 4 ♂ 66.5–68; ♀ 66 mm.
tiphia 4 ♂ 63.5–65.5; 3 ♀ 63–65.5 mm.

Hypocolius ampelinus orientalis, new subspecies.

Type.—Adult male (wing 106 mm.), taken at Kandahar, Afghanistan, on October 23, 1937, by W. Koelz.

Topotypes.—5 specimens, taken October 21–24, 1937.

Compared with specimens in the Rothschild Collection from Fao, which may be considered the type locality of *ampelinus*, my specimens are darker above, especially on the crown where in males there is a distinct bluish cast; they have a smaller bill and longer wing.

Wing measurements:

orientalis 4 ♂ 103–106; 2 ♀ 96, 100 mm.
ampelinus 5 specimens 97–103 mm.

Molpastes leucotis farahensis, new subspecies.

Type.—♂ (wing 90.5 mm.), taken at Farah, Afghanistan, October 30, 1937, by W. Koelz.

Paratypes.—A specimen from the type locality on the same date; 7 specimens from Kandahar on October 17–22, 1937.

Differs in color from *mesopotamia* and typical *leucotis* of Sind, by being greyer, not sandy, above and below, and with more black, less brown, in the tail. In the matter of wing size it is intermediate. The tail is longer than in *leucotis*.

Wing measurements:

farahensis 4 ♂ 90–91.5; 5 ♀ 84–88 mm.
mesopotamia ♂ 90–95; ♀ 87–89 mm., ex Hartert, V. P. F. III, 1921–22, p. 2133.
leucotis 8 ♂ (75) 83–84.5 (87) mm., Sind specimens.

Tail measurements:

farahensis 3 ♂ 76–80; 4 ♀ 76–80 mm.
leucotis 8 ♂ 66–77 mm.

Iole icterica intensior, new subspecies.

Type.—Male (wing 94.5 mm.), taken at Kunjapani, Nilgiri Hills, on February 20, 1937, by W. Koelz.

Paratypes.—2 specimens taken at about the same time in the type locality, and one from Kodaikanal, Palni Hills, on March 15, 1937.

Compared with specimens in my collection from Londa, which is between the type locality of *icterica* (Mahableshwar) and the Nilgiris, this form is richer in color, especially on the sides of the head.

Wing measurements:

intensior, ♂ 88.5, 94.5, 94.5; ♀ 90 mm.;
icterica 10 ♂ (90) 93–96; 4 ♀ 88.5–90.5 mm.

Certhia himalayana cedricola, new subspecies.

Type.—Adult ♀ (wing 67 mm.), collected at Jalalabad, Afghanistan, on December 18, 1937, by W. Koelz.

Paratypes.—3 specimens from the type locality on the same date; one from Kail on June 3, 1937, and from Ferajghan Pass, June 6, 1937; 3 from Sirotai in mid-June, 1937.

Compared with specimens of *limes* from Gilgit in the Rothschild Collection, this form has greyer upper parts. The red-brown of the back is much reduced and duller, and the buff of the underparts is much paler.

Compared with specimens of *taeniura* from Turkestan in the Rothschild Collection, the upper parts are much darker. The under parts are also darker, especially the belly.

Wing measurements: 5 ♂, 69–72.5; 5 ♀, 65–67 mm.

Cinclus pallasii kargasiensis, new subspecies.

Type.—Adult ♂ (wing 106 mm.), taken on Kargasi Pass, Afghanistan, August 8, 1937, by W. Koelz.

Paratypes.—5 specimens taken in the type locality at the same time; one from Sanglech, July 26, 1937; one from Minjan Pass, July 28, 1937; one from Paghman, Afghanistan, June 27, 1937; and one from Upper Tale Valley, Baltistan, August 24, 1936.

Compared with specimens of *tenuirostris* in my collection and that of the University of Michigan, mostly from Punjab, these Afghan specimens are duller, more hair-brown, but not so dark as typical *pallasii*. Juveniles average greyer and paler, especially on the breast. The wings and tail are longer.

Measurements:

kargasiensis adult ♂ 100.5, 103 (worn); 102 (worn); 105; juvenile ♂ 103+, 104.5; 3 adult ♀ 95–97.5; juvenile 97.5 mm.
tenuirostris, 15 ♂ 96–100 (103); 4 ♀ 91–95 mm.

Saxicola caprata rupchandi,[1] new subspecies.

Type.—Adult female (wing 69.5 mm.) taken at Londa, Bombay Presidency, January 21, 1938, by W. Koelz.

Topotypes.—7 ♂ W 68–75; 7 ♀ 68–71 mm., taken from January 8 to March 12, 1938.

Like the races *atrata* and *burmanica*, this form has the white of the under parts confined to the lower abdomen in the male. Compared with Ceylonese *atrata* in the Rothschild Collection, this form has shorter wings and tail, heavier feet, and smaller bill. The color of the males is more black (no trace of brown), and the females are more black (less rufous brown) above and below.

[1] Named for the Thakur Rup Chand, without whose help I could not have collected birds.

Compared with *burmanica* from Benghal, Bhamo, and Hospet, which recent writers consider synonymous with typical *caprata*, the female is darker and less rufous throughout. Males are purer black with no trace of brown. There are no size differences.

The form is apparently resident. Breeding begins in late January. No migrant forms were collected.

A comparison with specimens in my collection from the Palni Hills (♂ 81, 2 ♀ 73.5, 74 mm.), Nilgiris (2 ♂ 76, 3 ♀ 72, 72.5, 74 mm.), and from Tellicherry (2 ♀ 69 mm.) indicates that the hill forms are nearest *atrata*. The Malabar females are colored like the hills female, but average smaller in the four measurable characters enumerated. The bill is heavier than in any Londa female.

Oenanthe isabellina kargasi, new subspecies.

Type.—Adult ♀ (tail 62 mm.), in fresh fall plumage, taken August 8, 1937, on Kargasi Pass, Afghanistan, by W. Koelz.

Paratypes.—2 adults and three first plumage specimens in the type locality at about the same time; a juvenile from Zebak on July 22, 1937; 2 adults and a juvenile from Minjan Pass, July 26–28, 1937, and an adult from Teshkan Pass, August 13, 1937.

The new form differs from juveniles and adults of *isabellina* from South Afghanistan (Gardez) in my collection and from many specimens in the Rothschild Collection from North Africa, Asia Minor, Turkestan, Mongolia, in having heavier bill, longer tail, tarsus and toes, and deeper color.

Cercomela fusca ruinarum, new subspecies.

Type.—Adult male (wing 94.5 mm.), taken at Sanchi, Bhopal State, on January 3, 1938, by W. Koelz.

Topotypes.—3 specimens taken on January 1 and 3, 1938.

Compared with specimens of *fusca* in the Rothschild and University of Michigan collections from Lahore and Hissar District, both in the Punjab,[1] these birds are much darker in color. The wing averages longer.

Wing measurements:

ruinarum 3 ♂ 90–95; ♀ 87 mm.
fusca 2 ♂ 88–90; 3 ♀ 84.5–87 mm.

Saxicoloides fulicata lucknowensis, new subspecies.

Type.—Adult male (wing 71 mm.), taken at Lucknow, U. P., on December 10, 1936, by W. Koelz.

Topotypes.—3 specimens taken on about the same date.

The races *fulicata*, *intermedia*, and *ptymatura* occurring in the southern part of the Peninsula have the back predominantly black, and this form need therefore be compared only with the two northern forms *munda* and *cambaiensis*. Comparing males, this form differs from *munda* in being paler and much more grey, less rufescent, with crissal chestnut paler and with shorter wing and tail. Females are greyer throughout and have the same size differences.

[1] The type locality of *fusca* is Muttra.

Compared with specimens of *cambaiensis* from the Sind in the University of Michigan Collection and from Udaipur in my collection, the male of *lucknowensis* is greyer and paler above and wings and tail are shorter. Females differ in about the same way.

Wing measurements:

lucknowensis 2 ♂ 72, 73; 2 ♀ 67, 72 mm.
cambaiensis 7 ♂ 76–80; 4 ♀ 72–73 mm.
munda, 5 ♂ 72–77; 2 ♀ 73, 74.5 mm.

Saxicoloides fulicata stuartbakeri, new subspecies.

Type.—Breeding ♂ (wing 73 mm.), taken at Bodhgaya, Bihar, on April 10, 1937, by W. Koelz.

Topotypes.—3 specimens taken at about the same time.

This form, like *lucknowensis*, has a short wing and tail and brown back. Comparing males, the color above is deeper and browner than in that form. It is darker than *munda* and more rufescent than *cambaiensis*, especially on the head. Color differences between females are slight.

Wing measurements: 2 ♂ 71, 73; 2 ♀ 69, 70.5 mm.

Turdus merula brodkorbi, new subspecies.

Type.—Breeding female (wing 136 mm.), collected at Farakar, Afghanistan, July 6, 1937, by W. Koelz.

Paratypes.—Male and 3 females from Kandahar, October 21–23, 1937; a female from Bala Murghab, November 15, 1937, and one from Maimana, November 16, 1937; and two females from Balkh, November 30 and December 3, 1937.

Compared with females of the race *intermedia* from Turkestan in the Rothschild Collection and in the U. S. National Museum, these birds are not so brown above or below. The belly especially is greyer.

The race differs from *syriaca* in having much less brown. In *syriaca* the females are hair-brown above, with often an olive tint, and often nearly monochrome below, while the black of the male shows some brown.

Wing measurements: ♂ 135; 8 ♀ 127–137 mm.

Prunella strophiatus sirotensis, new subspecies.

Type.—Adult ♂, taken at Sirotai, Afghanistan, on June 17, 1937, by W. Koelz.

Topotype.—Adult ♀, taken next day.

Wing measurements of both, 65 mm. Compared with topotypical *jerdoni* in my collection taken in Kashmir during summer of 1936, this race is greyer above, especially on the back and rump. The wing may average shorter. Wing measurements of topotypical *jerdoni*, 5 ♂, 66–71 mm.; 9 ♀ W 64–68.5 mm.

Muscicapa strophiata euphonia, new subspecies.

Type.—Male (wing 74 mm.), taken at Kulu, Kangra Dt., Punjab, on December 25, 1932, by W. Koelz.

Paratypes.—One specimen from the type locality taken on December 25, 1932; one from Arsu, Punjab, on November 15, 1933; three from Chaura, Rampur State, Simla Hills, on November 3 and 4, 1933; 9 from Serahan, Rampur State, from November 5–8, 1933.

Compared with a series of *strophiata* in my collection from Darjeling, taken in the winter, this race is generally paler, except for the throat. The edgings of the large wing feathers are especially brighter.

Hypothymis azurea similis, new subspecies.

Type.—Adult male (wing 68.5 mm.), taken at Londa, Bombay Presidency, on January 10, 1938, by W. Koelz.

Topotypes.—16 specimens taken from January 10 to March 6, 1938.

In coloration, duller than any Indian form. Compared with *sykesi* from Vizagapatam District and from the Nilgiris in my collection, the blue is duller (in females, less extensive below), and the light of the underparts greyer. The black band of the upper breast in males is but weakly developed, and the occipital spot is smaller.

Whistler (J. B. N. H. S. XXXVI, p. 91) rejects *sykesi*, but my specimens of *styani* from Dacca and those in the Rothschild Collection from Hainan have a much longer tail than any I have seen from peninsular India. The coloring may average richer.

Ceylonensis in the Rothschild Collection is more purplish and has the pectoral bar absent or obsolescent in males.

Wing measurements:

similis, 10 ♂ 65–70.5; 7 ♀ (62) 66–70 mm.
styani, 7 ♂ 69.5–74; 5 ♀ 66–69 mm. (Ex Whistler).
sykesi, 8 ♂ (64) 68–73; 3 ♀ 68–71 mm.
ceylonensis, 6 specimens 65.5–67 (70.5) mm.

Chelidorhynx hypoxantha noa, new subspecies.

Type.— ♀ (wing 57 mm.) collected at Naggar, Kulu, Punjab, on October 28, 1936, by W. Koelz.

Paratypes.—12 specimens from the type locality taken in December of 1932 and 1933; 2 from Baijnath, also in the Kangra Dt., Punjab, January 14, 1933; one from Chaura, Rampur State, Simla Hills, November 2, 1933; four from Serahan, Rampur State, November 5 and 6, 1933.

Compared with specimens from Sikkim in the Rothschild Collection this race shows somewhat paler on the back, primaries, and rectrices. The white wing-spots average larger and the yellow below is less tipped with smoky.

Leucocirca albicollis canescens, new subspecies.

Type.—Male (wing 80.5 mm.), taken at Bhadwar, Punjab, March 31, 1933, by W. Koelz.

Topotypes.—Nine specimens taken between March 27 and April 19, 1933.

Wing measurements: 6 ♂ 77–81; 4 ♀ 74–76 mm.

Compared with Bengal specimens (Sukna Forest), the northwestern

specimens are ashy on the back, breast, and belly, not sooty, and the light tips to the rectrices are less sharply demarcated.

Hemipus picatus insulae, new subspecies.

Type.—American Museum of Natural History No. 655585, Wavenden, Ceylon, February 8, 1881, H. J. Elwes Coll.

Paratypes.—Six specimens from Ceylon in the same collection.

Differs from typical *picatus* from the Nilgiris, the Palnis, and Londa, Bombay Presidency, in having the white tip of the outermost tail feathers shorter.

All these specimens have a black back and it may be that the females are like the males in color, as has been suggested.

Tephrodornis pondiceriana warei,[1] new subspecies.

Type.—Adult male (wing 89.5 mm.), taken at Londa, Bombay Presidency, on January 12, 1938, by W. Koelz.

Topotypes.—11 specimens taken between January 11 and March 6, 1938.

Whistler (J. B. N. H. S. 38 p. 310) is right in saying that the birds of the western Ghats and the eastern provinces are darker. The Sikkim and Bengal birds of my collection and those in the Rothschild Collection are dark. They are the darkest and greyest of the Indian races. Compared with *pondiceriana* from the Punjab they are much darker and have less white on the throat. The white is present usually as streaks over the grey. Hodgson's name *leucurus* is probably available for this form.

The Londa birds are dark like *leucurus* but the cast is brown, and the crown is usually darker than the back. Compared with *pondiceriana*, the breast is also darker and the white of the throat is perhaps less extensive.

I have three adults from Mangalore on the Malabar Coast that are in rather worn plumage, but they appear to be like this form.

Compared with the Ceylonese race *affinis*, the tail and wings in *warei* are longer and the supercilium is more conspicuous.

Wing measurements: 9 ♂ 85–91; 4 ♀ 82.5–87 mm.

Birds taken in early March were breeding.

Pericrocotus cinnamomeus sidhoutensis, new subspecies.

Type.—Adult ♂ (wing 67.5 mm.), taken at Sidhout, Madras Presidency, March 23, 1937, by W. Koelz.

Paratypes.—3 specimens from the type locality at about the same time; 2 from Kodur nearby, on March 18, 1937.

In the distribution and intensity of red this form is intermediate between the richly colored, typical race of Ceylon (not *malabaricus* of Malabar, which is the most intensely colored of all races), and the two pale races, *iredalei* of Punjab and *pallidus* of Sind.

Compared with the typical race, the back and throat are paler and the wing shorter.

[1] Named for my friend S. J. Ware.

Compared with *pallidus*, the smallest of the named Indian races, which it most resembles, the coloration everywhere is deeper and the tail is shorter.

Vividus, of which I have seen examples in the Rothschild Collection from Rangoon, Upper Burma and the Shan States, appears to differ from the typical Ceylon form chiefly in having the throat grey.

Wing measurements:

sidhoutensis, 4 ♂ 65–67; 2 ♀ 65, 65.5 mm.

cinnamomeus, 8 ♂ 68.5–71; 6 ♀ 68–71.5 mm.

(Specimens from Londa, Bombay Presidency, Nilgiri Hills, Ceylon.)

iredalei, 6 ♂ 66.5–72; 7 ♀ 66–70 mm.

(Specimens from Punjab.)

pallidus, 8 ♂ 64–68 (70); 2 ♀ 63, 66 mm.

(Specimens from Sind.)

Tail measurements:

sidhoutensis, 4 ♂ 66–69.5; 2 ♀ 64, 70 mm.

pallidus, 8 ♂ 69–72.5 (76.5); ♀ 74 mm.

Two pairs taken at Sanchi, Bhopal State, are like *sidhoutensis* in color but are larger (2 ♂ 69, 71; 2 ♀ 69, 71 mm.).

Chibia hottentota londae, new subspecies.

Types.—♂ (wing 166 mm.) collected at Londa, Bombay Presidency, on January 24, 1938, by W. Koelz.

Topotypes.—11 specimens taken from January 16, to February 20, 1938, by W. Koelz.

Compared with topotypical *hottentota* in my collection from near Darjeling, Bengal, and in the Rothschild Collection from Sikkim, the wing and tail of this form are shorter, the bill averages smaller, and the general color is duller.

Wing measurements: *londae*, 4 ♂ 165.5–166; 9 ♀ 153–161 mm.

I follow Whistler (J. B. N. H. S. XXXVI, No. 2, 1933, p. 352) in retaining Sikkim as the type locality of *hottentota*.

The Forms of *Orthotomus sutorius* in Peninsular India.

Orthotomus sutorius sutorius (Pennant).

The type locality of *sutorius* is Ceylon, from whence I have seen specimens in the Rothschild Collection. My specimens from the Nilgiris (February) match these specimens closely. This form has the back a clear yellow-green, more yellow than any of the other Indian races. The color of the forecrown generally spreads to the nape. There is no supercilium. The ear coverts are pale, washed with buff. The wing, 6 ♂ 46.5–51.5 mm.

Orthotomus sutorius londae, new subspecies.

Type.—Adult ♂ (wing 48.5 mm.) taken at Londa, Bombay Presidency, on January 13, 1938, by W. Koelz.

Topotypes.—13 specimens taken between January 8 and March 12, 1938.

This form has the back less yellow than the above, the color of the fore-

crown is generally restricted, and the hind-crown is greyer. There is a narrow greyish supercilium; the ear coverts are grey without buff.

Wing: 9 ♂ 47.5–51; 5 ♀ 43–48 mm.

Specimens from Mangalore on the Malabar Coast are nearest this form; from Nilambur intermediate with *sutorius*. Specimens from Cuddapah and Kodur, Madras Presidency, and from Mahendra Giri, Orissa, are nearest this form, with the crown as in the next.

Orthotomus sutorius guzurata (Latham).

I have five molting specimens from Udaipur, which is near the Guzerat border, the type locality, taken on April 22, 1937. The back has the yellow reduced; the crown is as in *sutorius;* there is a conspicuous whitish supercilium; the ear coverts are buffy.

Wing measurements: 5 ♂ 50–54; 4 ♀ 45.5–49.5 mm.

Four specimens from Sanchi, Bhopal, are very similar, and the measurements are included above.

Orthotomus sutorius sindiana, new subspecies.

Type.—Adult male (wing 51 mm.), Hyderabad, Sind, British India, April 28, 1937, collected by Walter Koelz.

Topotypes.—5 specimens taken near Khinjar Lake, Sind, February 11 to March 5, 1934, all in the University of Michigan Collection; one from Hyderabad, Sind, in my collection, taken April 28, 1937. The last is moulting to spring plumage.

This form has the yellow of the back more reduced, more green, than any of the preceding races; the color of the forecrown is more restricted and the hind neck is greyish, without the strong vinaceous wash of *londae;* the supercilium is absent or there is a greyish trace; the ear coverts are pearly grey; the under parts are slightly less buffy, with a tinge of grey.

Wing measurements: 5 ♂ 49–51; 3 ♀ 47.5–48 mm.

Orthotomus sutorius ruficapilla (Hutton) Simla.

I have seen specimens in the Rothschild and University of Michigan collections, in addition to my own, from Kashmir, Punjab (plains and foothills to 5000 feet), Saharanpur.

This is near *sindiana* in coloration but has the hindneck less grey and the ear coverts more buffy and has a longer wing: 13 ♂ 51–56.5; 4 ♀ 48–51 mm.

A specimen from Benares is nearest to the dull Bengal form *patia.*

Phylloscopus occipitalis kail, new subspecies.

Type.—Adult ♂ (wing 67 mm.) taken at Kail, Afghanistan, June 3, 1937, by W. Koelz.

Paratypes.—3 specimens from the type locality on the same date; one from Daulatshah, on June 1; two from Gumandru, on June 5; one from Sanglech, July 26; one from Iskarzir, on July 31, 1937.

Compared with winter specimens of *occipitalis* in my collection from the Eastern and Western Ghats, and breeding birds from Kashmir, Chamba,

and Lahul, this form has less green in the upper parts and duller edges to the primaries.

Wing measurements:

kail, 6 ♂ 64–67.5; 3 ♀ 59.5–62.5 mm.

occipitalis, 20 ♂ 64–70 mm., winter;
7 ♂ 62.5–68; 2 ♀ 59, 60 mm., summer.

Prinia sylvatica palniensis, new subspecies.

Type.—♂ taken at Kodaikanal, Palni Hills, on March 12, 1937, by W. Koelz. Wing 52 mm.; tail 60.5 mm.

Paratypes.—A male (wing 52.5; tail 62 mm.), a female (wing 50; tail 58 mm.), from the type locality on about the same date; 2 males (wing 55, 56; tail 70, 69 mm.), and a female (wing 53; tail 61 mm.), from Oatacamund, Nilgiri Hills, taken February 15 and 16, 1937. These birds are all in winter plumage. One of the Palni males had begun molting.

Baker: New Fauna, gives the type locality as the Seegore Pass, Nilgiri Hills, which designation Whistler (J. B. N. H. S., XXXVI, p. 575) accepts. Jerdon (Madras Jour. Lit. Soc. Vol. XI, p. 4, 1840) says, however, in his description, "I have only seen this species *hitherto* . . . in the Seegore Pass . . .," and gives the wing measurement as 2.4 inches (61 mm.).

The bird of the Nilgiris is a small form, with a shorter wing than the bird of the lower elevations. Whistler gives for the birds of the Palkonda and Seshachalam Hills wing measurements of 12 ♂ 56–63.5; 2 ♀ 51.5–54 mm., and he includes (l. c., p. 721) the birds of Hyderabad State and Bombay Presidency (Nasik, Mahableshwar) with this form. I have seen specimens only from Sidhout, Madras Presidency, located in about the center of this range, and these fit Whistler's description.

It seems likely then that Jerdon's description refers rather to the race in the surrounding lowland than to the Nilgiri race, and the former may be considered typical *sylvatica*. *Palniensis* differs further from it in having a more conspicuous supercilium and a much smaller bill.

Prinia sylvatica mahendrae, new subspecies.

Type.—♂ (wing 62 mm.) taken on Mahendra Giri, Orissa, January 24, 1937, by W. Koelz.

Topotypes.—2 males taken at about the same time.

Wing measurements: 60.5, 61 mm.

Compared with any of the other races of India, this is in winter plumage dark cinnamon brown, rather than grey-brown or fulvous, and it has a longer tail: 77, 79, 81 mm., as compared with 65–72.5 mm. for 12 ♂ of *sylvatica* (ex Whistler, l. c.). The underparts, especially the sides, are much greyer.

Oriolus oriolus baltistanicus, new subspecies.

Type.—A female in first year plumage (wing 141.5 mm.) taken at Dagoni, Baltistan, on August 25, 1936, by W. Koelz.

Paratypes.—a juvenile from Skardo, August 15, 1936; two in first year

plumage, and one adult male from Shigar, August 19 to 21, 1936; one in first year plumage from Kapalu, August 28, 1936.

Compared with specimens of *kundoo* in my collection from Afghanistan (summer) and India (winter), the two adult males average less golden. The other specimens are in the early plumage that shows white below, streaked with black. These have much less yellow on the breast than *kundoo* in similar plumage, and the white is clearer, or greyer, with no buff. Above the tone is greener, less yellow.

Compared with *turkestanicus* in similar plumage (Shiburghan, Afghanistan, September 10, 1937, female, wing 154 mm.; Pitug, Ladakh, September 20 and 21, 1936, males, wing 160 mm.), this race is smaller, the underparts are whiter, and the upper parts are not so green.

Wing measurements:

baltistanicus, 7 specimens 134.5–146 mm.
kundoo, 29 specimens 133–147 mm.

Temenuchus pagodarum afghanorum, new subspecies.

Type.—Adult ♂ (wing 109 mm.), taken at Tagau, Afghanistan, on June 8, 1937, by W. Koelz.

Paratypes.—4 specimens taken at Mamakhel, May 20 to 24, 1937; 3 from Chandau, on June 7, 1937.

Compared with breeding specimens in my collection of *pagodarum* from Nilambur (near the type locality="Malabar"), and from Cuddapah, Madras Presidency, these are more grey, less brown, and are generally paler, especially on the wing coverts and the outer vane of the secondaries. The pale edgings of the long feathers of the collar are more conspicuous. The wing averages longer. The distal white of the outer rectrix is generally less extensive.

Birds from the Kangra District in the Punjab Hills are most like this form, likewise two specimens from Udaipur.

From Lucknow I have four specimens that are dark grey, the darkest of any I have seen. A series from Londa, Bombay Presidency, is similar. For these birds Hodgson's *sylvestris* of Nepal is probably applicable.

Wing measurements:

afghanorum, 6 ♂ 107–113; 2 ♀ 103 mm.
pagodarum, 6 ♂ 102–109, 6 ♀ 98–100.5 mm.

Lonchura striata estriata, new subspecies.

Type.—Adult female (wing 51 mm.), taken at Jagalbed, Bombay Presidency, on February 22, 1938, by W. Koelz.

Paratypes.—13 specimens from the vicinity of the type locality, taken January 8 to February 24, 1938, and one from Nilambur, Madras Presidency, March 2, 1937.

Wing measurements: 5 ♂, 53–55.5; 9 ♀ 51–57 mm.

Compared with specimens of typical *striata* from Ceylon in the Rothschild Collection this race has the head striping obsolete or nearly so, and that of the rest of the upper parts obsolescent; the brown of the upper parts,

throat, and breast has more admixture of black; the white is duller, with no creamy cast.

Compared with specimens of *acuticauda* of Nepal, there is no marking on the breast or sides; the tail coverts are nearly uniformly dark; central rectrices are not modified; the color is duskier.

Specimens from Mahendra Giri in Southern Orissa agree with Whistler's Vizagapatam series (Whistler, J. B. N. H. S. XXXVI, p. 384).

Specimens collected in late January and early February were breeding.

Chloris chloris smithae,[1] new subspecies.

Type.—Adult male (wing 91 mm.), taken at Balkh, Afghanistan, December 1, 1937, by W. Koelz.

Topotypes.—A male (wing 90.5 mm.) and 2 females (wing 88.5, 90 mm.) with the same data.

Compared with specimens of *turkestanica* from Syr Darya, Taschkent, and *bilkevitchi* from Askhabad in the Museum of Comparative Zoology, this form has the feathers of the back and breast in males more heavily tipped and with more of a brown, rather than grey. The yellow of the body is more olive. The yellow edges of the primaries average paler and at the scallop fade into a conspicuous white patch. The wing size is as in *bilkevitchi.*

Erythrina rubicilla eblis, new subspecies.

Type.—Breeding ♂ (wing 122 mm.), taken at Puga, Rupshu, Kashmir, on July 5, 1931, by W. Koelz.

Paratypes.—18 specimens from the Spiti River Valley, Spiti, Punjab, taken in September, 1933; 5 from the vicinity of the More Plain, Rupshu, taken in August, 1933.

Similar to typical *severtzovi* of which two pairs have been examined from the collection of the Field Museum of Natural History, taken July 3, 1925, on the Sanju River, Tam Karaul, Chinese Turkestan, the type locality as restricted by Hellmayr: F. M. N. H. Publ. 263, 1929, p. 47.

These birds are in relatively unworn plumage; the deep carmine edges that in the male come with wear are conspicuous only on the head. Comparing specimens in comparable plumage, the new form is generally darker, especially on wings and tail, and has longer wing and tail.

I have not seen specimens of *kobdensis* (Northwestern Mongolia), but from Sushkin's careful description (Proc. Boston Soc. Nat. Hist., Vol. XXXVIII, 1925, p. 13) it seems this form, while probably similar in color and tone, is smaller (wing measurements of 26 specimens ♂ 110–119; ♀ 107–111 mm.).

Wing measurements:

severtzovi, 2 ♂ 113, 115; 2 ♀ 107.5, 108 mm. ♂ (112) 115–117; ♀ 107–110 mm., ex. Sushkin.

eblis, 12 ♂ 119–123; 11 ♀ 111–117 mm.

[1] Named for my friend Miss Geneva Smithe.

Erythrina rubicilla diabolica, new subspecies.

Type.—Adult ♂ (wing 118 mm.), taken at Sanglech, Afghanistan, July 27, 1937, by W. Koelz.

Topotype.—adult female, July 26, 1937, wing 109 mm.

Compared with topotypical *severtzovi* in Field Museum of Natural History from Sanju River, Chinese Turkestan, and with typical *rubicilla* from the Caucasus in the Rothschild Collection, this form has a larger bill. It is intermediate in color between the two forms except that the males have the white spotting on the head restricted in extent as in *rubicilla.*

Hirundo rustica afghanica, new subspecies.

Type.—Breeding male (wing 128 mm.) taken at Baghlan, Afghanistan, July 1, 1937, by W. Koelz.

Paratypes.—An adult from the type locality on the same date; a juvenile from Mamakhel on May 23 and one from Laghman on May 25; an adult from Charakar on June 11; two adults and two juveniles from Gardez on June 15 and 16; two juveniles from Baghlan on July 1; a juvenile from Girishk on October 27.

Wing measurements of adults: 3 ♂ 119–128; 3 ♀ 119–124 mm.

Similar to typical *rustica* except that the underparts and under wing coverts and axillaries are paler, as in *gutturalis.*

I should assume that my specimens had faded were not birds from Sind in fresh plumage taken in January, along with specimens of *gutturalis,* just as pale.

Anthus hodgsoni burzil, new subspecies.

Type.—Breeding male (wing 85 mm.), taken on August 5, 1936, on Burzil Pass on the edge of the Deosai Plain, Kashmir, by W. Koelz.

Paratypes.—3 adults and a juvenile from the same locality on the same date; a breeding female from Pukar, Lahul, taken June 23, 1936; a breeding male from Koksar, Lahul, taken July 23, 1930.

These birds are in dull breeding plumage from which most of the green has faded, but they show one character that separates them from typical *hodgsoni,* the winter resident of the lower Himalayas (Kulu, Darjiling), and from *inopinatus,* the winter resident of India (Nilgiris, Bombay Presidency); i. e., the bill is much heavier. They agree with the former in being heavily streaked above.

Motacilla maderaspatensis kangrae, new subspecies.

Type.—Adult ♂ (wing 97.5 mm.), taken at Bhadwar, Kangra District, Punjab, April 25, 1933, by W. Koelz.

Paratypes.—16 specimens in the collection of the University of Michigan Museum: from Bajaura, Kulu, and Bhadwar in the Kangra District; from Lahore; from the Hissar District, all in the Punjab; from Rampur State, Simla Hills.

Compared with specimens of typical *maderaspatensis* from South India and Ceylon in my collection and the Rothschild Collection, this form never has

the upper parts so deep black, and the sides have less of a sooty wash. The tail is shorter.

Wing measurements:

kangrae, 12 ♂ (92) 95–100.5; 5 ♀ 91 (94) mm.

maderaspatensis, 9 ♂ 99–101.5 (106); 6 ♀ 92.5–97.5 mm.

Tail measurements:

kangrae, 12 ♂ (91) 95–102; 5 ♀ 90–96 mm.

maderaspatensis, 6 ♂ 99–103 (107); 6 ♀ 98.5–103 mm.

Mirafra cantillans bangsi, new subspecies.

Type.—Adult ♂ (wing 86 mm.), taken March 25, 1937, at Hospet, Madras Presidency, by W. Koelz.

Topotypes.—3 specimens with the same data.

Ruddier than *cantillans* of Bengal, throughout.

Wing measurements: 2 ♂ 81, 86; 2 ♀ 82 mm. (all birds moulting).

Galerida malabarica propinqua, new subspecies.

Type.—Breeding ♂ (wing 95 mm.), taken at Londa, Bombay Presidency, on February 5, 1938, by W. Koelz.

Topotypes.—20 specimens taken between January 11 and March 5, 1938.

Compared with topotypical *malabarica* in my collection from Tellicherry and Mangalore, taken February 25 and March 1, 1937, this race is less ruddy everywhere below and on the back. The wing is perhaps a little shorter and the bill of lighter weight. I have a juvenile of each race, and the color differences are evident on comparing them.

Wing measurements:

propinqua, 10 ♂ 94–99.5; 10 ♀ 89.5–93 mm.

malabarica, 3 ♂ 97–100; 2 ♀ 89 mm.

Specimens taken in early January were breeding and a full-fledged young was taken on January 27.

Zosterops palpebrosa remota, new subspecies.

Type.—Male (wing 55.5 mm.) taken at Jalalabad, Afghanistan, on December 18, 1937, by W. Koelz.

Topotypes.—5 specimens taken on the same date.

Similar to a series of *occidentis*[1] from Punjab in collection of the University of Michigan, but is greener above and somewhat darker below.

Wing measurements:

remota 4 ♂ 55–57; 2 ♀ 54, 58 mm.

occidentis, 7 ♂ 54–59, 4 ♀ 53–57 (Punjab hills).

Zosterops palpebrosa palniensis, new subspecies.

Type.—Male (wing 54 mm.) taken at Kodaikanal, Palni Hills, March 1, 1937, by W. Koelz.

Topotypes.—4 specimens taken on the same date.

[1] If Baker's restriction of the type locality of *palpebrosa* to Orissa is valid, then *occidentis* is probably a synonym of *palpebrosa*.

Wing measurements: 3 ♂ 54–56; 2 ♀ 54, 55.5 mm.

Compared with topotypical specimens of *nilgiriensis* in my collection, the Palni Hills race is much less yellow, more green above and duller on the throat. The bill is larger.

It differs from *egregia* of Ceylon in the same way and is, in addition, much greyer below.

I have specimens from Londa, Bombay Presidency, that are probably *salimalii*. These differ from *nilgiriensis* in about the same way as *palniensis* differs from *nilgiriensis*, so that the contrast between *palniensis* and *salimalii* is pronounced.

Arachnothera longirostra vantynei, new subspecies.

Type.—Breeding male (wing 66 mm.) taken at Jagalbed, Bombay Presidency, on March 4, 1938, by W. Koelz.

Paratypes.—3 females taken in or near the type locality from March 2 to 6, 1938.

Wing measurements: 57–60 mm.

The Rothschild Collection has a female from North Cachar, which may be considered topotypical of *longirostra* and four other specimens from Malaya. These differ from my specimens in having a larger bill and in being more green above and below, especially on the breast.

Piprisoma agile saturatior, new subspecies.

Type.—Adult male (wing 62 mm.), taken at Londa, Bombay Presidency, on February 9, 1938, by W. Koelz.

Topotypes.—12 specimens taken from January 11, to March 12, 1938.

Compared with specimens of *agile* in my collection and that of the University of Michigan Museum, from Sanchi in Bhopal and from Punjab, these birds are darker and have stronger pectoral striping. The wing averages shorter.

Wing measurements:

saturatior, 7 ♂ 55.5–62; 6 ♀ 58.5–62 mm.

agile, 12 ♂ 61–65; 8 ♀ 59–64 mm.

Two Nilgiri males measure 63 mm. They are dark like *saturatior*. Jerdons *vireoides* (Madr. Jour. Lit. Sci. XI, 1840) probably came from the Eastern Ghats.

Birds taken in late February were breeding.

Pitta brachyura pulchra, new subspecies.

Type.—Adult ♂ (wing 109 mm.), taken at Bhadwar, Kangra, Punjab, May 15, 1933, by W. Koelz. U. M. M. Z. No. 77452.

Topotype.—Male (wing 106 mm.), taken May 12, 1933, in the same collection.

Compared with specimens of *brachyura* from Ceylon in the Rothschild Collection, and from Malabar and Londa, Bombay Presidency, in my collection, this race is generally paler; the lateral crown streaks are greyer, less brown; the back is purer green, less brown.

Brachypternus benghalensis woodi,[1] new subspecies.

Type.—Female (wing 148 mm.), taken at Jagalbed, Bombay Presidency, on February 23, 1938, by W. Koelz.

Topotypes.—13 specimens taken in or near the type locality between January 27 and March 5, 1938.

Wing measurements: 7 ♀ 147–153; 7 ♀ (139) 145–150 mm.

This race agrees with *tehminae*, of which I have a specimen from Mangalore, in having the rump and wing extensively clouded with the color of the back, the shoulder spotting obsolescent, the underparts stained. It differs from that form and from all the other forms of peninsular India in having the yellow of the back strongly tinged with red, and in having the feathers of the neck between the throat and breast unspotted or with the white much reduced. These characters are strongest in evidence in females. The crown spotting in these tends also to be reduced in quantity.

Chrysocolaptes guttacristatus socialis, new subspecies.

Type.—Adult male (wing 151 mm.) taken at Jagalbed, Bombay Presidency on February 22, 1938.

Topotypes.—10 males and 8 females taken between January 14 and March 12, 1938.

Whistler (J. B. N. H. S. XXXVII) shows that the name *chersonesus* is applicable to the race of this woodpecker found in South India. My specimens from Bombay Presidency, however, do not agree with Malayan *chersonesus* Kloss (Singapore I.). Compared with Malayan birds in the Rothschild Collection the new race is more olive, less golden on the back, especially in males; the red crown of males is duller; the brown of the forehead in both sexes is more extensive; the white spots of the crown in females average smaller. The size is about the same as my *chersonesus* but not like Kloss' measurements of 142–150 mm. Wings of ten males of *socialis* measure 151–159; eight females 152–162 mm.

Xantholaema haemacephala confusa, new subspecies.

Type.—Breeding ♂ (wing 81 mm.), taken at Londa, Bombay Presidency, January 18, 1938, by W. Koelz.

Topotypes.—7 specimens taken January 11 to 23, 1938.

Whistler (B. N. H. S. J. XXXVII, p. 517) is apparently right in considering *lutea* of Pondicherry a synonym of *indica* of Bengal. My specimens from Bengal, U. P., Punjab (plains and foothills), East Madras, and the Nilgiris, virtually all winter birds, are similar. I find, however, that at Londa occurs a race that is much less yellow throughout. The back is rather grass-green than yellow-green, the throat is paler, and the breast and belly have the yellow wash much reduced. The streaking of the under parts is darker.

Two specimens from Kodur, Madras Presidency, are intermediate, and two from Patna, Bihar, are near this form.

Wing measurements: 3 ♂ 80–82.5; 5 ♀ (72) 77.5–80 mm.

[1] Named for my friend Norman A. Wood.

Alcemerops athertoni brevicaudata, new subspecies.

Type.—Male (W 131, T 123 mm.), American Mus. N. H. No. 642636, taken January 2, 1904, at Cheteriana, Hainan, Katsumata Coll.

Paratypes.—5 males and 8 females from various Hainan localities, taken chiefly in September (fresh plumage) and January.

Compared with winter specimens from the Nilgiris, Bombay Presidency, and Darjeling, the new form has the tail shorter, the brown on the belly richer, the azure on the beard more conspicuous, and more yellow in the plumage green.

Tail measurements:

athertoni, 3 ♂ 137–141.5; 3 ♀ 129–137.
brevicaudata, 5 ♂ 123–130; 7 ♀ 125–128 (132) mm.

Ceryle rudis afghanistanica, new subspecies.

Type.—Adult female (wing 139 mm.) taken May 26, 1937, at Laghman, Afghanistan, by W. Koelz.

Topotypes.—two females on the same date.

Wings: 142, 146 mm.

Compared with a pair of *leucomelanura* (wing ♂ 132.5, ♀ 135 mm.) from Ceylon in the Rothschild Collection, the Afghan specimens have broader white edgings to the dark feathers, the dark feathers have a blue-grey cast, the dark pectoral spots are weaker and less extensive, the bill averages shorter and the wing longer. There is, on the average, less black on the secondaries, especially on the inner web.

Seven specimens from Londa, Bombay Presidency, appear to be nearest the typical form in color. Nine specimens from Sind and seven from Punjab in the University of Michigan Collection are nearest this form. The wings however, average shorter;

Wing measurements:

Sind, 9 specimens 134–139 mm.;
Punjab, 3 ♂ 134–138; 4 ♀ 135.5–141.5 mm.

Tockus birostris pergriseus, new subspecies.

Type.—Female (wing 203 mm.) taken February 13, 1933, at Lahore, Punjab, by W. Koelz. U. M. M. Z. No. 82256.

Compared with specimens in my collection from Saba and Hospet in Madras Presidency, and Londa in Bombay Presidency, and from Nepal and Bengal in the Rothschild Collection, this bird is much less brown, especially on the wing coverts, and the grey is deeper. The bill measured from the nostril to the tip is shorter.

Bill measurements:

pergriseus, ♀ 63 mm.
birostris, ♀ 69.5, 74, 71, 75 mm.; ♂ 92, 82.5, 81, 87, 71 mm.

Harpactes fasciatus legerli, new subspecies.

Type.—Adult ♂ collected in the forests at the foot of Mahendra Giri, Orissa, on January 22, 1937, by W. Koelz.

Differs from *malabaricus* in my collection from Londa, Bombay Presidency, the Malabar Coast, and the Nilgiris, in being paler, especially on the back and in having the white of the wing barring more extensive. The wing may average longer. In the single specimen it measures 130.5 mm., while in 20 specimens from the Western Ghats only one has so long a wing.

Caprimulgus asiaticus gurgaoni, new subspecies.

Type.—American Museum of Natural History No. 633103, male, Hattin, Gurgaon, Cleveland Coll.

Paratypes.—3 specimens in the same collection with the same locality data.

Wing measurements: 146, 148, 153 mm.

Compared with birds from South Canara, Malabar, South Orissa, and Sidhout in Madras Presidency, the Punjab birds are very much paler throughout. Typical *asiaticus* of Peninsular India appears to be distinguishable from *minor* of Ceylon only in having on the average a longer wing. *Siamensis* is also a smaller form.

Tyto alba crypta, new subspecies.

Type.—Male (wing 297 mm.), taken at Londa, Bombay Presidency, January 26, 1938, by W. Koelz.

Topotypes.—A male (262 mm.) and a female (293 mm.) taken at about the same time.

Compared with the type and the series of cotypes of *stertens* in the Rothschild Collection, the new form is darker. It differs from *javanica* in being greyer above; the brown is duller throughout; the white spots are smaller and the reticulation is probably finer.

Otus bakkamoena stewarti,[1] new subspecies

Type.—Adult male (wing 163 mm.), taken at Baijnath, Kangra District, Punjab, on January 16, 1933, by W. Koelz, U. M. M. Z. No. 76261.

Paratype.—adult male from Bhadwar, May 7, 1933, wing 160 mm.

Compared with *plumipes* from 8000 feet altitude in the same district, this form is paler and strongly washed tan throughout. On the underparts the dark markings are greatly reduced, the shaft streaks are narrower, and the barring is broken into dots, much as in *O. brucei* or *O. b. lempiji.* The toes are nearly bare.

It is very like *lempiji* of Siam but *lempiji* is tawnier.

Compared with specimens of *deserticola* from Sind, the latter is much paler, especially below; the markings of the underparts more distinct. The black tipping to the feathers of the throat is especially conspicuous.

Aegolius funerea juniperi, new subspecies.

Type.—Breeding female (wing 184 mm.), taken at Kyelang, Lahul, Punjab, on June 18, 1936, by W. Koelz.

Paratype.—feathered juvenile ♀ taken at Jurnat, Lahul, on June 23, 1936.

[1] Named for my friend R. E. Stewart.

The tone of coloration is deep hair-brown as in *richardsoni*, much deeper than in *tengmalmi* (juvenile and adult). It differs from *richardsoni* in having (1) whitish, nearly unmarked feet, (2) the abdomen barred, not streaked, (3) a much larger white patch on the ear ruff, (4) the spots of the crown and primaries and the ears duller, not clear white, (5) the scapular spotting less conspicuous, (6) the under tail coverts less streaked.

The juvenile, compared with a juvenile of *richardsoni* from New Brunswick in the collection of Mr. Hoyes Lloyd of Toronto, is darker and duller, rather hair-brown than Van Dyke brown.

Magna is a much larger and paler race with much more white in the plumage.

Buturlin and Dementiev (Systema Avium Rossicarum, 1935) say that all the Asiatic forms, except *caucasicus* (Caucasus) and *beickianus* (North Kansu) have a greyish tone. The exceptions are described as having a dark ground color, probably like *juniperi*, but from the descriptions available other characteristics appear different.

The species has, so far as I know, not been recorded previously from the Indian Empire.

Streptopelia orientalis sylvicola, new subspecies.

Type.—Breeding male (wing 185 mm.), taken at Castle Rock, Bombay Pres., March 6, 1938, by W. Koelz.

Topotypes.—4 males and two females taken from March 5–8, 1938.

Compared with specimens of *agricola* from Upper Assam and Tenasserim in the Rothschild Collection, these specimens are similar in coloration, but the wine cast of the under parts is dull, with a light rusty wash, and where in *agricola* the color extends nearly evenly over the underparts, it is deepest in this race in the crop region. The back in this race is darker. The females show the differences more strikingly.

Wing measurements: 5 ♂ 176–185; 2 ♀ 173, 175 mm.

Pterocles orientalis bangsi, new subspecies.

Type.—Breeding ♂ (wing 225 mm.) taken with a juvenile near Tolokhan, Afghanistan, on August 28, 1937, by W. Koelz.

Paratypes.—An adult female and a female in first plumage taken in the type locality on the same date; a male at Ikatut on August 24, 1937; and one at Balkh on September 5, 1937.

Compared with specimens of *orientalis:* winter migrants to Punjab in the University of Michigan Collection, and with winter birds from Syria, Tunis, and Russian Turkestan, and breeding birds of Russian and Chinese Turkestan, Persia, and Algeria in the collections of Mr. H. B. Conover and U. S. National Museum, and the Rothschild Collection, the male of this form has the spotting of the back and the edgings of the wing coverts more yellow, less ochraceous buff. The general tone of the ground of the back is paler, less black. The female is also paler with less black in the barring of the back and with a broad yellowish wash on the ends of many of the feathers.

Wing measurements: 3 ♂ 224–228; ♀ 235 mm.

Koslovae is described as differing from *orientalis* by paler breast in the female; *enigmaticus* by darker breast and also upper parts.

Syrrhaptes tibetanus pamirensis, new subspecies.

Type.—Male (wing 267 mm.), taken in June, Akbaital R., Pamirs, Am. Mus. Nat. Hist., No. 547727.

Topotype.—a female with the same data. Wing 260 mm.

Compared with a large series of topotypical specimens from Ladakh in the American Museum of Natural History and in my collection, among them 12 birds taken in late June and early July, the new race has a paler ground color and the broad tipping of the wing coverts is much paler. The breast is virtually white, not washed with buff. The black bars on the rectrices are narrower and there is more white on the tips. The light area on the inner webs of the inner primaries is more extensive.

Burhinus œdicnemus mayri, new subspecies.

Type.—Adult ♂ (wing 226 mm.), taken at Londa, Bombay Presidency, on January 26, 1938, by W. Koelz.

Topotypes.—5 specimens taken from January 20 to March 12, 1938.

Compared with specimens of *indicus* in the Rothschild Collection from Ceylon and Agra, these specimens are much more deeply colored, especially on the breast, neck, and under tail coverts, much as in *oedicnemus*. The brown of the back and crown is darker and the black streaking is heavier. The white of the wing coverts is duller and more restricted.

Wing measurements:

mayri, 2 ♂ 210, 226; 4 ♀ 208–217.5 mm.

indicus, 15 specimens 205–220 (225), ex Hartert.

A female taken on March 12 was incubating.

Lobivanellus indicus lankae, new subspecies.

Type.—Male (wing 209 mm.), taken at Galgamuwa, Ceylon, on September 16, 1922, by D. E. Goonewardine; U. M. M. Z. No. 63888.

Paratypes.—one specimen from the same place, and one from "Ceylon" in the Michigan University Collection, and one from "Ceylon" in the Rothschild Collection.

Compared with eight topotypical specimens of *indicus* in my collection from Londa, Bombay Presidency, on the Goa frontier, this form has a much shorter wing; the black of the hind neck extends farther toward the body; the vinous cast of the back is stronger.

Wing measurements:

lankae, 3 ♂ 201–209; ♀ 204 mm.

indicus, 4 ♂ 218–229; 4 ♀ 212–232 mm.

Vol. 52, pp. 83–84 June 5, 1939

PROCEEDINGS
OF THE
BIOLOGICAL SOCIETY OF WASHINGTON

THREE NEW BIRDS FROM PARAGUAY.

BY PIERCE BRODKORB.

This is the eighth preliminary paper on Paraguayan birds collected by Alberto Schulze for the University of Michigan Museum of Zoology. Thanks to the kindness of the authorities of the U. S. National Museum, I was recently able to compare two of the birds described here with the series in Washington.

Milvago chimango azarae, subsp. nov.

Type.—UMMZ No. 93198; ♂ ad.; 25 kilometers east of Rosario, Paraguay; June 2, 1937; Schulze and Loesch, orig. no. 3706.

Characters.—Similar to *Milvago chimango chimango* (Vieillot), of Argentina and Chile, but smaller; pileum, back, and upper wing coverts darker and more sooty (less reddish brown); hind neck and sides of neck darker and grayer; light bars on upper tail coverts with much less rufous, the dark bars blacker; breast and abdomen much darker and sootier (less reddish brown) and with the shaft streaks blackish instead of brown; under tail coverts dull pinkish white instead of pale buff or plain white; dark areas of wings and tail more blackish brown.

Wing ♂ 264, ♀ 279; tail ♂ 150, ♀ 161; culmen from cere ♂ 18.5, ♀ 19.5; tarsus ♂ 57, ♀ 59; middle toe ♂ ♀ 33.5 mm.

Remarks.—Vieillot's *Polyborus chimango* was based on Azara, who says that this hawk is rare in Paraguay but common on the Rio de la Plata. I accordingly accept the latter place as type locality of *chimango*.

Four specimens of *Milvago chimango chimango* (both sexes) from Buenos Aires (Quilmes), Rio Negro, Neuquen, and Chile measure as follows: wing 282–312; tail 170–186; culmen from cere 18.5–20.5; tarsus 55.5–59.5; middle toe 35–37 mm.

Rhinocrypta lanceolata saturata, subsp. nov.

Type.—UMMZ No. 96265; ♀ ad.; Kilometer 170, west of Puerto Casado, Paraguay; February 11, 1938; Schulze and Lopez, orig. no. 5391.

Characters.—Similar to *Rhinocrypta lanceolata lanceolata* (I. Geoffroy-St. Hilaire) of western Argentina, but back darker and more brownish; rump and upper tail coverts much darker, light olive brown rather than

buffy grayish olive; tail blacker; breast a little darker gray; white of posterior underparts less pure and more restricted laterally (i. e. narrower); crissum much darker olive brown, less grayish olive; bill longer and more robust (culmen 17.5 mm., against 16–16.5 mm. in *lanceolata*).

Material examined.—*R. l. saturata*—2 from the type locality. *R. l. lanceolata*—Rio Negro: General Roca 4; Mendoza: Las Cortitas 1, Potrerillos 1, Mendoza 1; Santiago del Estero: Corral 1; "Pampas Argentinas" 1.

Turdus rufiventris chacoensis, subsp. nov.

Type.—UMMZ No. 93731; ♂ ad.; Kilometer 195, west of Puerto Casado, Paraguay; August 29, 1937; Schulze and Lopez, orig. no. 4367.

Characters.—Similar to *Turdus rufiventris rufiventris* Vieillot of southern Brazil to eastern Argentina, but above more grayish olive, less buffy; throat on average whiter; breast more pearly gray, less buffy.

Differs from *Turdus rufiventris juensis* (Cory), of northeastern Brazil, in being darker above and much less buffy on the breast.

Material examined.—*T. r. chacoensis*—Paraguay: Kilometer 195, west of Puerto Casado 2; Kilometer 80, west of Puerto Pinasco 1. *T. r. rufiventris*—Bahia 1; Sao Paulo: Itatiba 1; Rio Grande do Sul: Quinta 1; "Brazil" 2. East Paraguay: near Horqueta 5, near Rosario 4, Sapucay 1, Rio Parana 2, unspecified 1. Uruguay: San Vicente 3. Buenos Aires: Lavalle 2, Conchitas 4, Quilmes 1. Chaco Territory: Resistencia 1, Las Palmas 1. Tucuman: Tafi Viejo 1. *T. r. juensis*—Cera: Larvas 1.

Vol. 52, pp. 85–88 June 5, 1939

PROCEEDINGS
OF THE
BIOLOGICAL SOCIETY OF WASHINGTON

RARE FISHES OFF THE ATLANTIC COAST INCLUDING A NEW GRAMMICOLEPID.

BY J. T. NICHOLS[1] AND F. E. FIRTH.[2]

The junior author has been in close touch with fishermen who land their catches at the Boston market, and who, realizing his interest, frequently bring rarities to him. Three such are as follows.

Scymnorhinus lichia (Bonnaterre).

An individual of this shark taken 178 miles east-by-south of Boston Light Vessel on the northern edge of Georges Bank in 50 fathoms of water, August 19, 1937, by the Steamer Illinois' mate (J. J. Moran) seems to be the first American record for this species of eastern Atlantic and Mediterranean waters. It may perhaps be taken as further evidence of the tendency we have mentioned elsewhere for fishes with Mediterranean affinities when they occur in American waters to do so on the continental slope. This specimen measured 5 ft. 1 in. (approx. 1550 mm.) in total length and weighed 23½ lbs. fresh with the viscera removed.

Xenolepidichthys americanus, new species.

Description of type.—No. 14107, American Museum of Natural History, from some 220 miles east-south-east of Boston Lightship at the outer edge of Georges Bank, July 17, 1938, collected by Captail Gil Lafford of the schooner "America."

Length to base of caudal, 100 mm. Depth in this length, 1.3½; head, 3.5; longest anal spine, 1.3½; caudal, 2.2. Eye in head, 2.4; snout, 3; interorbital, 3.5; greatest width, 2.5; depth of peduncle, 3.5; pectoral, 1.7; ventral, 1.8; first dorsal spine, 1.2; longest dorsal ray, 2.6; longest anal ray, 2.4. Maxillary in eye, 2; second anal spine, 3.5.

Dorsal rays, V, 33; anal II—34. Scales crossing lateral line, about 110. Gill-rakers, about 20, short and close spaced.

Body deep and strongly compressed, irregularly diamond shaped, slanting upward to origin of dorsal and downward to origin of anal below

[1] Amer. Museum Natural History.
[2] U. S. Bureau of Fisheries.

it, then backward to the upper and lower bases of caudal peduncle. The lower angle of the body is about twice as far below the line through snout, eye and peduncle, as the upper angle is above it. Eye large, mouth small and oblique, with a single row of small, slender, curved, conical backwardly directed teeth in each jaw. Top of head broadened, with irregular spinigerous ridges on either side, depressed between them with a deep oval pit in its center above the front of the eye. A ridge above and behind the eye to a strong compressed spine at the upper angle of the opercle. Sides of the body with a number of horizontally flattened spines, some simple, others larger and compound, the largest on either side of the peduncle below the lateral line. These spines seem irregularly placed but mostly correspond on the two sides of the body. Along the upper and lower posterior ridges of the body, there are crests of small sharp irregular spines, at either side of the bases of dorsal and anal rays, also continuous for the considerable space between the second anal spine and first ray.

The ventral fin is placed low, a short distance before the anal, which it does not reach. Its spine is moderately strong, curved, serrate on the outer margin. The dorsal spines are weak and the rays all simple; the fin continuous but more or less divided, how deeply one can not say as the first two rays (or last two spines) are broken. The first dorsal and anal spines are similar, filamentous with a row of spinules both before and behind toward their bases; the anal, much the longer, extends to opposite the base of the

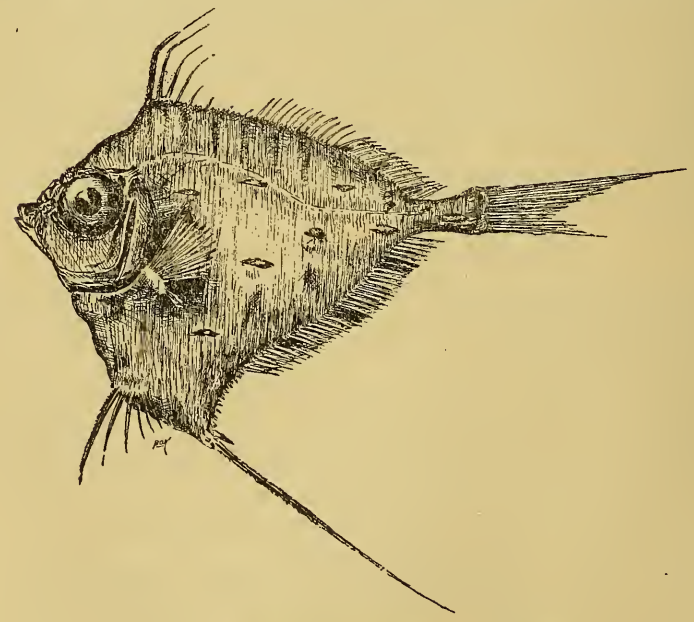


Fig. 1. *Xenolepidichthys americanus*, type.

caudal fin. The second anal spine is small, stiff, close behind the first, separated from the first ray by a distance equal to the diameter of the eye. The caudal is long, pointed, with some of the upper rays filamentous, the lower also lengthened to form a slight fork.

The scales are parchment-like, linear, vertical, much elongate, each marked with several more or less vertical and papillose ridges. They become shorter on the nape, relatively short and somewhat spinigerous on the peduncle, and are arranged cross-wise on the branchiostegal region. They are present on the head, except for its top, the snout and lower jaw which are scaleless. The lateral line is strongly arched in front and straight from about the middle of the body backward.

Color in alcohol pale with a series of dark marks on the mid-line of the back, and about 10 narrow dark bars extending downward from these to the level of the top of the eye. Further down on the sides there is a double lengthwise series of three or more very faint dark blotches. The flattened spines scattered over the body are blackish. Base of anal with a series of dusky blotches, and posterior part of caudal dusky.

This singular fish is so like *Xenolepidichthys dalgleishi* Gilchrist from South Africa that it seems best to describe it in that genus rather than to make it the type of another monotypic grammicolepid genus. Obvious differences consist of horizontally flattened spines scattered over the body, much longer anterior filamentous dorsal and anal spines, and a long pointed versus short approximately truncate caudal. The first two characters are such as are sometimes subject to intraspecific variation of one sort or another, and there is a possibility of a short caudal being derived from a long by breakage. One may not safely judge how distantly or how closely related this fish is to the South African form without comparing specimens of about equal size, but there can be little doubt that it is a different, well-marked, undescribed species.

The single specimen had been swimming about a swordfisherman for two days, was caught in a bucket, and presented to Mr. Firth at Boston. The name *americanus* seems appropriate as the schooner's name was "America," and nothing like it has been recorded previously from American waters.

Chaetodon aya Jordan.

A specimen of this rare butterfly-fish was taken in an otter-trawl net 8 miles southwest of Diamond Shoal Light Vessel, North Carolina, February 6, 1937; and was sent to Mr. Firth by fishermen who know these waters well, as something very new and strange to them.

Apparently the species is known previously only from small specimens taken in the Gulf of Mexico, the only definite record for it with which we are familiar being that of the type, 1½ inches long, from the stomach of a red snapper caught in rather deep water near Pensacola. The fauna from corresponding depths off the Carolinas may be more uniform with the bank fauna of the Gulf than would seem likely offhand.

Our specimen is a grown fish measuring 85 mm. in length to base of caudal. Depth in this length, 1.7, head, 2.9. Eye in head, 3.4; snout, 2.6;

interorbital, 3.6; depth of peduncle, 3.2; pectoral, 1.4½; ventral, 1.3; longest dorsal spine (3d), 1.0; longest anal spine (2d), 1.7; caudal, 1.7.

Dorsal rays, XIII, 19; anal, III, 15. Scales (following the course of the lateral line which numbers 27 or 28), about 37.

The snout is produced, narrow, with small mouth at its tip, forehead and chin concave, maxillary reaching about half way to eye.

Color in preservative pale, a black band from the first two dorsal spines to the eye, continued narrower and fainter from below the eye to behind the maxillary; a very broad black band from the 5th to 10th dorsal spines to the base of the anal; a narrow dusky stripe in the middle of the interorbital from over the center of the eye to the snout. Color notes when fresh give a dark spot on the upper corner of the opercle, faint dark blotch near the posterior margin of the spinous dorsal, back between the black bands, vertical fins and ventrals yellow.

Vol. 52, pp. 89–92 June 5, 1939

PROCEEDINGS

OF THE

BIOLOGICAL SOCIETY OF WASHINGTON

THE NAME OF THE BLESBOK.[1]

BY FRANCIS HARPER.

The name [*Antilope*] *albifrons* was proposed by Burchell (Travels Interior Southern Africa, vol. 2, p. 335, 1824) in the following words:

"The *Blesbok* is so called, from having a white mark on its forehead, similar to that which, in horses, is termed, in Dutch, a *bles*, and by English horsemen a *star*, or *blaze*. Late systematic writers have applied to the *Blesbok* the name of *Pygarga* (White-rump), which, by earlier authors, was intended for the *Springbok:* and as this name becomes absurd and contradictory when thus used, I have taken the liberty of substituting in its place, that of *albifrons*."

Like other early writers on South African mammals, Burchell did not distinguish between the Bontebok and the Blesbok, and it is obvious that he proposed *albifrons* merely as a substitute name for *Antilope pygargus* Pallas (1767) (modified to *A. pygarga* by Pallas in 1777). He makes this still clearer in the following passage from a later work (List Quadrupeds Brought by Mr. Burchell from Southern Africa 1817, p. 5, 1836 ?):

"Antilope Pygarga. (1.) Antilope albifrons of 'Trav.' vol. ii. p. 335. The *Blesbok* of the Colonists, and sometimes *Bontebok*. Shot near Zwellendam, on the 17th January, 1815, and the species is now become very scarce."

An apparent remnant of the above-mentioned specimen, which may be regarded as the type of *albifrons*, is listed by Lydekker and Blaine (Cat. Ungulate Mammals Brit. Mus., vol. 2, p. 35, 1914) among the specimens of *Damaliscus pygargus*, as follows: "644, *a*. Single horn. Swellendam (?), Cape Colony; collected 17/1/1815. *Presented by Dr. W. J. Burchell about* 1817."

1 The present communication is a by-product of an investigation of extinct and vanishing mammals, which has been sponsored by the American Committee for International Wild Life Protection and supported in part by a grant from the Penrose Fund of the American Philosophical Society.

The explanation given by Sclater and Thomas (Book of Antelopes, vol. 1, p. 80, 1895) for their acceptance of the name *albifrons* is not at all satisfactory. The locality indicated by Burchell—Swellendam—was inhabited only by the Bontebok, and not by the Blesbok (*cf.* Selous, in Bryden, Great and Small Game of Africa, pp. 175–177, 1899; W. L. Sclater, Mammals South Africa, vol. 1, p. 143, 1900; Selous, The Gun at Home and Abroad, the Big Game of Africa & Europe, pp. 83–84, 1914). Thus Burchell's name *albifrons* never did apply to any species but the Bontebok, and it must be discarded as a synonym of *Antilope pygargus* Pallas, which is currently placed in the genus *Damaliscus*.

Accordingly I propose for the Blesbok the name of

Damaliscus phillipsi, sp. nov.

Type.—No. 35443, Museum of Comparative Zoölogy; adult male, skin and skull (most of palate and left maxilla, and part of left mandible, lacking); Orange Free State; collected July 23, 1935, by P. Andreka; collector's no. 1958d.

Characters.—Very similar to *Damaliscus pygargus* (Pallas), but of a generally lighter color and without the prominent white rump-patch of the latter.

Description of type.—Face blaze extending from eyes to nostrils, two-thirds as wide as long, Cream Color,[2] with a Y-shaped mark, not sharply defined, of Cinnamon-Buff in the middle; a narrower, buffy white median stripe extending from the forehead, between the horns, to the occiput; a narrow (15-mm.) band of Chestnut at the level of the eyes separating the two light areas; rest of head and neck mainly Chestnut, with admixture of some whitish hairs, especially about the lips, eyes, and base of ears; color gradually changing on median dorsal area of neck to Sayal Brown; ears turned inside out in the tanned skin and not available for description; a broad median dorsal area of Rood's Brown extending from shoulders to rump, and gradually changing on sides to Vandyke Brown; a triangular rump-patch Auburn, with a narrow posterior border of white; tail black, with a few scattered white hairs; extreme base of tail Light Buff; under parts light Chestnut anteriorly, white posteriorly; legs mainly Sepia; a broad stripe of buffy white commencing on anterior side of foreleg above the knee and extending down inner side of lower leg to the hoofs; a similar stripe passing down front of thigh and inner side of hind leg below the hock to the pastern; a narrow strip of Ochraceous-Tawny hairs in the cleft above the front hoofs. Head and body, 1480 mm.; tail, 260; hind foot, 420; ear, 170; height at shoulder, 1020.

Skull extremely similar in size and proportions to that of *Damaliscus pygargus;* basilar length from tip of premaxilla to inferior lip of foramen magnum, 287; zygomatic width, 123; interorbital width, 78; greatest length of nasals, 132; maxillary tooth-row at alveolar border, 82. Teeth little worn.

[2] Capitalized names of colors according to Ridgway's Color Standards and Color Nomenclature (1912).

Horns averaging a little longer and stouter than in *D. pygargus;* longitudinal axes of basal parts of horns lying in a plane parallel to that of the upper surface of the frontals, whereas in *D. pygargus* they are inclined forward at a slight angle from this plane; horns diverging and also curving slightly backwards for about two-thirds of the length, then converging and curving slightly upwards to the tips; basal two-thirds somewhat compressed, with 13 more or less complete rings (most of them very prominent, especially anteriorly); apical third rounded; horns blackish, rings pale anteriorly. Length of horns along front curve, 385 (right) and 394 (left); basal circumference, 166 (right) and 165 (left); distance between tips, 204.

Remarks.—An adult female from Orange Free State (No. 35444, Mus. Comp. Zoöl.) is generally similar to the type male, but not quite so richly colored; face blaze buffy white, continuous with a stripe of the same color on forehead and crown[3]; ears covered with buffy white hairs, very short on external surface; triangular rump-patch Sayal Brown, with a narrow posterior border of white; under parts white, with a light Chestnut band across the chest and a narrow border of the same color on the lower flanks. Head and body, 1480; tail, 220; hind foot, 410; ear, 160; height at shoulder, 980. Length of horns along front curve, 308 (right) and 298 (left); basal circumference, 125 (right) and 120 (left); distance between tips, 147. Teeth somewhat worn.

In days long past the Blesbok "was an inhabitant of the plains to the south of the Orange River in the eastern part of the Cape Colony, and of all the open country to the north of that river in the territories now known as the Orange River Colony, the Transvaal and Bechuanaland" (Selous, *op. cit.*, p. 84).

The Blesbok is now extinct in the wild state, but some thousands of individuals are preserved on farms in Orange Free State and the Transvaal as well as in the Somerville Reserve in the former state. There is also a small herd in the Giant's Castle Game Reserve in Natal.

The species is named in memory of Dr. John C. Phillips, and in recognition of his efforts to conserve the dwindling mammalian faunas of the world for the benefit of posterity as well as of our own generation.

Specimens examined.—Besides the two specimens described above, the following material in the collection of the Academy of Natural Sciences of Philadelphia has been examined: a mounted head, a skull, and a set of horns purchased in Kimberley, Cape Province; a mounted head and a set of horns from "South Africa"; and two skins and skulls from the Zoological Society of Philadelphia.

[3] The continuity of these two whitish areas appears to be somewhat exceptional. Selous remarks (*op. cit.*, p. 84) that as a rule they "are separated by a band of brown of varying width."

Vol. 52, pp. 93–96 June 5, 1939

PROCEEDINGS
OF THE
BIOLOGICAL SOCIETY OF WASHINGTON

TWO NEW SHREWS FROM WEST-CENTRAL CALIFORNIA.

BY JACK C. VON BLOEKER, JR.
Los Angeles Museum.

In the summer of 1936, while trapping mammals in Monterey County, California, the writer procured a shrew of the *Sorex ornatus* group from the salt-marsh at the mouth of the Salinas River. Comparative examination of the specimen at the Museum of Vertebrate Zoology, Berkeley, California, indicated that it differed appreciably from other known Californian races of the group. It was therefore determined that an attempt should be made to obtain additional specimens for comparison. Subsequent field operations in the salt-marshes bordering Monterey Bay have proven successful and reveal the presence in that region not only of an hitherto unknown race of the *Sorex ornatus* group of shrews, but one of the *Sorex vagrans* group as well. These two new subspecies may be named and diagnosed as:

Sorex vagrans paludivagus, subsp. nov.

PALUSTRINE WANDERING SHREW.

Type.—♂ adult, skin and skull, no. 5053, Los Angeles Museum of History, Science and Art, from the salt-marsh at the mouth of Elkhorn Slough, Moss Landing, Monterey County, California, November 3, 1938, collected by Jack C. von Bloeker, Jr., orig. no. 9456.

Distribution.—In so far as known, confined to coastal salt-marsh areas in west-central California, from San Gregorio, San Mateo County, south at least to Seaside Lagoon, Monterey County. Probably also occurs in the salt-marshes on the seaward side of the San Francisco Peninsula as far north as Rockaway Beach, San Mateo County, and on the Monterey Peninsula as far south as Point Pinos, Monterey County.

Diagnosis.—A moderately large (see measurements), darkly colored,

long-tailed shrew of the *vagrans* group, pelage shining black dorsally and mouse gray ventrally, ears brown, tail unicolor, light seal brown; skull short and relatively broad in cranial region, narrow in rostral region.

Comparisons.—Compared with *Sorex vagrans vagrans*, larger in external measurements, color darker (winter-taken skins of *vagrans* being lighter in color than summer-taken skins of *paludivagus*); skull actually and relatively shorter and broader, palatal length and interorbital breadth greater, cranial height less. Compared with *Sorex vagrans halicoetes*, larger in external measurements, color darker (winter-taken skins of *halicoetes* average slightly darker than summer-taken skins of *paludivagus*); skull actually and relatively shorter, broader cranially and narrower rostrally, palatal length greater, maxillary breadth and cranial height less, maxillary tooth row shorter.

Color (using color terms from Ridgway, *Color Standards and Color Nomenclature*, 1912).—Type (in winter pelage): Dorsal hairs with basal portions dark neutral gray, extremely narrow subterminal bands ivory yellow, terminal portions black; ventral hairs slate color basally, tipped with deep mouse gray; hairs of ears bone brown; tail unicolor, hairs near light seal brown; hairs at base of vibrissae and vibrissae in basal two-thirds black, apical portions of vibrissae cinereous.

In summer pelage the hairs of the sides are bone brown in the subterminal bands, leaving a sharply defined darker dorsal band which approaches the dark coloration of the dorsal and lateral regions of winter-taken specimens; ventrally the hairs are tipped with clove brown, as opposed to the deep mouse gray of the ventral pelage of winter-taken specimens.

Measurements (in millimeters).—Averages and extremes of six adults (4 males and 2 females), including the type and five paratypes: Total length, 115 (113–118); tail, 46.5 (42–48); hind foot, 14.5 (14–15). Skull: Condylobasal length, 16.3 (16.1–16.5); palatal length, 6.6 (6.4–6.7); cranial breadth, 8.2 (8.1–8.3); height of cranium, 4.8 (4.6–4.9); ratio, height to breadth of cranium, 58.5%; interorbital breadth, 3.4 (3.2–3.5); maxillary breadth, 4.5 (4.4–4.6); maxillary tooth row, 5.6 (5.5–5.7).

Specimens examined.—Seven, from the following localities in California: **Monterey County:** Moss Landing, 2[1]; mouth of Salinas River, 2[2]; Seaside, 1[2]. **San Mateo County:** San Gregorio, 2[3].

Sorex ornatus salarius, subsp. nov.

SALINE MARSH SHREW.

Type.— ♀ adult, skin and skull, no. 81548, Museum of Vertebrate Zoology, from the salt-marsh at the mouth of the Salinas River, Monterey County, California, August 13, 1937, collected by Jack C. von Bloeker, Jr., orig. no. 8504.

Distribution.—In so far as known, restricted to the coastal salt-marshes and adjacent sandhill regions of Monterey and Carmel bays in Monterey

1 One in O. P. Silliman collection.
2 O. P. Silliman collection.
3 Museum of Vertebrate Zoology.

County, California, from Moss Landing south to Carmel and east to Sugarloaf Peak, near the northwest base of the Gabilan Range.

Diagnosis.—A small (see measurements), darkly colored, long-tailed shrew of the *ornatus* group, pelage sepia color dorsally and drab gray ventrally; tail bicolor, seal brown above, cinereous below; skull short and relatively broad; brain-case relatively low and flat-topped.

Comparisons.—Compared with *Sorex ornatus ornatus*, smaller in external measurements, color darker; skull shorter and relatively broader. Compared with *Sorex ornatus californicus*, external measurements longer, color darker; skull relatively broader and cranial height less. Compared with *Sorex ornatus relictus*, smaller throughout, color paler. Compared with *Sorex ornatus salicornicus*, tail shorter, otherwise averages larger throughout; pelage of summer-taken skins darker, of winter-taken skins paler. Compared with *Sorex sinuosus*, externally smaller, color paler; skull averages broader and higher cranially.

Color.—Type (in summer pelage): Dorsal hairs with basal portions slate color, subterminal bands sepia, apical portions black; ventral hairs slate color basally, broadly tipped with drab gray; tail bicolor, dorsal hairs of tail seal brown, ventral hairs of tail, hairs of upper surface of hind feet and nasal vibrissae cinereous.

In winter pelage the dorsal body hairs are more broadly tipped with black and the ventral body hairs are narrowly tipped with smoke gray.

Measurements.—Averages and extremes of nine adults (7 males and 2 females), including the type and eight paratypes: Total length, 97 (95–101); tail, 34 (32–35); hind foot, 12 (12). Skull: Condylobasal length, 16.3 (16.1–16.4); palatal length, 6.3 (6.2–6.5); cranial breadth, 8.2 (8.1–8.3); height of cranium, 4.6 (4.5–4.7); ratio, height to breadth of cranium, 56%; interorbital breadth, 3.3 (3.2–3.4); maxillary breadth, 4.6 (4.5–4.7); maxillary tooth row, 5.9 (5.7–6.0).

Specimens examined.—Ten, from the following localities in Monterey County, California: Moss Landing (salt-marsh), 2; mouth of Salinas River (salt-marsh), 3[4]; Point Pinos (salt-marsh), 2; Carmel (sandhills), 1[5]; mouth of El Toro Canyon (sandhills), 1[5]; Sugarloaf Peak, 3 miles north-northeast of Natividad (sandhills), 1[5].

Bibliography.

Baird, S. F.

1857. Mammals of North America; the descriptions of species based chiefly on the collections in the museum of the Smithsonian Institution. U. S. Pac. R. R. Expl. and Surv., **8** : i–xxxiv—1–764, 87 pls.

Grinnell, J.

1913. The species of the mammalian genus *Sorex* of west-central California, with a note on the vertebrate palustrine faunas of the region. Univ. Calif. Publ. Zool., **10** : 179–195, 6 figs. in text.

[4] Type in Museum of Vertebrate Zoology, two in O. P. Silliman collection.

[5] O. P. Silliman collection.

1932. A relic shrew from California. Univ. Calif. Publ. Zool., **38** : 389–390.

Jackson, H. H. T.

1928. A taxonomic review of the American long-tailed shrews (genera *Sorex* and *Microsorex*). U. S. Dept. Agr. Bur. Biol. Surv., N. Am. Fauna, **51** : 1–238, 13 pls., 24 figs. incl. 19 maps) in text.

Merriam, C. H.

1895. Synopsis of the American shrews of the genus *Sorex*. U. S. Dept. Agr., Div. Ornithology and Mammalogy, N. Am. Fauna, **10** : 57–124, pls. 4–12.

Von Bloeker, J. C., Jr.

1932. Three new mammals from salt-marsh areas in southern California. Proc. Biol. Soc. Wash., **45** : 131–138.

Vol. 52, pp. 97–98 June 5, 1939

PROCEEDINGS

OF THE

BIOLOGICAL SOCIETY OF WASHINGTON

A NEW APLOPAPPUS FROM THE DEATH VALLEY REGION, CALIFORNIA.

BY S. F. BLAKE.

Dr. Ivan M. Johnston has recently sent me for study two collections of *Aplopappus* made by Mr. M. French Gilman on the summit of Telescope Peak in the Panamint Mountains of California. They prove to represent, as Dr. Johnston suspected, a very distinct new species, which may be described as follows:

Aplopappus gilmanii Blake, sp. nov.

Suffrutex pedalis ramosus foliosus resinosus glaber; folia spathulata parva sessilia hamata acuta cuspidata 1-nervia epunctata; capitula mediocria apicibus ramorum solitaria vel 2–3 cymosa subsessilia vel lateralia breviter pedunculata radiata alba; involucri 5–6-seriati gradati 7–9 mm. alti phyllaria exteriora suborbicularia ad ovalia v. oblonga chartacea appendice subaequali lanceolata v. subulata herbacea squarrosa v. reflexa donata, intima oblonga chartacea obtusa v. apiculata; achenia dense erecto-pilosa.

Much branched undershrub "12–15 inches high, 20–24 inches broad"; branches divergent to erectish, the older with dark gray fissured bark, the younger yellowish- or greenish-white; leaves alternate, often with axillary fascicles, the internodes mostly 2–4 mm. long; blades spatulate, 6–8 mm. long, about 2 mm. wide, often conduplicate, coriaceous, light green, entire, resinous, the resin often aggregated in form of globules; branches or peduncles leafy essentially to apex, the heads subtended by 2 or 3 reduced leaves shorter than the involucre; heads slenderly campanulate, 8–12 mm. high, 9–12 mm. wide; disk 5–7 mm. wide; involucre 5–6-seriate, graduate, 7–9 mm. high, glabrous but resinous, the phyllaries 24–25, the 3–4 outer series with suborbicular or broadly ovate to oval or oblong-oval, chartaceous, whitish, 1-nerved base with narrower, subscarious, ciliolate margin, abruptly and subtruncately contracted into a longer to shorter, lanceolate to subulate, acuminate and weakly cuspidate, widely squarrose or reflexed, coriaceous-herbaceous appendage, the 2 inner series oblong, chartaceous throughout, obtuse or abruptly short-pointed, appressed,

without appendage; receptacle fimbrillate; rays 6, pistillate, white, spreading, the tube slender, 3.5–4 mm. long, puberulous chiefly above the middle with clavellate hairs, the lamina oval, 3-denticulate, 4-nerved, glabrous, 5–5.3 mm. long, 2.3–3 mm. wide; disk flowers 16–18, fertile, their corollas white, puberulous with clavallate hairs on lower part of throat, 7.2–7.5 mm. long (tube 2.2 mm., throat slenderly funnelform, 3.7–4 mm., teeth 5, triangular-ovate, erectish, 1–1.3 mm. long); achenes (not mature) subcylindric, 5-ribbed, densely erect-pilose, 3.2–3.8 mm. long; pappus of about 30–38 rather fragile whitish hispidulous bristles up to 6.5 mm. long, somewhat graduate, the outermost only 2.5 mm. long; style branches 2.3–2.6 mm. long, the lance-subulate appendage 1–1.3 mm. long, equaling or very slightly shorter than the stigmatic area; anther tips lance-subulate.

California: Summit of Telescope Peak, Panamint Range, Death Valley region, Inyo Co., alt. 3370 m. (11045 ft.), 25 Aug. 1938, *M. French Gilman* 3297 (type, Gray Herb.); same data, *Gilman* 3298 (Gray Herb.)

A species of the section *Asiris* of Hall, nearest *Aplopappus resinosus* (Nutt.) Gray of Oregon, Washington, and Idaho, which likewise is abnormal in the genus in having white corollas, but readily distinguished from it and the few related species by the conspicuous, abruptly narrowed, widely squarrose or reflexed herbaceous tips of all but the innermost phyllaries.

Vol. 52, pp. 99–100 June 5, 1939

PROCEEDINGS

OF THE

BIOLOGICAL SOCIETY OF WASHINGTON

A PLEISTOCENE PORPOISE (TURSIOPS SP.) FROM MARYLAND.

BY S. F. BLAKE.

On 3 July 1938 Mr. F. Stearns MacNeil and I discovered the remains of a porpoise in the lowest bed (Bed 1 of Mansfield)[1] of the Talbot formation of the Pleistocene at Wailes Bluff, St. Marys Co., Maryland. The material collected consisted of 1 middle and 2 anterior ribs and 9 vertebrae, approximately the 3d, 5th, and 11th dorsal, the 6th, 8th, 12th, and 13th lumbar, and the 1st and 2d caudal. All the bones were close together in the bank, except 2 vertebrae found on the beach close by, and obviously belong to a single individual. Mr. Gerrit S. Miller and Dr. Remington Kellogg have identified the specimen as *Tursiops* sp., near *T. truncatus* (Montague), but probably not identical with that species. The bones have been given to the United States National Museum (no. 15727, Div. Vert. Paleont.). A single anterior lumbar vertebra, presumably from the same individual, which I collected in October 1938 on the beach at essentially the same locality is in my own collection.

The remains of fossil porpoises of several other genera are common in the Miocene of Maryland, but no specimen has previously been found in the Pleistocene deposits of the State. In fact, the only Pleistocene porpoises (*Delphinidae*) recorded by Hay[2] from North America east of the Mississippi River are *Delphinapterus leucas* Pall. from Canada, *D. vermontanus* (Thompson) from Vermont and Canada, *Monodon monoceras* L. from Canada, and *Globicephala baereckeii* (Sellards) from Florida, the last attributed to the Pliocene or Pleistocene.

1 W. C. Mansfield, Notes on Pleistocene faunas from Maryland and Virginia and Pliocene and Pleistocene faunas from North Carolina, U. S. Geol. Surv. Prof. Paper **150** : 130. 1928.

2 Second Bibl. & Cat. Foss. Vert. East. N. Amer. (Carn. Inst. Publ. **390**) 2 : 586–595. 1930.

Vol. 52, pp. 101–104 June 5, 1939

PROCEEDINGS

OF THE

BIOLOGICAL SOCIETY OF WASHINGTON

A NEW SUBSPECIES OF PEROMYSCUS FROM THE NORTH SHORE OF THE GULF OF ST. LAWRENCE

BY C. F. JACKSON,

University of New Hampshire.

In 1935 and again in 1937 the north shore of the Gulf of St. Lawrence was visited for the purpose of collecting small mammals (Journal of Mammalogy, Vol. 19, No. 4, Nov. 14, 1938, pp. 429–434). The region covered extended from the Bay of Seven Islands eastward to the vicinity of Cape Cormorant. A white footed mouse of the *Peromyscus maniculatus* group was everywhere abundant and a total of 67 specimens was collected. A comparison of this series with specimens of the described subspecies shows several striking and constant differences. This form may be described as follows:

Peromyscus maniculatus plumbeus, subsp. nov.

Lead colored white footed mouse.

Type.—From Pigou River on the north shore of the Gulf of St. Lawrence, Province of Quebec. Spec. No. 265/332, adult male, skin and skull, University of New Hampshire Museum; collected by H. W. Jackson in runway, edge of tall grass in ravine near mouth of Pigou River, September 5, 1937.

Distribution.—From Pigou River westward to the Bay of Seven Islands. Limits of range unknown.

General characters.—A dark form without pronounced dorsal stripe and with the ventral pelage light plumbeous or cinereous[1] rather than white or yellowish-white as is true of all other described northeastern subspecies. Total length of skull and nasals shorter than in described northeastern subspecies.

Color of type.—Above blackish slate in mid-dorsal region, changing

1 Color terms used from Ridgway's *Nomenclature of Colors.*

gradually to slate color along the sides, the entire upper pelage being faintly intermixed with dark drab gray. No distinct dorsal stripe present, the upper pelage being nearly of the same color throughout. Ears slate black, distinctly edged with white. Base of whiskers and orbital region black. Tail strongly bicolored, blackish slate above and cream beneath. A tuft of white hair shows on either side of the tail. The feet are cream color with a tuft of white hairs at the base of each claw. Ventral pelage light plumbeous or cinereous with slate gray showing through, resembling in this respect immature *Peromyscus*.

Color variation.—In the series of 67 specimens no measurable color variations of the ventral pelage could be detected, but some slight variation in the intensity of the dorsal pelage was noted, the type falling almost exactly midway between the two extremes. The chief variation consisted in the amount of intermixing of drab gray or drab with the slate color. At one extreme the pelage varied from slate black to slate gray with little drab intermixture; at the other, the darker slate was more or less overlaid with drab. Looking at the series of skins there was little indication of brown or umber so common in many of the other northeastern subspecies.

Young in juvenile pelage.—Slate black in middorsal region fading to slate gray along sides with only a vague line of demarcation between the sides and the cinereous ventral pelage. Tail blackish slate above, cream beneath. Feet somewhat darker than in adult. Ears slate black edged with white.

Skull.—In general the skulls of northeastern *Peromyscus* are unsatisfactory for purposes of diagnosis of the subspecies. However, the present form is distinctly different from any of the northeastern subspecies in several regards. Comparing measurements with those given by Osgood (North American Fauna No. 28, *Revision of the Mice of the American Genus Peromyscus*, Osgood, Wilfred H., 1909, p. 263), the total length is considerable less, zygomatic breadth generally so (except in *Peromyscus maniculatus gracilis*) and nasals distinctly less than in any other adjacent subspecies. Although a difficult character to measure, the skull appears lighter than in the other forms.

Measurements.—Type No. 265/332, adult male—length, 177; tail, 90; hind foot, 21.0. Skull: total length, 24.0; zygomatic breadth, 12.0; interorbital constriction, 4.0; nasals, 9.2; shelf of bony palate, 4.0; palatine slits, 4.9; maxillary tooth row, 3.6.

The average body measurements of ten males are as follows: total length, 175.7; tail, 87.8; hind foot, 20.7, and of ten females: total length, 181.2; tail, 91.2; hind foot, 20.8.

The average skull measurements of five males and five females are as follows: total length, 24.5 (male 24.0 to 24.8), (female 24.8 to 25.1); zygomatic breadth, 12.4 (male 12.0 to 12.8), (female 12.5 to 13.0); interorbital constriction, 4.0 (male 3.8 to 4.0) (female 3.9 to 4.3); nasals, 9.6 (male 9.1 to 9.9) (female 9.3 to 10.3); shelf of bony palate, 4.0 (male 3.9 to 4.0) (female 4.0 to 4.3); palatine slits, 5.1 (male 4.9 to 5.5) (female 5.0 to 5.3); maxillary tooth row, 3.9 (male 3.6 to 4.1) (female 3.9 to 4.4).

Comparison with other northeastern subspecies.—A large number of specimens of *Peromyscus maniculatus* have been examined through the courtesy

of Dr. Glover M. Allen who allowed me to study all of the material in the collection of the Museum of Comparative Anatomy which includes a large series from the east coast of Labrador as well as the material from the Bangs collection of Labrador mammals. Specimens of *Peromyscus* were also examined from the National Museum (courtesy Dr. H. H. T. Jackson) and from the American Museum (courtesy Dr. H. E. Anthony). These, however, are not included below except where noted. The following observations are made in the light of these studies.

Peromyscus maniculatus plumbeus, subsp. nov.

Total number of specimens examined, 67 from the following localities: mouth of Moisie River, 19; Seal House Cove, 1; Point St. Charles, 14; Seal River, 20; Pigou River, 13. All are located in the collection of the University of New Hampshire.

Peromyscus maniculatus maniculatus (Wagner).

Total number of specimens examined, 95 from at least eleven different localities on the east coast of Labrador. Differentiated from the present form by the distinctly yellowish color of the ventral pelage. The dorsal pelage is much browner in color. The demarcation between the upper and lower pelage is much more distinct. Several specimens from the Hudson Bay region labeled *Peromyscus maniculatus maniculatus* were much lighter and browner in color with white ventral pelage.

Peromyscus maniculatus gracilis (Le Conte).

Total number examined, 54 from at least eighteen different localities. Russet or cinnamon brown rather than slate above with a more distinct dorsal stripe, and ventral pelage snow white or white tinged with yellow.

Peromyscus maniculatus abietorum Bangs.

Total number of specimens examined, 38 from at least six different localities in Nova Scotia and New Brunswick. Dorsal pelage much browner, ventral pelage white or yellowish, not slate gray. Demarcation between upper and lower pelage much more distinct.

Peromyscus maniculatus argentatus Copeland and Church.

Two specimens examined from Grand Manan Island (topotypes). Dorsal pelage approaching that of *Peromyscus maniculatus plumbeus* but more mixed grayish brown in color, ventral pelage white or tinged with yellow.

Peromyscus maniculatus eremus Osgood.

Three specimens examined (topotypes) from Magdelen Islands (courtesy of Dr. H. H. T. Jackson). Dorsal pelage russet brown, ventral pelage creamy white.

Peromyscus maniculatus anticostiensis Moulthrop.

Twenty-two specimens examined. (James Bay, 17, courtesy of Dr. Allen; Fox Bay, 5, courtesy of Dr. Philip N. Moulthrop, Cleveland Museum of Natural History). Dorsal pelage more brownish to grayish brown tinged with ochraceous, ventral pelage white or yellowish white.

Remarks.—No specimens of *Peromyscus maniculatus* from the north shore of the Gulf of St. Lawrence have been found by me in any of the museum collections examined. A comparison of 67 specimens with representatives of all of the northeastern subspecies indicates that the light plumbeous or dark cinereous ventral pelage, the blackish slate or slate color dorsal pelage washed with drab gray, and the short skull and nasal bones are diagnostic characters of *Peromyscus maniculatus plumbeus.*

Vol. 52, pp. 105–112 June 24, 1939

PROCEEDINGS
OF THE
BIOLOGICAL SOCIETY OF WASHINGTON

TWO NEW RACES OF *CARPODACUS MEXICANUS*.[1]

BY ROBERT T. MOORE.

During the course of work on a Review of the Subgenus *Burrica*, a comparison of nearly fifteen hundred specimens, assembled through the courtesy of the curators of the major museums of the United States and the British Museum, has convinced the author that Ridgway's dictum (Birds of North and Middle America, Part I, p. 138 footnote) that "variation in the extent of the red is not geographical" in *Carpodacus mexicanus frontalis*, is no longer tenable. It is obvious Ridgway did not suspect the relatively tremendous effect of wear on both the extent and coloration of male House Finches, a process which has been fully understood only in recent years. (See Grinnell, 1911, Univ. Cal. Pub. Zool., Vol. 7, No. 4, pp. 179–195; H. M. and J. R. Michener, Condor, 1931, Vol. XXXIII, pp. 12–19; Moore, 1936, Condor, Vol. XXXVIII, pp. 203–208.) One of the proofs of this is Ridgway's description under *Carpodacus mexicanus roseipectus* (op. cit. p. 133) of two males from Huajuapam, Oaxaca, as "darker" than *C. m. mexicanus*, when they are in fact merely early (Nov. 18th) winter plumage males of true *mexicanus*, which, like all House Finches, are always "darker" in November plumage. Instead of segregating his birds according to "extent of red," he should have segregated them according to stage of wear, into at least four separate groups in each area and compared only similar groups.

Analysis of a much larger series, based upon a more exact knowledge of the processes of molt (See the Micheners, op. cit.), indicates that *Fringilla frontalis* Say is a composite of four races, (1) the bird of north-central Colorado, north of the Arkansas River and east of the Divide, which J. D. Figgins

[1]Contributions from the California Institute of Technology.

described as *Carpodacus frontalis smithi;* (2) true *frontalis*, restricted to the birds of Colorado, south of the Arkansas River and west of the Divide, to Kansas, Oklahoma, New Mexico and extreme eastern Arizona; (3) an unrecognized paler race of the Great Basin and (4) a darker, more extensively red race on the west coast. These last two are described herewith.

A complete understanding of the affinities of these two proposed races and their relation to other forms of *Burrica* can be obtained only by a study of all the races of northern Mexico, as well as of the islands off the Pacific Coast. This, the author has undertaken in his Review of *Burrica*, which is now in the hands of the publisher. It would take too long to repeat the evidence given therein, by which the author concludes that *frontalis* shows closest affinity with *smithi* to the north and with the races of the Mexican Plateau, associated in a closely related company, which he has termed the Plateau Group. In a similar way the undescribed Great Basin race reveals affinities with *ruberrimus* and *rhodopnus* of the coastal plains about the Gulf of Lower California, which he has termed the Western Desert Group, while the California form belongs with the darker races of the islands off the Pacific coast, *clementis*, *mcgregori* and *amplus* in the Marine Group.

I conclude this introduction briefly by saying that *sayi* J. D. Figgins (Figgins, Proc. Col. Mus. Nat. Hist., Vol. IX, No. I, April 22, 1930, p. 3) is a synonym of *Fringilla frontalis* Say; that *Pyrrhula inornata* Vigors is revealed by an examination of the Latin description not to be a House Finch, but probably one of the Purple Finches. These two names, as well as others, are discussed fully in the above-mentioned Review of *Burrica*.

In order to save space, and at the same time to show clearly the localities, from which the vast number of specimens have been examined, I am listing them in a briefer way, but still giving the essential facts. I protest the present tendency of describers to omit the exceedingly important data on which their findings are based. Without knowledge of the localities from which specimens were examined, a later investigator in the same field finds himself confronted with a mere "opinion" and has no way of ascertaining whether that "opinion" was based on sufficient and comprehensive factual data, or not.

Where reference is made to the "five inch rainfall area,"

it indicates the mean annual rainfall from zero to five inches, whereas "ten inch" designates the rainfall from five to ten inches. The word "red" is a general term indicating various shades and tints of that color.

Carpodacus mexicanus solitudinis, subsp. nov.

DESERT HOUSE FINCH.

Type.—Male adult, No. 22858, collection of Robert T. Moore; Fallon, Nevada; April 3, 1939, collected by Ray Alcorn and Robert T. Moore.

Subspecific characters.—Nearest in its affinities to *C. m. ruberrimus* of Sonora, but red less extensive, ground color slightly whiter and size larger.

Resembling *C. m. frontalis* in size, it differs in the winter plumage, having the upper parts more Drab[2] (less gray) above, with even less suffusion of red, if any, the red being confined to the rump, forehead and superciliary streak even in the winter plumage; the crown and occiput being Brownish Drab streaked with darker, paler above in nuptial plumage; ground color of posterior under parts whiter, often pure white; streaking finer; red of anterior under parts less extensive; in worn nuptial plumage ground color of under parts much whiter than in corresponding plumage of *frontalis*, generally pure white; streaking finer and suffusion of red on upper parts, except forehead and rump, obsolete or rarely present.

Range.—*Solitudinis* expresses itself most clearly in the extreme arid desert conditions of Nevada, where the mean annual rainfall is less than five inches, but it extends into areas where the rainfall is from five to ten inches in Nevada, the extreme arid portions of Mono and northern Inyo Counties, California, southeastern Oregon, southern Idaho, southeastern Washington from Wallula to Walla Walla, possibly to Yakima Valley of Washington and the Okanagan Valley of Washington and British Columbia.

I do not know what form the House Finches of the Okanagan Valley in northeastern Washington and the region about Penticton, British Columbia represent. Mr. S. J. Darcus informs me they breed at Penticton, but no specimens have been taken. They occupy a tongue of the Arid Temperate Zone, having a mean annual rainfall of ten inches or less. Thanks to the courtesy of Miss Flauhaut, the fine series from Kiona, Gibbon and Wenatchee, southeastern Washington, have been examined. All are winter plumage birds, except two. Not very close to *solitudinis*, they have its pale ground color, but are more suffused with red above, more extensively red below and buffy on the sides. They may be intergrades with the unknown birds of Victoria, B. C. Birds of Death Valley, California, are slightly more extensively red below, but have just as pure a white ground color and are closer to *solitudinis*

Specimens examined.—Solitudinis: 5 ♂ 2 ♀ from S. E. WASHINGTON; Wallula, Walla Walla. 11 ♂ 7 ♀ from E. OREGON: Millers, Moro, John Day River, Hart Mt., Adel, Plush, Steen Mts., Beulah, Vale, Ontario, Hermiston.

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

3 ♂ 1 ♀ from S. IDAHO: Riddle, Payette, Pocatello. 31 ♂ 14 ♀ from NEVADA: Fallon (Type), Pyramid Lake, Truckee River, near Wadsworth, Virginia Mts., Virgin Valley, Quinn River, near Pine Forest Mts., Carson City, Yerington, Kingston Creek, Millet, Crystal Springs, Indian Springs, Charleston Mts., St. Thomas. 8 ♂ 1 ♀ from CALIFORNIA: Mono Lake, Keeler, Shoshone, Triangle Spring, Furnace Creek Ranch. Unknown intergrades: 17 ♂ 15 ♀ from WASHINGTON: Zillah, Wenas Valley, Yakima, Gibbon, Kiona, Wawawai, Wenatchee. Intergrades with birds of CALIFORNIA: 1 ♂ from S. OREGON: Klamath Falls. 24 ♂ 6 ♀ from CALIFORNIA: Tule Lake, Warner Mts., Goose Lake, Alturas, Sugar Hill, Vinton, Cannell Meadow, Whitney Meadow, Planada, Sweeney's Ranch, Isabella, Waltham Cr., Ft. Tejon, near Palmdale, San Jacinto Mts., Lower Palm Canyon, Cabazon, Banning, San Gorgonio Pass, S. Palo Verde, Foot of Coast Range Col. Desert. Intergrades with *C. m. frontalis*: 5 ♂ 4 ♀ from UTAH: Salt Lake City, Great Salt Lake, Provo, Iron City, Washington, Antelope Is.; 2 ♂ from N. W. ARIZONA: Grand Canyon, above Big Williams River. Intergrades with *ruberrimus:* 13 ♂ 5 ♀ from S. E. CALIFORNIA: Potholes, Laguna, Bard, Kane Spring, Mellon; 1 ♂ from S. W. ARIZONA: below Cibola; 9 ♂ from SONORA: El Doctor, Saric; 7 ♂ 2 ♀ from N. E. LOWER CALIFORNIA: Cerro Prieto, Las Palmas Canyon, El Cajon Canyon.

Remarks.—If my concept of this race is correct, its paleness above and white coloration below are due to the excessive aridity and other meteorological factors of the Great Basin, which reach their extreme manifestation in the very portions of Nevada and eastern California, where *solitudinis* is found in its best expression. The low humidity, large number of days with continuous sunshine, purity of the air, rapid evaporation and great diurnal variation may all have exercised an influence. From the five-inch rainfall area of western Nevada arms of the ten-inch area extend into the surrounding States. By means of this area, as well as parts of the fifteen-inch area, *solitudinis* inosculates with other races northwest, south and east of it. For example, specimens from localities in the lower San Joaquin Valley, where the mean annual rainfall (U. S. Dept. Agr. Weather Bureau 1930, Climatic Summary, Sec. 19) ranges from 5.37 to 8.21 inches, have the posterior under parts much whiter than birds of the same nuptial plumage from northwestern California, where it ranges from 24.69 to 109.45 inches at the various meteorological stations. This ten-inch area is separated from the ten- and five-inch areas of eastern California and Nevada by a narrow strip of the fifteen southeast of Bakersfield. The Cannell Meadow and Whitney Meadow males are probably summer wanderers to higher altitudes from this region, having the posterior under parts white. Similar groups of white-bellied individuals are found on all sides of *solitudinis*, for example in northeastern Oregon, Yakima Valley of southern Washington, southeastern Idaho, northeastern California (Modoc County), Imperial Valley and northwestern Arizona, all of them in five- or ten-inch rainfall areas, except the Modoc County birds. The three stations there, which surround our bird-localities, range from 10.6 to 12.43 inches. The presence of breeding birds at Penticton, British Columbia, was discovered by Mr. S. J. Darcus and corroborated later by Major Allan Brooks, who

writes he has "seen the birds and their nest in the orchards." Apparently House Finches are pushing gradually northward, for this occurrence, like the one in Victoria, B. C., representa a recent extension of range.

On the other hand, the restricted amount of red, found to the same degree in no other race, except *C. mexicanus mexicanus* of extreme southern Mexico, is probably due to a totally different set of factors, possibly heritable. As we proceed south from Nevada into California and Arizona we find this red becoming more extensive, so that even the birds of the five-inch rainfall area in Death Valley, although maintaining the other characters of *solitudinis*, including pure white ground color, are more expansively red.

Carpodacus mexicanus grinnelli,[3] subsp. nov.

GRINNELL'S HOUSE FINCH.

Type.—Male adult, no. 19226, col. Mus. Ver. Zool., Univ. Calif.; Scott River, 6 mi. N. W. of Callahan, Siskiyou Co., Calif.; June 11, 1911, collected by A. M. Alexander.

Subspecific characters.—Nearest to *C. m. clementis* Mearns, but bill smaller; in adult males, particularly in nuptial plumage, ground color of posterior under parts and sides slightly less buffy and streaks narrower; adult females less Drab, more Drab-Gray above; ground color of under parts decidely less buffy; streaks Hair Brown, rather than Drab, and narrower.

Of the same size and resembling *Carpodacus m. frontalis* of Colorado, adult males differ in winter plumage in having the upper parts darker, prominently suffused with Victoria Lake; the crown more solidly red, varying from Vandyke Red on the forehead to Victoria Lake on the crown and occiput; red of under parts both in winter and worn nuptial plumage, averaging somewhat more extensive both above and below; ground color of posterior under parts in Winter Plumage more buffy, rather than gray; Pale Pinkish Cinnamon to Pinkish Buff, whiter in worn nuptial plumage, but still with a pinkish suffusion lacking in *frontalis;* in both plumages and sexes more narrowly streaked below.

Differs far more from *solitudinis*, adult males being more extensively red above and below in all plumages; ground color of posterior under parts more pinkish buff in winter plumage, less whitish in nuptial plumage; streaking wider. Females darker above, less whitish ground color below.

Range.—Expresses its characters most markedly in the forty to eighty inch rainfall areas (U. S. Dept. Agri., 1922, Atlas of Amer. Agric., Climate, Precipitation, pp. 6–7) of the Transition Zone of southwestern Oregon and northern California; thence it extends south throughout the Upper Sonoran Zone, except in northeastern California and the Mono Lake region, also into portions of the Lower Sonoran Zone, to the San Pedro Martir Mountains and the northwestern coast of Lower California, as far as latitude

[3] It is peculiarly fitting that California's best-known bird should bear the name of the distinguished ornithologist, whose recent passing makes us realize how much Californian ornithology is indebted to him.

28°; also on the Farralone Islands, the northern members of the Santa Barbara group, the Todos Santos and Cedros Islands.

Remarks on Range.—In the southern part of its range, *grinnelli* is represented on the mainland from approximately Santa Cruz south by birds, which on the average have whiter ground color and the back and occiput less suffused with red and this color slightly less extensive on the posterior under parts, particularly in the nuptial plumage. But they are closer to *grinnelli.* Some males have the red less extensive during the first year than during the second and third years (Micheners, 1931, op. cit. p. 17), but these individuals have been carefully considered in statements made throughout this paper. Undoubtedly the presence in southern California of some extensively red winter birds can be explained as migrants from the north, but I have inspected a June 14th male (Dickey Col. No. 26946) from El Monte, and a June 8th male (M. V. Z. Col. No. 11583) from Riverside, which almost precisely match northwestern birds.

In sections of the Lower Sonoran Zone of California, apparently where the mean annual rainfall is approximately not much more than ten inches, such as in the region from Riverside to Santa Ana, *grinnelli* seems to be the resident form, but where it is less than ten inches, such as in the deserts of the southeast, the southern part of the San Joaquin Valley, and even in the restricted ten-inch rainfall areas of southwestern San Diego County, a varying series of intergrades occur, most of them closer to *solitudinis,* showing at least the whiter ground color of the posterior under parts, noticeably in the nuptial plumage.

In the north, the few specimens available from Curry County to Sam's Valley, Jackson County, Oregon, are *grinnelli,* but eastwardly at Klamath Falls, Oregon, and Tule Lake, California, we find intergrades with *solitudinis.* Generally, the birds east of the Cascades are either intergrades or true *solitudinis;* west of the Cascades very few specimens have been taken. One female in the collection of Stanley G. Jewett, secured March 21, 1932, at Forest Grove, Washington County, probably should be classed as *grinnelli.*

The subspecific identity of the breeding House Finches at Victoria, British Columbia (Cowan, Condor, Vol. XXXIX, p. 225), can not be determined by the nestling, kindly loaned by Mr. Cowan. I am listing them tentatively as *grinnelli.* The following quotation from Mr. Cowan's letter indicates this is not a sporadic occurrence, but seems to portend a permanent annexation of new territory: "Last summer I kept close watch and was able to locate six singing males in various parts of this city." Its presence in this Humid Transition Zone would indicate its affinity with *grinnelli.* In view of the above record, it is rather strange that the House Finch has not been taken in western Washington, west of the Cascades (Kitchen, Northwest Fauna Ser., No. 1, Feb., 1934, p. 19). Mr. Kitchin confirms this in a letter of March 3, 1939.

Specimens examined.—1 ♂ 1 ♀ (nestlings) from Vancouver Is., B. C.: Victoria. 6 ♂ 3 ♀ from western and southwestern Oregon: Forest Grove, Pistol River, Medford, Sam's Valley, Central Point. 54 ♂ 32 ♀ from California: near Callahan (includ. Type), N. E. Mt. Shasta, Maytem,

Eureka, above Ruth, near Baird, mouth Battle Creek, Paine's Creek, near Red Bluff, Petaluma, Nicasio, San Geronimo, San Francisco, Ingleside, near Giant, near Albany, Oakland, Arroyo Mocho, West Berkeley, Mt. View, Palo Alto, Sacramento, Stockton, Grass Valley, Santa Cruz, Pacific Grove, Monterey, Dudley, San Benito Mt., Trout Creek, Tipton, Bodfish, Santa Barbara, Santa Cruz Is., Santa Rosa Is., San Miguel Is., Ventura, Ojai Valley, Alamitos Bay, Pasadena, El Monte, Alhambra, San Pedro, Palms, Los Angeles, Glendora, Long Beach, Covina, Pomona, near Culver City, Ontario, Riverside, Santa Anita River bottom, Lemon Grove, Torrey Pines, Jamul Creek, Dulzura, Jacumba, Campo, Mountain Spring, Battle Creek. 8 ♂ 1 ♀ from northern Lower California: Mission St. Maria, Valladares, San Pablo, El Medano, San Telmo, north end Cedros Is.

Remarks.—Although we are still in doubt as to the racial identification of the birds of northeastern Washington, the unbroken continuity of the white-bellied birds from eastern Oregon and Nevada through southeastern California to northeastern Lower California, indicate that the ranges of *grinnelli* and *frontalis* are separated, and that the area between is occupied by *solitudinis*, a bird which is far more different from either than *grinnelli* is from *frontalis*. In spite of the nearer approximation of the characters of *grinnelli* and *frontalis*, it is possible to differentiate them immediately. Three groups must be kept separate, the freshly-molted fall birds from September to approximately November 10th, the winter birds from the latter date to March 1st and the worn nuptial plumage birds from April 1st to June 15th. Ridgway's failure to realize the importance of this segregation accounts for his incorrect conclusion, mentioned previously. Furthermore, it seems clear he did not have available a sufficient, if any series, from the Humid Transition Zone of northwestern California and southwestern Oregon, which are imperatively essential for a decision. He was also unfamiliar with the relatively great extent to which the red is gradually worn away from November to June.

A series of April and May adult males of the two races, laid out side by side, give a convincing demonstration. Of nine adult male *frontalis* from Colorado, which are clearly not darkened by coal dust, all are markedly gray with gray crowns and backs, except one, which has a moderate suffusion of red on the back. Of the twelve *grinnelli* from the northern counties of California, namely Shasta, Humboldt, Trinity and Tehama, all have reddish upper parts, some exceedingly incarnidined, and the crowns and occiputs strongly red, in most cases solidly so. The same is true of six April and May adult males from Alameda and Contra Costa Counties. On the under parts the contrast is still greater. Every one of the eighteen California males, with the exception of one, is much more brilliantly and much more extensively red than all, except one of the Colorado birds. I should emphasize that these are not selected individuals, but the total of adult April and May males available. The same comparison is true, but to a lesser degree, of the birds of winter plumage, when compared month by month.

I take this opportunity to make correction of errors in my previous article in this volume of the Proceedings, which occurred on page 59. The word "not" in the third line from the bottom of the page crept in by some *lapsus* and should have been eliminated in the proof-reading. In the same paragraph in the seventh line from the bottom of the page, quotation marks should appear after the word "species." In the second line from the bottom of the page quotation marks should have been inserted before the words "was made by," and the first word on page 60 should be singular, not plural. On the third line from the top of page 59, quotation marks should appear after the words "taken it."

Vol. 52, pp. 113–120 July 22, 1939

PROCEEDINGS

OF THE

BIOLOGICAL SOCIETY OF WASHINGTON

FERN MISCELLANY—V.[1]

BY WILLIAM R. MAXON.

The following descriptions and notes relate mainly to tropical American species of *Polypodium*, a genus in which the writer is especially interested.[2]

Polypodiaceae.

Adiantopsis Seemanni (Hook.) Maxon.

Cheilanthes Seemanni Hook. Sp. Fil. **2** : 85. *pl. 97*, A. 1852.

Founded on material collected by Seemann in the Sierra Madre of northwestern Mexico, and apparently not since collected. The type specimen, examined at Kew in 1930, shows the characteristic thin indusia of *Adiantopsis*, free at the sides, reflexed at maturity, and rather broader than illustrated by Hooker.

Enterosora spongiosa Maxon, sp. nov.

Epiphytica, *E. Campbellii* affinis, sed multo amplior, laminis usque ad 5 cm. latis, lineari-oblongis vel anguste triangulari-oblongis nec linearibus vel anguste oblanceolatis, admodum pinnatifidis nec sinuatis, segmentis oblongis vel deltoideo-oblongis, margine praesertim pilis castaneis longis patentibus ornatis, soris plerumque 5- vel 6-jugis.

Rhizome oblique or short-creeping, up to 4 cm. long, 5–10 mm. thick, densely dark-radicose below, copiously paleaceous; scales tufted, erect, lance-ligulate, subcordate in attachment, 3–5 mm. long, 0.6–1.2 mm. broad, abruptly acutish at apex, golden yellow, light brownish with age, distantly ciliolate (the hairs pale and gland-tipped), reticulate, the partition walls sharply defined, yellow. Fronds 6–12, fasciculate, 15–30 cm. long in well-developed plants, ascending, the blades somewhat decurved; stipes slightly shorter than the blades, about 1 mm. thick, dull brownish, freely clothed with slender spreading castaneous hairs 2–4.5 mm. long; blades linear-oblong to narrowly triangular-oblong, mostly 10–20 cm. long, 2.5–5 cm. broad in basal portion, acutish (the tip rounded), pinnately lobed except

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

[2] Earlier papers of this series are: Proc. Biol. Soc. Washington **43** : 81–88. 1930; **46** : 105–108. 1933; **46** : 139–146. 1933; **51** : 33–40. 1938.

at the short broad subentire apex, the midrib wholly concealed; segments 9–14 pairs, slightly oblique, oblong to deltoid-oblong, rounded at apex, the basal ones broadly dilatate below, 2–2.5 cm. long, 2–3 cm. broad at base, 8–12 mm. broad at middle, subentire, those above less dilatate, the sinuses mostly more acutish, all the segments persistently long-ciliate, the hairs like those of the stipe, a few borne also on both surfaces of the blade; venation phymatodoid, a single series of narrowly linear exappendiculate areoles borne along the midrib, sometimes also a similar incomplete second series; midvein of segments subflexuose, the branches very deeply immersed, oblique, joined in a series of elongate subhexagonal areoles, the included basal veinlet either simple and free or variously joined to 1 or 2 short lateral branches, or occasionally produced to the distal end of the areole; marginal excurrent veinlets short, free; sori mostly 5 or 6 pairs per segment, up to 1 cm. long, straight or subarcuate, borne deeply within the thick spongiose leaf-tissue on the included veinlet of the major areoles, wholly concealed before maturity, until then the glabrous linear orifice nearly closed; sporangia barely extruded at maturity, the empty linear pits of old sori 0.5 mm. broad or less.

Type in the U. S. National Herbarium, no. 1,181,637, collected in the vicinity of La Palma, on the road to La Hondura, Costa Rica, altitude about 1600 meters, on trunk of tree in potrero, July 17, 1923, by William R. Maxon and Alfred D. Harvey (no. 7975).

The following additional material is in the National Herbarium:

Costa Rica: Type locality, *Maxon & Harvey* 7975 (type coll.); *Standley* 32780, 38049. Santa Clara de Cartago, alt. 1950 meters, *Maxon & Harvey* 8191; *Lankester* 600. Along cart-road from Vara Blanca (between Poás and Barba volcanoes) to La Concordia, alt. 1600–1950 meters, *Maxon & Harvey* 8412. San Cristobal Road, alt. 2400 meters, *Stork* 2194. Road from Las Nubes to La Palma, *Knight.* Cerro de Las Lajas, north of San Isidro, alt. 2000–2400 meters, *Standley & Valerio* 51542. Cerros de Zurquí, northeast of San Isidro, alt. 2000–2400 meters, *Standley & Valerio* 50490, 50523.

Panama: Region of El Boquete, Chiriquí, in humid forest of the Cordillera east of Río Caldera, alt. 1900 meters, *Killip* 5284.

In type of soriation *Enterosora spongiosa* accords perfectly with *E. Campbellii* Baker,[3] from Mount Roraima, British Guiana, upon which the genus was founded by Baker. The type specimen of that (*im Thurn* 184), at Kew, was photographed by the writer in 1930. It was illustrated by Baker,[4] but the details of venation are perhaps not correctly shown, since presumably a series of linear sterile areoles extends along the costa at either side nearly throughout, as in *E. Fawcettii* Jenman, a very rare Jamaican species, which Christensen reduces to *E. Campbellii* and of which a single specimen is at hand from the type locality, "Rose Hill Wood," alt. 1200 meters (*Maxon* 1120). *Enterosora spongiosa* differs notably from both in its broad, deeply pinnatifid fronds and, consequently, its more complicated venation and numerous paired sori. The leaf-tissue is very thick (2 mm. in

[3] Timehri II. 5 : 218. 1886.

[4] Trans. Linn. Soc. II. Bot. 2 : 294. *pl. 55.* 1886.

moistened material), and consists mostly of loosely spongiose mesophyll with large air-chambers, very much as shown in Baker's illustration of *E. Campbellii* (fig. 5, cross-section). Upon dissection the veins are found to lie close to the upper surface of the blade.

Enterosora can hardly be regarded as a strongly marked genus, its relationship being clearly with *Polypodium percrassum* Baker and *P. enterosoroides* Christ, of Costa Rica, in which the roundish to elliptical sori are similarly borne in deep pits.

Polypodium turquinum Maxon, sp. nov.

§ *Grammitis.* Epiphyticum. Rhizoma parvum adscendens, paleis testaceis ligulatis subclathratis copiose onustum. Folia subpendula, usque ad 21 cm. longa, stipitibus filiformibus quam laminis multo brevioribus, fumosis striatis minutissime hirtellis; laminae anguste lineares, herbaceae, plerumque 10–15 cm. longae, 1–2 mm. latae, basi attenuatae, simplices, integrae vel leviter repandae, decidue ciliolatae, alioqui glabrae, nervo mediano et venis supra elevatis; venae admodum obliquae, acute unifurcatae, ramis ambobus venam submarginalem crassiusculam continuam adeuntibus, anteriori elongato nervo mediano subparallelo, sorum infra-medium vel medium ellipticum ca. 1 mm. longum unicum ferente, soris subremotis itaque utrinque uniserialibus.

Rhizome oblique or short-creeping, up to 1.5 cm. long and 2 mm. thick; scales numerous, imbricate, ligulate-attenuate, rounded at base, up to 2.5 mm. long and 0.5 mm. broad, entire, yellowish brown, delicate, translucent, subclathrate, the partition cell walls only slightly thicker than the yellowish outer walls. Fronds several, laxly spreading or pendent, cespitose or subimbricate in attachment, up to 21 cm. long; stipes dull pale brownish, 1–3.5 cm. long, filiform, only 0.1 mm. thick, striate, minutely and densely hirtellous; blades firmly herbaceous, mostly 10–15 cm. long, very narrowly linear, 1–2 mm. broad, attenuate at base, acutish at apex, simple, entire or repand, ciliolate, the hairs septate, simple or sometimes furcate; midvein strongly elevated above, glabrous; veins strongly elevated above, very oblique, acutely once-forked, both branches excurrent to a continuous submarginal vein, the distal branch nearly parallel to the midvein, bearing an elliptical or subrotund sorus at or below its middle, or rarely at base; sori about 1 mm. long, alternate, borne in a single line at each side of the midvein about midway to the margin.

Type in the U. S. National Herbarium, no. 1,301,480, collected at the summit of Pico Turquino, Sierra Maestra, Province of Oriente, Cuba, altitude 2040 meters, July 22–24, 1922, by E. L. Ekman (no. 14558). Additional specimens, all from Cuba, are as follows: Northern summit of Pico Turquino, alt. 1500 meters, *Ekman* 5268; Palma Mocha peak, alt. 1400 meters, *Leon* 11160; Pico Turquino, alt. 1790 meters, *Hamilton* 2; La Bayamesa, Sierra Maestra, alt. 1725 meters, *Ekman* 7165.

The present species, from the Sierra Maestra of eastern Cuba, is related only to *P. gramineum* Swartz, of which a good series is at hand from the Blue Mountain region of Jamaica, the type locality. The two are alike in anatomy, notably in having a submarginal vein to which both branches of

the oblique costal veins run out, the venation being thus entirely closed; but *P. gramineum* differs from *P. turquinum* sufficiently in its larger rhizome scales, its stouter stipes (0.4–0.6 mm. thick), its much broader (3–5 mm.) blades, its less oblique fertile vein-branches, and its subcoriaceous leaf-tissue. *P. gramineum* has been reported from Guiana also.

For the accommodation of *P. gramineum* John Smith erected the genus *Lomaphlebia*, on the basis of the submarginal connecting vein, which is of true fibrovascular structure. This curious closed venation, matched precisely by that of *P. turquinum*, is unique among the heterogeneous assemblage of species referred by most authors to *Polypodium*, subgenus *Grammitis*, and should justify setting apart these two species in a subgenus. In this connection the claim of *Grammitis* as the proper name, rather than *Lomaphlebia*, must be considered. The relationship with the group of seven or eight species typified by *P. marginellum* Swartz is not especially close, since that is characterized by free or casually anastomosing venation, which has no connection whatever with the sharply defined, truly marginal band of dark, sclerotic, non-fibrovascular tissue.

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

In discussing this species not long ago,[5] in relation to *P. Sprucei* Hook. and *P. yarumalense* Hieron., specimens were cited from Venezuela (the type region), Colombia, Panama, and Guatemala, and from Costa Rica, where it has proved to be abundant. Two synonyms were given, viz. *Polypodium Sprucei* var. *furcativenosa* Hieron. and *P. Sprucei* var. *costaricense* Christ. To these must be added two more, applied to Jamaican plants: *Polypodium Fawcettii* Baker (Journ. Bot. Brit. & For. **27** : 270. 1889) and *P. dendricolum* Jenman (Gard. Chron. III. **16** : 467. 1894).

Polypodium Fawcettii was founded by Baker on specimens collected near Morce's Gap, Jamaica, March 28, 1889, by Alexander Moore. The type, on loan from Kew, has been studied, as also a small portion of this collection on loan from the herbarium of the Botanical Department of Jamaica (Hope Gardens). The slender ascending rhizomes are quite devoid of scales, being merely pilose, and the plants differ in no respect from continental material of *P. jungermannioides*.

Polypodium dendricolum, described by Jenman from Jamaica, "on trees at and above 5000 ft. altitude in the Port Royal Mountains," has been difficult to determine accurately, apparently not all the original material having been preserved. Among the Jenman specimens at the New York Botanical Garden there is a single small frond so labeled by Jenman and accompanied by a clipping of the original printed description. It seems to have been taken from a plant in the herbarium of the Botanical Department herbarium, at Hope Gardens, which also is annotated by Jenman as *P. dendricolum*, with citation of publication. The latter is broken, undersized, and incomplete, but the rhizome shows no scales and the fronds differ from the usual form of *P. jungermannioides* only in their somewhat irregular lobation, with corresponding modification of venation. *P. dendricolum* may thus be regarded as a slightly teratological form of *P. jungermannioides*.

[5] Proc. Biol. Soc. Washington **51** : 35. 1938.

The entire series of West Indian specimens examined, including Hispaniola material rather recently listed as *P. Fawcettii*, is as follows:

Jamaica: Near Morce's Gap, *A. Moore*, type of *P. Fawcettii* (Kew, Jam.); *Maxon* 2760 (US, Y); *Underwood* 1386 (Y). Rose Hill, March 3, 1895, *Harris* (Jam.). Near New Haven Gap, June 28, 1898, *Harris* 7320 (Jam.); *Sherring & Nock* (BM, US); Jenman 28 (Kew;[6] *Jenman* s. n. (Y). John Crow Peak, Aug. 15, 1889, *Fawcett* (Jam.). Port Royal Mts., *Hart*, type of *P. dendricolum* (Jam., Y).

Hispaniola: High ridge between Río Cenobi and Río San Juan, Monte Cristi, Dominican Republic, alt. 1900 meters, *Ekman* 12819. Constanza, top of Loma La Vieja, alt. 2075 meters, *Ekman* 14034.

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

This species, described originally from Colombia, has been known also from Hispaniola and Panama,[7] and now may be reported definitely from Jamaica. The specimens, few in number, are among those mistakenly referred in the herbarium long ago by Underwood or the writer to either *P. Fawcettii* or *P. dendricolum*, that is to *P. jungermannioides;* but the fronds are densely cespitose upon a short ascending rhizome, rather than closely imbricate upon a slender elongate rhizome, and careful dissection discloses a terminal tuft of minute, bright brown, obscurely ciliolate scales, whereas *P. jungermannioides* has none. They may safely be referred to *P. yarumalense*, it seems, although some of the veins are twice forked and show an occasional anastomosis.

Jamaica: Blue Mountains, May, 1903, *D. Watt* (US, Y). Wooded slopes of Monkey Hill (above New Haven Gap), alt. 1800 meters, upon the underside and near the base of leaning tree trunks, June 22, 1904, *Maxon* 2723 (US), 2736 (US, Y).

Polypodium pruinosum Maxon, nom. nov.

Polypodium pruinatum Baker in Hook. & Baker, Syn. Fil. ed. 2, 508. 1875; not Sw. (1801).

Founded on *Tate* 44, from Chontales, Nicaragua, and known apparently only from the type material at Kew. It is a diminutive plant, apparently belonging to the group of *P. farinosum* Hook. and *P. discolor* Hook. The minute globose wax particles, which give rise to the pruinose condition noted by Baker upon the underside of the frond, are scattered over the upper surface also.

Polypodium delicatulum Mart. & Gal. Mém. Acad. Brux. **15**[5] : 35. *pl. 7, f. 1.* 1842.

Polypodium heterotrichum Baker; Jenman, Journ. Bot. Brit. & For. **17** : 262. 1879.

The name *Polypodium delicatulum* was applied by Martens and Galeotti to specimens collected by Galeotti (no. 6378) in the eastern cordillera of

[6] This is the additional material mentioned by Baker (in describing *P. Fawcettii*) as received from Jenman in 1875. According to a note by Sherring this collection (by Nock and himself) consisted of about 18 plants.

[7] Proc. Biol. Soc. Washington **51** : 36. 1938.

Oaxaca at 2100 to 2400 meters elevation. Their description is brief and inadequate and, is followed by a highly misleading comparison with *P. trichomanoides* Swartz, an unrelated plant with monosorous segments.

In his monograph of *Polypodium* Mettenius placed *P. delicatulum* near *P. apiculatum* Kunze and *P. firmum* Klotzsch (*P. aromaticum* Maxon), misidentifying it as a plant with "rather rigid fronds." In so doing he overlooked the peculiar significance of the species name employed and apparently was misled also by the somewhat artificial illustration. Hooker, in the Species Filicum,[8] quoted Mettenius' description and added a description of the rhizome as "clothed with subulate blackish scales," thus mistakenly confirming the reference of this species to the general vicinity of *P. pilosissimum* Mart. & Gal. This is wholly wrong. Specimens of *Galeotti* 6378 on loan from Brussels prove to be identical with Jamaican material subsequently described as *P. heterotrichum* Baker, which is a lax, soft-hairy, pendent epiphyte far removed from the group of *P. pilosissimum*. In ignorance of its true characters, *P. delicatulum* was long ago reported from Mexico (*Pringle* 13494) by the writer[9] as *P. heterotrichum*. This range, though unusual, is not unprecedented.

In view of its long-standing misidentification it seems desirable now to describe *P. delicatulum* rather fully, as follows:

Plants epiphytic, the fronds several or numerous, laxly pendent, 6–20 cm. long. Rhizome horizontal, 1 cm. long or less, 2–3 mm. in diameter, densely paleaceous on the upper side, the scales small and closely coherent, 1–1.6 mm. long, 0.6–0.8 mm. broad (excluding cilia), deltoid, acuminate, *yellowish*, concolorous (the cells short, quadrate or transversely oblong, the walls all very thin), closely fringed with short cilia, these 0.07–0.11 mm. long, pale, simple, blunt, allantoid, turgid; stipe 1–2.5 cm. long, 0.2–0.3 mm. in diameter, dull brownish, sparsely pilose with long spreading reddish hairs; blades 5–18 cm. long, 1.2–2 cm. broad, linear, acutish at the slowly developing apex, slightly narrowed at base, pinnate, the slender blackish rachis together with both surfaces of the blade reddish-pilose like the stipe, also densely but minutely glandular-pubescent, the hairs very short, hyaline, mostly 3-celled, two unicellular branches arising from a basal cell, one of these greatly elongate, clavate, glandlike; segments numerous, spreading (70°–80°), 6–11 mm. long, 1.5–2.5 mm. broad, linear-oblong, entire or lightly undulate, obtuse or acutish, fully adnate, sometimes narrowed above the slightly decurved base, not connected, less than their width apart, the sinus linear; 2 or 3 pairs of basal segments gradually shorter and a little broader; midvein medial, slender, blackish, flexuous, partially concealed; veins 4–7 pairs, oblique (30°), simple, extending halfway to the margin, short, or wanting toward the apex of the segment; sori 4–7 pairs, terminal or nearly so; sporangia glabrous, the annulus 12-celled. Leaf tissue delicate but somewhat spongiose and subopaque, the veins not readily visible.

Thus *Polypodium delicatulum* is seen to be quite unrelated to the several groups of species having rigid, erect or arcuately decurved, elastic fronds. Habitally and in general appearance it closely resembles *P. jamesonioides* Fée, of Colombia, Panama, and Hispaniola, which alone of the species

[8] 4: 184. 1862.

[9] Contr. U. S. Nat. Herb. 16 : 62. 1912.

known to the writer has similar bluntly short-ciliate rhizome scales; but in distinction, *P. jamesonioides* has fronds twice as long, the rhizome scales bright brown, narrowly elongate, and comparatively long-ciliate (cilia 0.13–0.3 mm. long), the stipe densely glandular-pubescent (not sparsely pilose), the blades long-attenuate at base, much broader, and everywhere covered with short, shining, *simple* hyaline hairs, and the segments more widely spreading.

Of the following specimens of *P. delicatulum* examined all but the types are in the National Herbarium:

Jamaica: Summit of Blue Mountain Peak and vicinity, alt. 2000–2200 meters, *Jenman* 24 (Kew; type of *P. heterotrichum*); *Hart* 242; *Hatch* 28; *Hitchcock* 9372; *Bot. Dept. Jamaica* 191; *Maxon* 9870, 9951, 9964; *Maxon & Killip* 1097; *Orcutt* 5315.

Mexico: Eastern cordillera of Oaxaca, *Galleotti* 6378 (type of *P. delicatulum*, Brussels; Kew). Barranca Trinidad, Hidalgo, *Pringle* 13494. Mount Tacana, Chiapas, alt. 2000 meters and upward, *Matuda* 2379.[10]

Guatemala: Santa Elena, Dept. Chimaltenango, alt. 2400–2700 meters, *Skutch*, 96b, 213.

As *P. heterotrichum* this species was reported from Haiti by Christ[11] on the basis of *Picarda* 264b and 1006. A Berlin specimen of the latter was identified by the writer as *P. induens* Maxon in 1921 and both were so listed by Urban.[12] *P. induens* is very closely related to *P. anfractuosum* Kunze, of South America, but has no affinity whatever with *P. delicatulum*.

Polypodium aromaticum Maxon, Proc. U. S. Nat. Mus. **27** : 743. 1904.

Polypodium firmum Klotzsch, Linnaea **20** : 378. 1847; not Kaulf. (1827).

Polypodium Herzogii Rosenst. Repert. Sp. Nov. Fedde **6** : 176. 1908.

Polypodium aromaticum, which belongs in the general group of *P. pilosissimum* Mart. & Gal., was described from Jamaica. Identical material from that island had been referred by Jenman to *P. firmum* Klotzsch, and Jenman's identification, though questioned by the writer when describing *P. aromaticum*, is probably correct. Nevertheless, as pointed out, the name itself is invalidated by the earlier *P. firmum* Kaulf., applied to an Australian plant.

Apparently *P. aromaticum* is not very common, yet is widely distributed. In the Blue Mountains of Jamaica it occurs at 1650 to 2200 meters (*Underwood* 1449, 1469, 2490; *Maxon* 1346a, 9815, 9958), but oddly enough it was not found by Ekman in Hispaniola. From the continent the following specimens are at hand.

Guatemala: Near Cobán, Alta Verapaz, alt. 1350 meters, *H. Johnson* 535a; *Hatch & Wilson* 250.

Costa Rica: Palmira, alt. 1800 meters, *A. Smith* H 209.

Venezuela: Heights of Galipán, near Caracas, *E. Pittier* 201.

Peru: Valle de Occobamba, alt. 1900 meters, *Bües* 877. Alturas del Río Lachac, Valle de Lares, alt. 2100 meters, *Bües* 1818, 1820. Cerro Huacontoy, Valle de Lares, alt. 2160 meters, *Bües* 1867. Michihuañunca, alt. 3000 meters, *Bües* 976. Alturas de Sicre, alt. 3000 meters, *Bües* 1565.

Bolivia: Songo, *Bang* 901, 901b. Yungas, alt. 1200 meters, *Rusby* 367

(greater part). Inca Corral, Prov. Cochibamba, alt. 2200 meters, *Herzog* 783 (as *P. Herzogii*). Hacienda Simaco, on trail to Tipuani, alt. 1400 meters, *Buchtien* 5254.

The Herzog specimen, though not of the original collection of *P. Herzogii*, is a topotype, and it agrees so well with Rosenstock's very full description that *P. Herzogii* may safely be reduced to synonymy. The alliance of this species was not understood by Rosenstock.

Polypodium latevagans Maxon & C. Chr., sp. nov.

§ *Goniophlebium*, turma *P. piloselloides* L. Rhizoma tenuiter funiforme, paleis pallide castaneis attenuatis angustis laxe imbricatis obliquis onustum; folia remota simplicia integra stipitata, usque ad 8 cm. longa, subconformia, sterilium laminis ovatis vel late lanceolatis, fertilium plerumque lanceolatis, omnium acuminatis subcoriaceis, venatione *P. piloselloides;* laminae pagina superior paleis castaneis e basi peltata rotundata grisea aristatis praedita; sori 7–9-jugi, uniseriales, paleis castaneis linearibus inter sporangia immixtis, latioribus paucis pagina inferiore dispersis.

Rhizome delicately funiform, wide-creeping, subflexuous, sparingly branched, about 0.5 mm. thick, laxly appressed-paleaceous, the scales light castaneous, subulate-attenuate, hair-pointed, 4–7 mm. long, 0.4–0.7 mm. broad above the base, here peltately attached. Fronds distant, delicately petiolate (1–1.5 cm.); blades simple, entire, subconform, the sterile ones ovate or broadly lanceolate, 3–6 cm. long, 1.5–2 cm. broad, the sterile ones smaller (2–4 cm. long, 0.5–1 cm. broad), mostly lanceolate, all the blades sharply acute to long-acuminate, subcoriaceous, distantly paleaceous; scales of upper surface relatively large, light castaneous, abruptly aristate from a nearly circular, peltately affixed, toothed, pale base; scales of the lower surface darker, few, scattered, lanceolate, or those mixed among the sporangia numerous and linear; sori 7–9-jugate, large, uniserial in the large costal areoles, a nearly complete outer row of minor areoles usually developed.

Type in the U. S. National Herbarium, no. 833,357, collected near Unduavi, Bolivia, alt. 2400 meters, October, 1885, by H. H. Rusby (no. 361). Other specimens, all from Bolivia, are: Incachaca, Prov. Sacaba, Dept. Cochabamba, alt. 2500 meters, *Steinbach* 5795; Sailapata, Prov. Ayopaya, Dept. Cochabamba, alt. 2800–3500 meters, *Cárdenas* 3154, 3317; Okara, Cordillera Real, alt. 2250 meters, *Tate* 922, 946; Coranital, alt. 2300 meters, *Herzog* 2153 (as *P. tectum* Kaulf.).

The present species was recognized as new by Christensen and writer, independently, several years ago. In its nearly isomorphous, sharply acute to long-acuminate fronds and larger scales of the upper surface it differs essentially from *P. piloselloides* L., which is nearly confined to the West Indies. A closer relationship is perhaps with *P. tectum* Kaulf., but that species has markedly dimorphous fronds, the sterile ones very much smaller than those of *P. latevagans*. The alliance with *P. ciliatum* Willd. is even more remote.

10 Mixed with this were small plants of *Polypodium pilosissimum* M. & G., which may be called no. 2379a.

11 Bot. Jahrb. Engler 24 : 126. 1897.

12 Symb. Antill. 9 : 360. 1925

Vol. 52, pp. 121–122 July 22, 1939

PROCEEDINGS

OF THE

BIOLOGICAL SOCIETY OF WASHINGTON

THREE NEW SUBSPECIES OF BIRDS.

BY WALTER KOELZ.

I am obligated to the authorities of the American Museum of Natural History, of the Charleston Museum, of the Michigan University Museum, and of the National Museum for the privilege of examining specimens in their collections. I am grateful to Dr. Ernst Mayr for advice.

Unless otherwise indicated, specimens on which the descriptions are based are in my collection.

Dicaeum concolor unicolor, new subspecies.

Type.—♂, wing 51 mm., taken at Kodaikanal, Palni Hills, Madras Presidency, March 12, 1937, by W. Koelz.

Paratypes.—6 specimens from the type locality taken March 10–15, 1937, and 5 from Ootacamund, Nilgiri Hills, Madras Presidency, taken on February 16, 1937.

Compared with specimens of *concolor* from the base of the Nilgiris, these birds have longer wing, larger bill and are darker, with less green yellow in the plumage, especially below, and with the light forehead less marked.

Wing measurements: *unicolor*, 7 ♂, 49–52.5; 4 ♀ 49–52 mm.
concolor, 3 ♂, 47.5–50; 2 ♀ 47, 47.5 mm.
3 ♂, 48–50.5; ♀ 47 mm., ex Whistler, Travancore.

Pipilo alleni rileyi, new subspecies.

Type.—Adult ♂, wing 85 mm., taken at Brunswick, Georgia, on March 6, 1939, by W. Koelz.

Paratypes.—16 specimens from the type locality; 10 from Leon and Madison Counties, Florida (U. S. National Museum Collection); 6 from near Charleston, South Carolina (Charleston Museum Collection); and 5 from Cook and Chatham Counties, Georgia (U. S. National Museum Collection).

This form is like *alleni* in having a straw-colored to pale orange eye. It differs from specimens of the typical race (specimens examined from type

locality, Dummitt's Grove north of Merritt's Island, Florida, as well as south of a line from there to Tampa) in having on the average a heavier bill, longer wing and tail, and a longer white spot on the rectrices. Females are, in addition, browner on the throat and above, less gray.

I do not consider these pale-eyed forms to belong to the red-eyed species group *P. erythrophthalmus* for these reasons: Specimens of the race *P. e. canaster* were common at Brunswick up to the date of my departure April 10, along with *rileyi*. The latter were breeding commonly in the palmettos. The others showed swelling sex organs, and were found most often in the swamps.

Wing measurements: *alleni*, 27 ♂ (74) 76–82 (86); 18 ♀ 74–80 mm.
rileyi, 22 ♂ (79) 82–88 (89.5); 14 ♀ (75) 78–83 (85) mm.

Melanocorypha maxima kashmirica, new subspecies.

Type.—Adult male, wing 156 mm., taken at Hanle, Rupshu, Kashmir, on July 13, 1931, by W. Koelz.

Topotypes.—4 males and a female taken at about the same time.

Compared with specimens of the typical form from Sikkim in the Rothschild Collection, the Kashmir form is much paler. The black markings of the back are less extensive. The chest is nearly white, not gray.

Compared with specimens of *subgrisea* in the National Museum from near Kokonor, Kansu, taken August 14, 1923, the new race is paler, especially on the crown and nape, with more buff, and with less extensive dark centers to the feathers of the back.

It appears in color to be near *flavescens*, of which I have seen no specimens, but has a longer wing.

Wing measurements: *kashmirica*, 5 ♂, 150–158; ♀ 136 mm.
flavescens, 15 specimens: ♂ 144–152; ♀ 128–139 mm.

Vol. 52, pp. 123–124 July 22, 1939

PROCEEDINGS
OF THE
BIOLOGICAL SOCIETY OF WASHINGTON

A NEW ARACHNID OF THE ORDER PEDIPALPIDA.

BY RALPH V. CHAMBERLIN.

The interesting new arachnid described below was discovered by Mr. Robert Wesson of Tucson, Arizona, by whom it was submitted to the writer. The type is in the author's collection.

Trithyreus wessoni, sp. nov.

Body dusky fulvous throughout. Setae of dorsal surface of body and those of legs acutely pointed, none clavate.

Elliptic eye spots distinct. Anterior sternum about three-fourths as wide as long. Second thoracic tergite distinctly divided along the median line, each of the resulting sclerites wider than long. Mesopeltidia present, their inner ends acutely pointed.

Trochanter of palpi with anterior inferior angle conspicuously produced distad; the long, convex edge of the article bearing a series of setae. Femur of palpus relatively deep, its inferior edge straight, the dorsal convex. Patella with dorsal margin. Patella long, clavately enlarged distad, the dorsal margin unarmed. Claw less than half the length of the tarsus (upper margin).

Coxa of first legs ending considerably caudad of distal end of endite. Femur shorter and stouter than patella and but little longer than the tibia. Tarsus and metatarsus together decidedly shorter than the tibia, with metatarsus much shorter than the tarsus.

In the fourth legs femur deep as usual, the edge of proximal end obtusely angled at middle, the shorter portion below angle straight, the upper portion curving convexly into dorsal line.

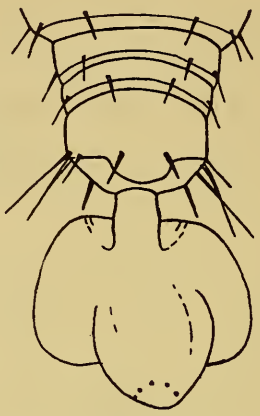
Abdomen elongate. Last three segments preceding the last short, together but little exceeding the fourth from the last, which is not much longer than the ultimate. Ultimate article moderately produced at caudal end above at middle.

Flagellum with a short basal stalk beyond which it is abruptly swollen into a three-lobed body, the large median lobe of which projects dorsad of caudad.

Length from base of chelicerae to base of flagellum about 4.8 mm.

Locality.—Arizona: near Tucson. One specimen "taken under a stone

shaded by small bushes and trees growing along the Santa Cruz River," by Mr. Robert Wesson, for whom I take pleasure in naming the species. The species is readily distinguished by the form of the flagellum as shown in the accompanying figure.



Trithyreus wessoni, sp. nov. Dorsal view of caudal end showing form of flagellum.

Vol. 52, pp. 125–130 July 22, 1939

PROCEEDINGS

OF THE

BIOLOGICAL SOCIETY OF WASHINGTON

NEW RACES OF THE GENERA *SIALIA* AND *CARPODACUS* FROM MEXICO.

BY ROBERT T. MOORE,
California Institute of Technology.

Thanks to the industry of Chester C. Lamb, new forms continue to appear in the collections from Mexico. Two of these are described in this paper.

For permission to examine the type of *Sialia mexicana bairdi*, Ridgway, and for the loan of a series of *Carpodacus* from Jalisco, my thanks are gratefully offered to Dr. Alexander Wetmore and Dr. Herbert Friedmann of the United States National Museum, Smithsonian Institution.

Sialia mexicana amabile, subsp. nov.

CHARMING BLUEBIRD.

Type.—Male adult in full breeding condition, nesting; number 20491, collection of Robert T. Moore; Nievero, 4 miles west of Ciudad, Durango, Mexico; March 27, 1937; altitude about 8,000 feet; collected by Chester C. Lamb.

Subspecific characters.—Nearest to *Sialia mexicana bairdi* Ridgway, but dorsal region slightly darker, Hay's Brown;[1] the brown coloration much more extensive on the upper parts; brown of the under parts much paler (Mikado Brown, compared with Walnut Brown) and more extensive. The upper parts of the females are darker and the top of the head and neck bluer.

Range.—Breeding in the lower part of the Boreal Zone[2] on Mt. Mohinora

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

[2] For an area of great altitudinal diversity such as northwestern Mexico, I deem it desirable to follow the faunistic school of Merriam, as modified and interpreted by Grinnell (Univ. of Calif. Pub. Zool., Vol. XII, 1914, pp. 62–64). In a previous paper (Proc. Biol. Soc. Wash.; Vol. 50, July 23, 1937, p. 96) I referred to the zone on the top of Mt. Mohinora as the "Temperate Zone," following Chapman's terminology, employed in his discussion of the birds of the Orizaba region. Hereafter I shall use the term "Boreal Zone," whose lower limits are indicated by firs and other related trees as well as by its bird life. An error in this paper (loc. cit.) was the use of the word "northeastern" for "northwestern" in three places under the paragraphs marked "Type," "Range" and "Remarks," on pages 101 and 102.

from 10,500 feet to the top of the mountain at approximately 11,215 feet and also in the Transition Zone from Laguna Juanota, 55 miles west of Parrál, to Los Frailes, Chihuahua, Arroyo del Buey, northcentral Durango, and Nievero, southwestern Durango. Its winter range is not known.

Although Lawrence (Memoirs of Boston Soc. of Nat. Hist., Vol. 2, part 3, No. 2, 1874, p. 267) records a specimen or specimens taken by Grayson at Mazatlan, four years of collecting by Chester C. Lamb and the author have not secured a single individual anywhere in Sinaloa at any time of the year.

Specimens examined.—Bairdi: California: Thermal 2 ♂, Bard 1 ♂, near San Antonio Canyon 2 ♂ 1 ♀. Arizona: Cactus Pass 1 ♂ (Type), Prescott 1 ♂ 1 ♀, Flagstaff 2 ♂ 1 ♀, Graham Mts. 4 ♂, Parker 1 ♂, Tunitcha Mts. 1 ♂, Santa Catalina Mts. 1 ♂, Williams 2 ♂, San Francisco Mt. 1 ♂, Pinery Canyon 1 ♂, Rosemont 1 ♀, Grand Canyon 1 ♂, Ft. Lowell 14 ♂ 2 ♀, Huachuca Mts. 2 ♂ 1 ♀, Roosevelt 2 ♀, Chiricahua Mts. 3 ♂; also 8 ♂ from Arizona (breeding period birds in Am. Mus. Nat. Hist.). New Mexico: Reserve 1 ♂, Gallina Mts. 4 ♂, Capitan Mts. 1 ♂ 2 ♀, Datil Mts. 2 ♂, San Luis Mts. 2 ♂, Hopewell 2 ♂ 1 ♀, Copperton 2 ♂ 1 juv., Manzana Mts. 1 ♂, Horse Lake 2 ♂, Bear Springs 4 ♂, Arroyo Seco 1 ♂, Stinking Spring Lakes 1 ♂, El Vado 1 ♂, Ft. Wingate 1 ♂, Hondo Canyon 1 ♂ 1 ♀, Zuna Mts. 1, Burro Mts. 1, San Mateo Mts. 1, La Jara Lakes 2, Ribera 1 ♂, Guyo Canyon 1 ♂, Garfield 1 ♂, Tierra Amarillo 1 ♂. Texas: Davis Mts. 1 ♂ 2 juv., Ft. Davis 1 ♂. Sonora: Nogales 1 ♂. Migrants in Sonora: Alamos 2 ♂, 11 (?). Chihuahua: Colonia Pacheco 3 ♂ 2 juv. ♂, 2 juv. ♀. Intergrades between *bairdi* and *amabile:* Chihuahua: Pinos Altos 20, Bravo 2, Chihuahua 3, Colonia Garcia 5 ♂ 3 ♀, Colonia Pacheco 1 ♂ 1 ♀. *Amabile:* Chihuahua: Laguna Juanota 5 ♂ 3 juv. ♂ 3 ♀, Mt. Mohinora 4 ♂ 5 ♀, near Guadelupe y Calvo 3 ♂, Los Frailes 2 ♂, 4 ♀. Durango: Muertocito 2 ♀, Ojito 1 ♂, Nievero 1 ♂ (Type) 1 ♀, El Salto 6 ♂ 3 ♀. Zacatecas: "Talparaiso Mts." 1 ♂. *Australis:* Vera Cruz: Mt. Orizaba 2 ♂ 1 ♀. Mexico: Popocatapetl 1 ♂ 1 ♀. Morelos: Huitzilac 1 ♀. Michoacan: Patamban 3 ♂.

Remarks.—As early as the publication of the Birds of North and Middle America, Ridgway called attention to the differences between the birds of northwestern Mexico and those of the United States, but lack of a sufficient series probably made him hesitate to describe the new form. W. deWitt Miller (Birds from Northwestern Durango, Bull. Am. Mus. Nat. Hist., Vol. XXII, Art X, p. 183) emphasized the differences and called attention to the fact that they "exemplify the extreme chestnut-backed type of coloration." This extreme extension of the brown both above and below occurs in the center of the range of the species (Chihuahua and Durango), for both *bairdi* to the north and *australis* to the south have this brown coloration more restricted. This is particularly true of the upper parts of *australis*, which in the state of Morelos show hardly any brown above.

The geographical distribution of the *Sialia sialis* and *Sialia mexicana* groups in northwestern Mexico seems quite extraordinary. South of the Sonora-Chihuahua cross section of the range *sialias* is confined to the western

slopes of the Sierra Madres in Sinaloa and *mexicana* to the eastern slopes in Durango. In the United States the distribution is exactly the opposite, *sialis* being found in the *east* and *mexicana* in the *west!* We have a very large series of both species, *S. sialis fulva* and *S. mexicana amabile,* covering the Sierra Madres from central Chihuahua to southern Sinaloa and Durango. Both species are confined to the high mountains. South of Sonora and Chihuahua *fulva* appears only on the western slopes ascending to at least 6,000 feet in southern Sinaloa, whereas *amabile* occurs only on the eastern slopes from an altitude of 5,000 feet to the top of Mt. Mohinora at over 11,000 feet. Neither species appears to cross the highest backbone of this range, and yet there seems to be no insuperable barrier, except the marked meteorological differences in the south, to prevent the movements of high mountain species from one slope to the other. That the bird of Mt. Mohinora, a heavy rainfall area in the center of the range, should have the dry eastern slope species, is not the anomaly it appears to be, for the same is true in other high mountain families, in which the species range in the Transition and Boreal Zones, such as the woodpeckers (Imperial), parrots (Thick-Billed) and Solitaires (calophonus).

To the north in west central Chihuahua and Sonora the situation seems quite different. Frazar took two specimens of *S. mexicana bairdi* and one specimen of *S. sialis fulva* from the *same* place, Bravo, Chihuahua. It would seem that the distributional lines of these two species cross each other like an "X," the point of the crossing being approximately in west central Chihuahua. The range of *S. sialis* begins in northeastern United States and proceeds south and southwesterly to Chihuahua, finally crossing the breeding range of *bairdi* and appears at Churo on the Barranca del Cobre in the center of the mountain chain, where I found it breeding in 1934, and where *bairdi* was absent. *S. sialis fulva's* range then proceeds southwest to the western slopes of the Sierra Madres and continues on this slope to southern Sinaloa (Rancho Batel). The range of the *Sialia mexicana* group begins in northwestern United States and proceeds southeasterly through Arizona and New Mexico, thence to the eastern slopes of the Sierras through Durango and Michoacan to Morelos. So far it has not occurred west of the Sierra Madres, except for one questionable record in Sinaloa and certain migrants at Alamos in southern Sonora. We have not taken a single specimen in Sinaloa in our intensive collecting of the past five years! The questionable record is Lawrence's, who quotes Grayson as taking it at "Mazatlan" on the coast (Mem. Bos. Soc. Nat. Hist., Vol. 2, Part 3, No. 2, 1874, p. 267). If this bird really came from Mazatlan, which I doubt, it was certainly a migrant. It should be emphasized that only Frazar has found the two species at the same locality (Bravo, July 27). Nowhere have we secured them at the same place in Sinaloa or Durango. The distribution of the two species in southern Mexico still further complicates the picture, but that is a problem which can be discussed intelligently only when large series have been collected. I have found this same kind of distribution of congeneric species in northwestern Mexico in other genera, which will be discussed in a later report.

Carpodacus mexicanus coccineus, subsp. nov.

SCARLET-BREASTED HOUSE FINCH.

Type.—Male adult, in worn nuptial plumage, no. 31826, collection U. S. National Mus.; "Mts. of Colima," Colima, Mexico; June, 1863, collected by John Xantus. Orig. No. 1003. On the back of the original tag is written "5½.3 Iris brown." Probably taken at 6000 feet altitude, on the Volcan de Nieve.

Subspecific characters.—Resembling in nuptial plumage most closely *Carpodacus m. potosinus,* but differing in having the red of the worn nuptial plumage Scarlet, as compared with Nopal Red; ground color of upper parts paler Drab as compared with Benzo Brown, suffused with Scarlet instead of Scarlet Brown; ground color of posterior under parts whiter; size about the same.

In winter plumage of early fall, adult males slightly paler on upper parts, streaking wider on posterior under parts. The female series is not truly comparable, but in worn nuptial plumage, they seem to have the upper parts paler, more Drab as compared with Fuscous, and the ground color of the under parts whiter.

Range.—Mountains of Colima, western Jalisco and Nayarit north to Tepic and Guadalajara, east through Jalisco to at least La Barca, possibly to Patzcuaro, Michoacan.

The northern Jalisco (Bolaños and Colotlan) birds are *intergrades* with *centralis,* closer to *coccineus.*

Specimens examined.—Mexico: Colima: Mountains of Colima 1 ♂, (Type). Jalisco: Tonila 1 ♂ 1 ♀, Talpa 1 ♂, Mascota 1 ♂, Zocoalco 1 ♂, Guadalajara 2 ♀, Ocotlan 2 ♂, Zapotlan 4 ♂ 1 ♀, La Barca 1 ♂. Nayarit: near Tepic 5 Ad. ♂ 4 Im. ♂ 2 Ad. ♀ 2 Im ♀. Intergrades with *centralis:* Michoacan: Patzcuaro 1 ♂. Jalisco: Bolaños 1 ♂ 1 ♀, Colotlan 1 ♂.

Remarks.—This bird is the most brilliant scarlet race in male nuptial plumage of any of the House Finches. Were it not for the fact that every one of the fifteen adult males in the worn nuptial plumage from April to July is uniformly Scarlet, one might conclude they represent merely the "orange type" of coloration, observable in some of the island forms. Comparison with all the aberrant color individuals of all races proves the tone is very different, much less orange and more brilliant. As the specimens come from four states of Mexico and ten different localities, there can be little doubt that this is the standard coloration of this race. Even the immature males have it and their upper parts are heavily suffused with it. This race has been overlooked merely because of failure to assemble sufficient material and the lack of the fresh specimens, which I now have.

With the birds to the south in Guerrero, *coccineus* need not be compared, as it is exceedingly different, in particular much more expansively red on the under parts. From the geographically closest bird to the east, namely *centralis* of Guanajuato, it is separated by its smaller size and much less extensively red under parts and brighter coloration. It is closest to the geographically more distant bird to the northeast, *potosinus* of San Luis Potosí, but differs as described above. Differing markedly from the tiny

rhodopnus of the coastal plains of Sinaloa, it is not only much larger, but of a totally different coloration both in nuptial and winter plumage and sharply streaked below, where *rhodopnus* has practically none.

Four males from Zapotlan and Zocoalco, in worn nuptial plumage (March 18–April 18) kindly loaned to me by Mr. Kinnear of the British Museum, confirm the characters in every particular.

Thanks to Mr. H. G. Deignan of the United States National Museum, I can quote from a letter of John Xantus, dated Colima June 19, 1863, which seems to give information concerning the Type specimen. He wrote: "In my nesting I went up also to the Volcan de Nieve about 8000 (feet) high, and collected there also many nests in the gulches . . . on the volcano about 6000 feet up I got specimens of the *Carpodacus frontalis*, Pipilo fuscus (?) . . ." It was undoubtedly on this excursion that he collected the Type.

Vol. 52, pp. 131–134 October 11, 1939

PROCEEDINGS
OF THE
BIOLOGICAL SOCIETY OF WASHINGTON

NATURAL HISTORY OF PLUMMERS ISLAND, MARYLAND.

BY E. A. GOLDMAN AND H. H. T. JACKSON.

IX. Mammals.[1]

No systematic survey of the mammalian fauna of Plummers Island, or its vicinity, has ever been undertaken. The following list embraces 30 species that have been collected or observed, or whose presence on the island has been definitely determined by tracks, during a period of about 37 years. Owing to lack of field work it is not feasible to list all the mammals of the "mainland," as the tract of about 40 acres belonging to the Washington Biologists' Field Club on the adjacent Maryland shore is commonly called by club members. It seems desirable, however, to direct attention to an additional list of eleven species that are known from the general region and may be expected to occur on the island or the "mainland" area. In the preparation of these lists the card records kept at the island for many years, mainly by Dr. A. K. Fisher, have afforded an indispensable basis. Special acknowledgment is also due to Vernon Bailey who has brought together so much information in his "Mammals of the District of Columbia" (Proc. Biol. Soc. Wash., vol. 36, pp. 103–138, May 1, 1923), which has been freely consulted by us. The lists directed attention to many gaps in our knowledge of the mammals of Plummers Island and vicinity, gaps which it is hoped may be filled through an intensified interest of club members in this branch of natural history.

[1] The following numbers of this series have been published previously: I (Introduction), Proc. Biol. Soc. Wash. **48** : 115–117. 1935; II (Flowering plants and ferns), *op cit.* 118–134; III (Mosses), *op cit.* 135–137; IV (Birds), *op cit.* 159–167; V (Fungi), *op cit.* **49** : 123–131. 1936; VI (Reptiles and amphibians), *op cit.* **50** : 137–139. 1937; VII (Hepaticae), *op cit.* **52** : 21–22. 1939; VIII (Lichens), *op cit.* 23–26.

Didelphis virginiana virginiana. Virginia Opossum.
Common. A nocturnal prowler around cabin.

Scalopus aquaticus aquaticus. Eastern Mole.
Common on the lower parts of the island.

Blarina brevicauda brevicauda. Short-tailed Shrew.
Several trapped by A. K. Fisher and F. M. Uhler in the cabin.

Myotis subulatus leibii. Least Brown Bat.
Smallest of the bats of the eastern United States. The synonym, *Myotis winnemana*, was based on a specimen taken on the island by A. K. Fisher.

Myotis keeni septentrionalis. Trouessart's Little Brown Bat.
Several flew into cabin and were captured by W. R. Maxon, W. H. Osgood, H. S. Barber, and A. K. Fisher at various times.

Myotis lucifugus lucifugus. Little Brown Bat.
One collected by A. K. Fisher, June, 1904.

Lasionycteris noctivagans. Silver-haired Bat.
One captured in cabin by A. K. Fisher, October, 1906.

Pipistrellus subflavus subflavus. Georgian Bat.
One caught in cabin by A. K. Fisher, March 23, 1907. Abundant in the region.

Eptesicus fuscus fuscus. Large Brown Bat.
One killed in cabin by A. K. Fisher, August 5, 1905. One caught, probably accidentally, in mouse trap set in cabin by H. S. Barber, January 21, 1907. One specimen taken from trap in cabin by F. M. Uhler and A. L. Nelson on January 15, 1939. Common in the region.

Lasiurus borealis borealis. Red Bat.
Six records of captures in cabin. Common in the region. One young apparently just able to fly collected July 15, 1914 (Bailey, l.c., p. 133).

Nycticeius humeralis. Evening Bat.
One captured in the cabin by H. S. Barber, September 7, 1910.

Procyon lotor lotor. Raccoon.
Common. Fresh tracks frequently seen.

Mustela frenata noveboracensis. Eastern Long-tailed Weasel.
Den containing young found by W. R. Maxon, June 9, 1907.

Mustela vison mink. Mink.
Tracks in mud identified by A. K. Fisher, March 22, 1908; January 11, 1914; and March 6, 1921. Fairly common in the region.

Mephitis mephitis nigra. Eastern Skunk.
Common. Fresh tracks frequently seen.

Lutra canadensis canadensis. Eastern Otter.
Tracks between air holes in ice identified by A. K. Fisher, January 13, 1910, and December 10, 1311.

Vulpes fulva fulva. Eastern Red Fox.
Tracks noted in snow almost every winter. Bailey (l.c., p. 122) records the observation of one by A. K. Fisher and Alexander Wetmore on the Virginia shore opposite the island in 1922.

Felis domestica. Domestic Cat.
Feral individuals occur.

Marmota monax monax. Groundhog; Southern Woodchuck.
Resident. Holes at base of cliff near cabin.

Tamias striatus striatus. Chipmunk.
Former resident, but not observed in recent years.

Sciurus hudsonicus loquax. Red Squirrel.
Former resident, and may still occur, but not common. One swimming from island to Virginia shore was captured by H. S. Barber, September 6, 1908.

Sciurus carolinensis carolinensis. Carolina Gray Squirrel.
Resident.

Sciurus niger neglectus. Fox Squirrel.
Former resident, but now of rare and erratic occurrence.

Glaucomys volans volans. Small Eastern Flying Squirrel.
Former resident, and probably still occurs. Several nested in gourds placed in trees by A. K. Fisher. One collected by F. M. Uhler, February 15, 1937.

Peromyscus leucopus noveboracensis. White-footed Mouse.
Common. Specimens taken at various times.

Neotoma pennsylvanica. Eastern Wood Rat.
Resident.

Sylvilagus floridanus mallurus. Eastern Cottontail.
Common.

Pitymys pinetorum scalopsoides. Pine Mouse.
Specimens were obtained by A. K. Fisher, December 31, 1906. Others were collected by E. A. and L. C. Goldman, November 6, 1938, in runways found on the low ground at the base of the hill near the ferry landing.

Ondatra zibethica macrodon. Virginia Muskrat.
F. M. Uhler has recently noted definite signs of occurrence along the "mainland" side of the narrow channel crossed by the ferry. His observations in such close proximity seem to warrant the inclusion of this common and widely dispersed species in the regular list for the island.

Mus musculus musculus. House Mouse.
Common pest, trapped from time to time in cabin.

The following list is of 11 species that have not yet been reported but may be expected to occur on the island or the "mainland":

Condylura cristata. Star-nosed Mole.
Known from Cabin John and, therefore, probably occurs on the "mainland."

Sorex fontinalis. Maryland Shrew.
Known from Cabin John and may be found both on the island and the "mainland."

Sorex longirostris longirostris. Bachman's Shrew.

Recorded from Falls Church, Va., and Chesapeake Beach, Md.

Microsorex hoyi winnemana. Winnemana Pigmy Shrew.

Rare. Smallest American mammal known, and one of the smallest known mammals in the world. Taken at Stubblefield Falls, in nearby Virginia, and at Berwyn, Md.

Cryptotis parva. Least Short-tailed Shrew.

Known from Laurel, Md., and Falls Church, Va.

Pipistrellus subflavus obscurus. Dusky Georgian Bat.

Two specimens, recorded by Bailey (l.c., p. 137) taken flying over river near the island September 9, 1905. Assumed to be migrants.

Lasiurus cinereus. Hoary Bat.

Recorded from Chain Bridge (Bailey, l. c., p. 132). Probably visits the island during migration.

Urocyon cinereoargenteus cinereoargenteus. Eastern Gray Fox.

Reports indicate the presence of this species along the cliffs flanking the Potomac River and it is probably an occasional visitor. The remains of rabbits killed on the island by a fox, perhaps of this species, were noted by Alexander Wetmore, February 1, 1918.

Microtus pennsylvanicus pennsylvanicus. Meadow Mouse.

Abundant in the region. Not reported, but doubtless inhabits the "mainland" and may occur on the island.

Zapus hudsonicus americanus. Carolina Jumping Mouse.

Bailey (l.c.) records one collected near Cabin John by E. W. Nelson, in 1913. Probably inhabits the "mainland," but occurrence on island more doubtful.

Rattus norvegicus. Brown Rat.

Common on the "mainland" near the old house close to the lock in the canal.

Vol. 52, pp. 135–136 October 11, 1939

PROCEEDINGS

OF THE

BIOLOGICAL SOCIETY OF WASHINGTON

TWO UNDESCRIBED SOUTH AMERICAN BARBETS.

BY PIERCE BRODKORB.

In the course of identifying material recently received from the Oriente of Ecuador by the University of Michigan, a comparison of some barbets from that region was made with others from Colombia and Peru, all currently passing under the name *Capito auratus punctatus* Lesson. The three groups show certain differences which in my opinion call for the division of the birds of these countries into three distinct subspecies.

Capito auratus macintyrei, subsp. nov.

Type.—Univ. Mich. Mus. Zool. No. 96463; ♂ ad.; Andoas, Rio Pastaza, Oriente, Ecuador; altitude 500 meters; April 1, 1938 : Wm. Clarke-Macintyre.

Characters.—Differs from *Capito auratus punctatus* Lesson, of Colombia, in having the pileum citrine or orange citrine posteriorly, fading anteriorly to aniline yellow, sulphine yellow, or strontian yellow; bill stouter. Female with throat more heavily streaked with black; crown as in male.

Named for the collector, William Clarke-Macintyre, director of the museum of the Universidad Central del Ecuador, Quito.

Capito auratus conjunctus, subsp. nov.

Type.—Univ. Mich. Mus. Zool. No. 87786; ♂ ad.; Pozuzo, eastern Peru; December, 1903; W. Hoffmanns.

Characters.—Differs from *punctatus* of Colombia in having the pileum about bister, fading anteriorly to sulphine yellow, with the feathers of the anterior part of the crown strongly washed or streaked with orange; male with smaller streaks on sides; female much less heavily streaked on throat, breast, and sides than either *punctatus* or *macintyrei;* bill weak as in *punctatus.*

Remarks.—In a series of seven topotypes of *punctatus* from Buena Vista, Colombia, borrowed from the American Museum through the kindness of Mr. John T. Zimmer, the posterior part of the pileum is mummy brown, passing into medal bronze or orange citrine on the anterior portion. An

old specimen in the U. S. National Museum, without original label but said to have been collected by Prof. Orton at Archidon on the Rio Napo, agrees with Colombian material, and I suspect that it may have come from the north, as many of Orton's specimens did. Two recently collected skins of authentic Rio Napo origin in our collection agree with others from the Oriente.

Conjunctus, in the orange tinge on the crown and the reduction of streaks below in the female, constitutes a link between the forms *punctatus* and *macintyrei* on the one hand and with *auratus* and *inexpectatus* on the other.

The difference in shape and stoutness of the bill of the Ecuadorean birds is apparent to the eye, but I have been unable to express it by measurements.

Material examined.—*C. a. punctatus*—Colombia: Buena Vista 7; not further specified 1. *C. a. macintyrei*—Ecuador: Andoas, Rio Pastaza 1; Tunegrama, Rio Pastaza 1; Rio Cotapino 2; Rio Napo 2. *C. a. conjunctus*—Peru: Pozuzo 2; Moyobamba 2; not further specified 1.

Vol. 52, pp. 137–138 October 11, 1939

PROCEEDINGS
OF THE
BIOLOGICAL SOCIETY OF WASHINGTON

NOTES ON THE RACES OF *RHEA AMERICANA* (LINNAEUS).

BY PIERCE BRODKORB.

Dearth of museum material has always hampered study of the struthious birds. The subspecific status of the rheas of Paraguay remained undetermined until last year when the University of Michigan received a series of an unrecognized race from the Chaco. Recently we have received four additional skins from eastern Paraguay, which prove to belong to a second unrecognized form.

The large rivers of South America seem to be impassable faunal barriers for these flightless birds, for it appears that the Pilcomayo, the Paraguay, and the Paraná, at least, form boundaries of the ranges of different races. Subspecific variation follows certain geographic trends. Size tends to increase southward and color to deepen. The largest form of all occurs in the Chaco, but in apparent response to climatic conditions its color has turned pale, instead of darkening.

A summary of the characters and ranges of the known subspecies follows.

Rhea americana americana (Linnaeus).

Struthio americanus Linnaeus, Syst. Nat., ed. 10, 1758 : 155. Pernambuco, Brazil, ex Marcgrave.

Characters.—Size small (tarsus 305 mm.); interscapular region dark brown; neck dull white.

Range.—Northeastern Brazil: Maranhão to northern Bahia.

Rhea americana intermedia Rothschild and Chubb.

Rhea americana intermedia Rothschild and Chubb, Nov. Zool., 21, 1914: 223. Barra San Juan, Colonia, Uruguay.

Characters.—Size small (tarsus 300–307 mm.); interscapular region ash gray; neck buffy white.

Range.—Southern Brazil and Uruguay.

Rhea americana nobilis, subsp. nov.

Type.—Univ. Mich. Mus. Zool., No. 100,001; male adult; 40 kilometers west-southwest of Capitán Bado, east Paraguay; November 16, 1938; A. Schulze, original No. 7266.

Characters.—Size large (tarsus 342–366 mm.); interscapular region dark brown; lower half of neck jet black, upper half orange-cinnamon; flanks vinaceous cinnamon to pinkish buff.

Range.—Paraguay, east of the Rio Paraguay (Capitán Bado, Horqueta, Rosario). The specimen from near Rosario is an immature bird and is referred to this race on geographical grounds.

Rhea americana albescens Arribalzaga and Holmberg.

Rhea albescens Arribalzaga and Holmberg, Naturalista Argentina, 1, 1878: 101. Carhue, Buenos Aires, Argentina; albino!

Rhea rothschildi Brabourne and Chubb, Ann. & Mag. Nat. Hist., 8th ser., 8, 1911: 273. Los Yngleses, Ajó, Buenos Aires, Argentina.

Characters.—Size large (tarsus 330–337 mm.); interscapular region black; neck mostly black.

Range.—Plains of Argentina, south to Rio Negro.

Rhea americana araneipes Brodkorb.

Rhea americana araneipes Brodkorb, Occ. Pap. Mus. Zool. Univ. Mich., No. 367, 1938 : 1. Kilometer 195, west of Puerto Casado, Paraguay.

Characters.—Largest (tarsus 351–370 mm.); interscapular region grayish brown; lower third of neck black, upper two-thirds pale buffy; flanks ashy gray.

Range.—Paraguayan Chaco. It is probably also this race which inhabits eastern Bolivia. The status of Matto Grosso birds is undetermined; they are probably either *araneipes* or *nobilis*, since the measurements published by Stone are large.

Vol. 52, pp. 139–144 October 11, 1939

PROCEEDINGS

OF THE

BIOLOGICAL SOCIETY OF WASHINGTON

THE GENERA OF PHALLOSTETHIDAE.

BY ALBERT W. C. T. HERRE,

Stanford University, California.

The little fishes known as Phallostethidae are among the most remarkable of all living fishes. The males have an extraordinary muscular organ attached to the under side of the head and throat. This structure bears either one or two movable external bones, which Regan, the discoverer and first describer of any of this group, says are not homologous with any bones in ordinary fishes. This whole complicated structure is a priapium, or copulatory organ. The movable bone or bones are used in clasping the female, fertilization being internal. The eggs are thread-bearing and are attached to aquatic plants.

Regan described two genera and three species, from brackish water in Malaya, and placed them in the *Cyprinodontidae*. Some years later I discovered three species, belonging to two genera, in mountain brooks and fresh water lakes in Luzon, P. I. Two species had a first dorsal, a feature not possessed by any cyprinodont, but I blindly followed Regan's arrangement.

The discovery of additional species by Villadolid, Myers, Smith, and Manacop, threw new light on Phallostethid affinities. Hubbs pointed out their relationship to atherinid fishes, and Myers created a new suborder for them in the order Percesoces, equal to the suborders Mugiloidea and Polynemoidea. The work of Bailey seems to lead with little doubt to the conclusion that the priapium is comparable to the pelvic girdle complex of the polynemid fishes.

The arrangement of the 14 different species of Phallostethidae now known, is a matter of some difficulty. Genera have been created by Regan, myself, Myers, and Aurich. The latter writer has done a very fine piece of

work on the skeletal morphology of the priapium, studying four Philippine species, two of which are described by him as new. These two he has placed in a new genus, *Solenophallus*, but they evidently do not belong in the same genus. As he has failed to designate a genotype for his genus, it has no standing under the International Rules of Nomenclature. However, I accept his genus although his defective descriptions of species and genus make it difficult to tell exactly what he had, without specimens for comparison.

In my own papers, as well as in those by Myers, Villadolid and Manacop, a certain error has been repeated. We have all given the name of pulvinulus to what is really the pulvinular appendage. Had any of us studied carefully Regan's excellent figures along with our specimens we would not have made this error. Aurich has recognized the difference, but has rejected Regan's analysis. He names the pulvinulus "Priapbug," and applies pulvinulus to the pulvinular appendage.

The discovery of an additional species in Luzon by Manacop, and one in Borneo by me, and further collections by me in the Philippines, Borneo, and Malaya, and the appearance of Aurich's paper, all in 1936–37, necessitate the diagnosis of additional genera, and a new generic key.

Key to the Genera of Phallostethidae.

A. A toxactinium present, with a shield-like pulvinulus over its base; one ctenactinium present.

B. Anal fin of 26 to 28 rays; ctenactinium serrated; jaws equal or lower slightly included; first dorsal not observed; abdomen of female with a groove.....1. PHALLOSTETHUS Regan

BB. Anal fin of 14 or 15 rays; ctenactinium not serrated; lower jaw projecting; first dorsal of 1 ray; no groove on female abdomen .....2. PHENACOSTETHUS Myers

AA. Toxactinium absent; pulvinulus reduced, small, or even absent, its appendage variously shaped or absent.

C. No first dorsal; 2 ctenactinia, one very short.

D. Nape and opercles scaled. Anal I–13–18; no pulvinulus or appendage visible, the appendage replaced by a thin strip of tender skin....3. MIROPHALLUS Herre

DD. Nape and opercles naked; anal I–18–21; an oval pulvinular appendage visible, its margin free.....
4. SOLENOPHALLUS Aurich

CC. A first dorsal of 1 or 2 rays; nape and opercles naked except 1 species of *Neostethus* with 3 opercular scales.

E. 2 long ctenactinia present; no comb-like cilia on hind end of priapium.

F. No pulvinulus or appendage visible, but only a thin strip of tender skin; mountain brook fishes with rather stout body.....
5. GULLAPHALLUS Herre

FF. Pulvinulus reduced, its appendage visible as an oval plate with depressed center on aproctal side of priapum, its tip or posterior half more or less free, and its margin almost wholly free.

Brackish water fishes of very slender form and strongly marked "neck"; a small fringe of coarse cilia sometimes present on the tissue connecting neck and priapum and concealed by the projecting rounded end of the latter.....6. CERATOSTETHUS Myers

EE. A single long ctenactinium present in adult males; comb-like cilia on hind end of priapum present or absent.

G. Ctenactinium slender, strongly curved, without a membranous fold or margin along its edge; priapium without a flat many-spined process on infrasulcular prominence.

H. Female with a curved, sharp-pointed bony projection from the breast, beneath gill opening and behind anus; males without visible pulvinulus, and no pulvinular appendage; no comb-like fringe of cilia on hind end of priapium.....

7. ACANTHOSTETHUS Herre, new genus

HH. No pointed bony papilla on breast of female; a fringe of comb-like cilia on rear margin of priapium; pulvinular appendage oval, its pointed posterior tip more or less free, its margin free or nearly so.

I. Priapium without an open fringed groove (one species with 3 opercular scales) 8. NEOSTETHUS Regan

II. An open groove on priapium, with a dense fringe along both margins.....

9. CTENOPHALLUS Herre, new genus

GG. Ctenactinium little curved, with a broad membranous margin along lower side of its proximal half; region of infrasulcular prominence with a large flat fleshy process, with 9 or 10 short sharp recurved spines on upper hind border, and 2 longer forward-pointing spines on its front edge; no comb-like fringe on hind end of priapium.....10. PLECTROSTETHUS Myers

Genus PHALLOSTETHUS Regan.

Phallostethus dunckeri Regan.

Only known from Regan's description and specimens from Johore.

Genus PHENACOSTETHUS Myers.

Phenacostethus smithi Myers.

Abundant in canals in Bangkok, Siam; not known elsewhere as yet.

Genus MIROPHALLUS Herre.

Mirophallus bikolanus Herre.

Known only from Lakes Bato and Lanigay, both fresh water, in southeastern Luzon.

Genus SOLENOPHALLUS Aurich.

Solenophallus thessa Aurich.

Known only from the large fresh-water lake, Mainit, in northeastern Mindanao.

Genus GULAPHALLUS Herre.

Gulaphallus eximius Herre.

Scales in longitudinal series, 56–58. Only known from two collections made by me from a mountain brook near Santa Fe, Nueva Vizcaya province, Luzon. This is the largest and bulkiest of known phallostethids.

Gulaphallus mirabilis Herre.

Scales in longitudinal series, 34–38. Abundant in various streams belonging to the drainage system of Manila Bay. Its presence in the Molawin, a brook running through the campus of the College of Agriculture, near Laguna de Bay, Luzon, enabled Villadolid and Manacop to study its habits, breeding, embryology, and the ontogeny of the external parts of the priapium. The osteology has been carefully worked by Bailey.

Genus CERATOSTETHUS Myers.

Ceratostethus bicornis (Regan).

Abundant in brackish waters on the island of Singapore. It is also reported by Myers from Palawan, P. I. The 3 original immature types came from Kuala Langat, on the coast of Selangor, Malay Peninsula.

ACANTHOSTETHUS HERRE, new genus.

Genotype *Acanthostethus falcifer* (Manacop), from central Luzon, P. I.

This genus is set apart from other Phallostethid fishes by the possession in the female of a curved, sharp-pointed bony papilla or projection from the breast. It is beneath the gill opening and behind the anal opening, which is in the throat below the opercle. The abdominal fringe, anus, oviduct, and ureter opening are not in a groove.

In adult males there is a single strongly curved slender ctenactinium, articulated to the side of the enlarged free posterior end of the priapium;

its tip usually lies in a groove between the chin and the anterior end of the priapium, but sometimes it perforates the tissue near the junction of the anterior end of the priapium and the head. On the side opposite the base of the ctenactinium is a small bone just beneath the skin, its hard sharp hooked tip projecting almost at a right angle from the corner of the anterior end of the free part of the priapium. This tiny bone is probably the same as the papillary bone supporting the seminal papilla in *Neostethus*.

There is no visible pulvinulus or pulvinular appendage; the part marked pulvinulus in Manacop's figure is a part of the posterior half of the priapium. There is no comb-like fringe of cilia on the rear end of the priapium, its projecting rounded posterior being perfectly smooth.

The anal fin is of moderate length, II–13–14; first dorsal II, over the anterior half of the anal fin; second dorsal I–6, its origin over the posterior part of the anal fin. The head, nape, and throat are without scales. Scales 30 to 32 in a longitudinal, 7 in a transverse series, and 14 to 16 predorsal scales.

One species known from brooks around Mt. Arayat, and gurami ponds in the municipality of Mexico, Pampanga Province, Luzon. The eggs and embryology of this fish have been studied and reported upon by Manacop.

Genus NEOSTETHUS Regan.

The limits of this genus are not well understood, as no specimens of the type species are available in this country for comparison. There seems to be considerable variation in the development of the small spine called a second actinium by Villadolid and Manacop, and "Priapklaue" by Aurich.

Neostethus lankesteri Regan.

The only specimens known are those described by Regan, 5 adult males and one adult female, from the Muar River, and from Singapore, all from brackish water.

Neostethus amaricola (Villadolid and Manacop).

Widespread in brackish water creeks and mangrove swamps in the Philippines. Originally described from a suburb of Manila, it is known from the northeastern tip of Luzon to Leyte and Negros. It is abundant about Dumaguete, and probably occurs on most Philippine coasts.

Neostethus siamensis Myers.

Only known from one female, collected in the estuary of the Chantabun River, southeastern Siam, by Dr. H. M. Smith.

Neostethus borneensis Herre.

This delicate little fish swarms in tidal creeks and brackish water swamps around Sandakan Bay, British North Borneo. Scales in lateral series 26 or 25 in males, 26 or 27 in females; predorsal scales 15 or 16; rarely more in females; 3 large scales on the opercles. First dorsal II, or rarely I; second dorsal I–4; anal II–13–12; pectoral I–8. Origin of second dorsal over base of 12th or 13th anal ray in males; in females it is over the base of the last ray, or behind the anal.

CTENOPHALLUS HERRE, new genus.

From other phallostethids this genus is separated by the different structure of the priapium. On the ventral side of the penis bone is an open groove, bordered on both margins by fine cilia, as shown in Aurich's figures. The large pulvinular appendage is almost equal to the diameter of the eye. The posterior end of the priapium has a comb-like row of cilia. First dorsal I; second dorsal 5, rarely 6 or 7; anal I–13–16; pectoral I–9 or 10. Gill-rakers long and smooth, 2 plus 13 on the first arch.

Ctenophallus ctenophorus (Aurich).

Only known from specimens collected by Woltereck, and said by Aurich to come from tributaries of Laguna de Bay, Luzon, P. I. It is a pity a more definite locality was not given, as it certainly does not occur in some of the tributaries flowing into this great fresh water lake. In most respects it seems to be very close to *Neostethus amaricola*, a brackish water species.

Genus PLECTROSTETHUS Myers.

Plectrostethus palawanensis Myers.

Known only from the west coast of Palawan, P. I.

LITERATURE CONSULTED.

AURICH, H. Die Phallostethiden, Int. Revue Hydrob. und Hydrog. Band 34, pp. 263–286, 1937.

BAILEY, RALPH J. The Osteology and Relationships of the Phallostethid Fishes. Journ. Morph., vol. 59, pp. 453–483.

HERRE, ALBERT W. C. T. Two Strange New Fishes from Luzon. Phil. Journ. Sci., vol. 27, pp. 507–513, 1925.

—— —— Four New Philippine Fishes. Phil. Journ. Sci., vol. 31, pp. 533–543, 1926.

MANACOP, P. R. A New Phallostethid Fish, with Notes on Its Early Development. Phil. Journ. Sci., vol. 59, pp. 375–381, March, 1936.

MYERS, GEORGE S. The Systematic Position of the Phallostethid Fishes, with Diagnosis of a New Genus from Siam. Am. Mus. Novitates No. 295, pp. 1–12, 1928.

—— —— A New Phallostethid Fish from Palawan. Proc. Biol. Soc. Washington, vol. 48, pp. 5–6, 1935.

—— —— Notes on Phallostethid Fishes. Proc. U. S. Nat. Mus., vol. 84, pp. 137–143, 1937.

REGAN, C. T. The Morphology of the Cyprinodont Fishes of the Subfamily Phallostethinae, with Descriptions of a new Genus and Two New Species. Proc. Zool. Soc. London, 1916, pp. 1–26, 1916.

SMITH, HUGH M. The Fish Neostethus in Siam. Science, new ser., vol. 65, pp. 353–355, 1927.

—— —— Notes on Some Siamese Fishes. Journ. Siam Soc., Nat. Hist. Suppl., vol. 8, pp. 11–14, 1929.

VILLADOLID, D. V., and MANACOP, P. R. The Philippine Phallostethidae, a Description of a New Species, and a Report on the Biology of *Gulaphallus mirabilis* Herre. Phil. Journ. Sci., vol. 55, pp. 193–220, November, 1934.

Vol. 52, pp. 145–146 October 11, 1939

PROCEEDINGS

OF THE

BIOLOGICAL SOCIETY OF WASHINGTON

A NEW ABEILLE'S GROSBEAK FROM TAMAULIPAS.

BY GEORGE MIKSCH SUTTON AND THOMAS D. BURLEIGH.

Among the most interesting specimens obtained by the John B. Semple Ornithological Expedition to northeastern Mexico (January 27 to March 6, 1938) are three adult Abeille's Grosbeaks (two males and a female) which were collected by the authors on March 4, not far from the Sabinas River in the vicinity of Gomez Farias, Tamaulipas, and which apparently represent an undescribed race. This race we propose to call

Hesperiphona abeillii saturata, subsp. nov.

Type.—Adult male in unworn plumage, U. S. Nat. Mus. No. 342075 (Biol. Surv. collection); Rio Sabinas, near the village of Gomez Farias, southwestern Tamaulipas, Mexico, March 4, 1938; collected by Thomas D. Burleigh.

Subspecific characters.—Dullest and most olive-gray of the races of *Hesperiphona abeillii.* Males much less yellow both above and below than in *H. a. abeillii* (Lesson); duller and more olive-gray than in *H. a. cobanensis* Nelson; and darker, olive-backed rather than brown-backed, and considerably shorter-tailed than in *H. a. pallida* Nelson. Females duller throughout than in straight *abeillii;* duller and grayer than in *cobanensis;* and darker, greener-backed, and shorter-tailed than in *pallida.*[1]

Range.—So far as is known, the "hill country" of southwestern Tamaulipas. Probably occurs also in southern Nuevo Leon and eastern San Luis Potosi.

Remarks.—Compared with three male and three female *H. a. abeillii* from Huachinango,[2] Puebla, our three birds are noticeably dull, the males being more olive (less yellow) both above and below, and more extensively black on the throat; the female being *gray* rather than buffy white on the throat, darker throughout the underparts, and much less yellowish-olive on the back. As for *cobanensis,* a form originally described as "brighter"

[1] The tail of Nelson's type measures 63 mm.; in two female *pallida* at hand the tail measures 69 and 71.

[2] Spelled Huachinango and Huachunango in Nelson's original description of *H. a. pallida* (Proc. Biol. Soc. Wash. 41, 1928, 155). Spelled Huanchinango and Huachinango on the labels of six E. A. Goldman specimens at hand.—G.M.S.

even than *abeillii*, Dr. Harry C. Oberholser has been good enough to compare our series with Nelson's type (from Coban, Vera Paz, Guatemala) and he reports our birds as "certainly not of that form, being much duller and more grayish."

The characters of *pallida* have given us trouble. This race was named from a single specimen, a female. The type (from Jesus Maria, Chihuahua) is at the Museum of Comparative Zoology, in Cambridge, Massachusetts. Sending our three birds on, we asked Mr. James L. Peters to compare them for us. This Mr. Peters graciously did, reporting as follows: "The type of *pallida* is a worn breeding female taken in June, very brown above, not a particularly good skin, and most of the feathers are gone off the lower back . . . Your birds are definitely not *abeillii*, but you will have to see more material to tell whether they may be referred to *pallida* or represent another form."

"More material" we finally obtained from Mr. Robert T. Moore, of Pasadena, California, who courteously sent on six specimens, three males and two females from Sinaloa (June and July), and a single male from Chihuahua, all of which we assume to be *pallida*. The last-named bird of the series is decidedly the brightest of the males; but it is also in the freshest plumage, having been collected in May.

Our three Tamaulipas birds are strikingly different from these Sinaloa and Chihuahua *pallida*. They are darker, and green-backed rather than brown-backed. They are definitely shorter-winged and considerably shorter-tailed. In our male *saturata* the tip of the inner web in the two outermost pairs of rectrices is distinctly white, whereas in every male *pallida* at hand the tail is wholly black. The gray tertials and proximal greater coverts are much darker in our three *saturata* than in any of the *pallida* at hand. Our single female *saturata* is darker and more olive-brown below than any of the three Sinaloa females, but less extensively black on top of the head, the crown patch terminating at the occiput, whereas in the two Sinaloa females the whole of the nape and back of the neck are black. This reduction in the amount of black in the crown-patch may possibly be a characteristic of subadult plumage; the fact nevertheless remains that this single Tamaulipas female is much darker, on the whole, than either of the Sinaloa females.

MEASUREMENTS.

MALES.

	Wing	*Tail*	*Exposed Culmen*	*Tarsus*
3 *abeillii*	101–106 (104)	62–66 (64.6)	21–21.5 (21.1)	20–22 (20.8)
2 *saturata*[1]	104, 101	62, 65	21, 21	21.5, 21
4 *pallida*	108–112 (110)	69–71 (70.5)	20–21.5 (20.6)	20–21.5 (20.6)

FEMALES.

3 *abeillii*	101–103 (101.6)	61–63 (62)	19.5–21 (20.1)	21–22 (21.1)
1 *saturata*	101	61	20	20.5
2 *pallida*	107, 108	69, 71	20.5, 21	20.5, 20

[1] First measurement throughout series is of type specimen

Vol. 52, pp. 147–150 October 11, 1939

PROCEEDINGS

OF THE

BIOLOGICAL SOCIETY OF WASHINGTON

DESCRIPTIONS AND RECORDS OF HARVEST MICE (GENUS REITHRODONTOMYS) FROM MEXICO.

BY SETH B. BENSON,

Museum of Vertebrate Zoology, University of California.

Harvest mice collected in northern Mexico in the past three years include *Reithrodontomys montanus* Baird, formerly not known to occur in Mexico, and two undescribed forms, one a species belonging to the subgenus *Reithrodontomys*, the other a race of *Reithrodontomys fulvescens* Allen.

Reithrodontomys burti, new species.

Type.—Adult male, skin and skull, no. 83001 Mus. Vert. Zool., collected at Rancho de Costa Rica, Rio Sonora, Sonora, Mexico, on May 3, 1938, by Margarito Delgadillo. Original number 5400 Seth B. Benson.

Distribution.—Coastal flood plains of western Sonora from the Rio Sonora south to near Guaymas.

Diagnosis.—A member of the subgenus *Reithrodontomys* (as defined by Howell, U. S. Dept. Agr., Bur. Biol. Surv., N. A. Fauna No. 36, 1914) characterized by small size, short tail, relatively short hind feet, large ears, pale color, yellowish cheeks, distinct light-colored area surrounding ear, conspicuous pale tuft at anterior base of ear, nearly pigmentless tail, angular skull, abruptly spreading zygomata, large infraorbital foramina, long (7.3 mm.) nearly straight baculum.

Comparisons.—Distinguished from all species of *Reithrodontomys* save *R. montunus* Baird, *R. megalotis* Baird, and *R. humulis* Bachman, in having, on the average, a tail less than 65 mm. in length and shorter than length of head and body.

Compared with *R. montanus* (as defined by Benson, Journ. Mammalogy, vol. 16, 1935, pp. 139–142): Similar in size and proportions except for ears which are much larger. Color paler, of yellowish cast rather than grayish. Cheeks paler and more strongly contrasted with color on top of head. Tail with less pigment, lacking the sharply distinct dark dorsal stripe present in *montanus*. Skull larger, nasals relatively longer, zygomata more angular and spreading more widely anteriorly, infraorbital foramina distinctly

larger, especially on dorsal surface of skull. Baculum longer, nearly straight rather than distinctly curved, more nearly cylindrical at base.

Compared with *R. megolatis:* Slightly smaller in body size and in weight, tail actually and relatively shorter (averaging only 80% of length of head and body rather than more than 100% as in *megalotis*), hind feet actually and relatively shorter, ears actually and relatively larger. Color paler, ear tufts more conspicuous and paler, tail without a distinct dorsal stripe (a distinct stripe present in *megalotis*). Skull more angular, braincase smaller, rostrum broader, zygomatic arches more robust anteriorly and more nearly parallel. Baculum about same in length, but nearly straight rather than distinctly curved, and more nearly cylindrical at base.

Compared with *R. humulis:* Much paler in color (yellowish gray rather than dark brown, hairs on breast white rather than pigmented), ears much larger (averaging 16.4 mm. from notch rather than 10 mm. or less), skull flatter and wider, zygomatic arches more nearly parallel, infraorbital foramina larger.

Color (Capitalized color terms after Ridgway, Color Standards and Color Nomenclature, 1912).—Dorsal hairs with tips black, subterminal bands Light Ochraceous-Buff to Pale Ochraceous-Buff (darkest distally), bases Dark Plumbeous. Pigmentation of subterminal bands more intense toward sides, where a lateral stripe is evident, and on the rump. Plumbeous pigment much reduced on sides of face and about base of ear allowing yellowish tone to dominate. Subterminal bands short and faintly pigmented on top of head and neck where plumbeous tone of hair bases dominates the general color effect. Skin and hairs of inner surface of pinna dark-pigmented. Feet white. Tail scantily clothed with short hairs, most of which lack pigment. A faint dorsal stripe on the tail in some specimens results mainly from pigment in the skin. Several specimens have no pigment in any of the hairs on the tail.

There is some variation in the intensity of the yellowish pigmentation which is Pinkish-Cinnamon on the most richly colored specimen.

Measurements.—Average, minimum, and maximum measurements in millimeters of 18 adult and subadult males: Total length, 129 (124–132); length of tail vertebrae, 59 (53–66); length of hind foot, 16.4 (16–17); height of ear from notch, 15.5 (14–17); weight in grams, 10.6 (9.7–12.4); length of head and body, 69 (65–72); greatest length of skull, 20.3 (19.7–21.2); breadth of braincase, 9.6 (9.3–10.1); width of outer wall of anteorbital [=infraorbital] foramen, 2.1 (1.9–2.2); length of baculum (10 specimens), 7.3 (6.0–8.3).

Specimens examined.—Total number 37, all from Sonora, Mexico, as follows: 11.3 mi. W. Hermosillo, 3; Rancho de Costa Rica, Rio Sonora, 34.

Remarks.—Among all the species of harvest mice, *R. montanus* bears the closest resemblance to *R. burti.* The relationship between the two is not close, however, as indicated by the trenchant differences between them, particularly in the baculum. There is no evidence of intergradation between the species although *R. montanus* is now known to occur in northeastern Sonora only about 200 miles to the northeast of the range of *burti. R. megalotis* probably is less closely related to *burti* than is *montanus*, and

likewise shows no sign of intergradation with *burti*. Burt, however, (Univ. Mich. Mus. Zool., Misc. Publ. No. 35, 1938, p. 52) recorded from San José de Guaymas, under the name *R. m. megalotis*, a specimen which he regarded as probably representing an unnamed race of *R. megalotis*. The characters listed for this specimen are those present in *burti* and I therefore assume that it belongs to this species. I have named this harvest mouse for Dr. Burt in recognition of his work on the mammals of Sonora.

Comparisons with *humulis* were made only because that species likewise is small and short-tailed. On geographic, ecological, and structural grounds *humulis* is much less closely related to *burti* than are *montanus* and *megalotis*.

In the shape of the baculum (see figure) *burti* is strikingly distinct from *montanus*, *megalotis*, and *fulvescens*, in which this bone is distinctly curved and tends to be broader and more flattened at the base. So distinctive is this character that by it alone *burti* can be distinguished from the other harvest mice occurring in Sonora.

At Rancho de Costa Rica, *burti* was abundant in a field of wheat stubble where two years previously none was caught in spite of intensive trapping. The specimens from 11.3 miles west of Hermosillo were caught on a flat plain of reddish silt which bore a thin stand of dry grass, and scattered trees of mesquite, palo verde, and palo fierro. This is probably the original habitat of the species.

Reithrodontomys fulvescens canus, new subspecies.

Type.—Adult male, skin and skull, no. 76664 Mus. Vert. Zool., collected five miles southeast of Chihuahua, Chihuahua, Mexico, on May 20, 1937, by Margarito Delgadillo. Original number 4446 Seth B. Benson.

Distribution.—High desert plains of Chihuahua and Durango.

Diagnosis and comparisons.—The palest race of *Reithrodonotomys fulvescens* known, characterized chiefly by grayish color of head and shoulders. Compared with *R. f. fulvescens:* Averages slightly larger; skull with braincase more inflated and rostrum longer; pigmentation less intense, especially on head and shoulders where the prevailing color is Pale Ochraceous-Buff rather than Light Ochraceous-Buff.

Color.—Dorsal hairs with tips colorless or black, subterminal band Light Ochraceous-Buff to Pale Ochraceous-Buff (darkest distally), bases Slate Color. Subterminal band palest on head and shoulders, darkest on rump and toward sides. A lateral stripe of between Light Ochraceous-Buff and Ochraceous-Buff is present. Hairs of ventral surface with tips white, bases Slate Color.

In *canus* the color of the subterminal band is not only less intense than in *fulvescens*, but is less even in distribution with a much greater difference in intensity of color between the distal and proximal portions of the subterminal band.

Measurements.—Average, minimum, and maximum measurements in millimeters of 7 adult and subadult males: Total length, 172 (158–187); length of tail vertebrae, 97 (87–109); length of hind foot, 20 (19–22); ear from notch, 15 (14–16); weight in grams, 12.9 (12.0–13.3); greatest length

of skull, 22.1 (21.0–23.0); breadth of braincase, 10.4 (10.1–10.8); length of nasals, 8.6 (8.0–9.1); width of outer wall of anteorbital [=infraorbital] foramen, 2.0 (1.8–2.2).

Specimens examined.—Total number 14, from localities in Mexico as follows: *CHIHUAHUA:* Cañon del Potrero, 7 miles west El Sauz, 2; Cañon Gotera, 9 miles northwest of Chihuahua, 2; 5 miles southeast of Chihuahua, 2; Pozo Mangiay, 30 miles south of Chihuahua, 1; San Lucas, Rio San Pedro, 2. *DURANGO:* 14 miles east of Zarca, 5.

Reithrodontomys montanus griseus Bailey.

The first specimen of *R. montanus* from Mexico was collected by Margarito Delgadillo and myself on May 30, 1936, among sacatón about 21 miles south of Agua Prieta, Sonora, in close proximity to Kilometer 30 on the railroad between Agua Prieta and Nacozari. The second I collected on June 9, 1937, on a short-grass plain five kilometers southwest of Canutillo, north-central Durango. These two locality records constitute a great extension of the known range of *Reithrodontomys montanus* to the west and south, as Socorro, New Mexico, was previously the westernmost locality, and San Antonio, Texas, the most southern. Probably the species will be found to occur throughout the plains of the Mexican plateau.

The specimens are nearly identical in color and size, but the skull of no. 76658, from Durango, is larger and the braincase relatively more inflated than in no. 75697, from Sonora. Each agrees in most characters with specimens of *R. m. griseus*, to which I refer them pending fuller knowledge of geographic variation in *R. montanus*.

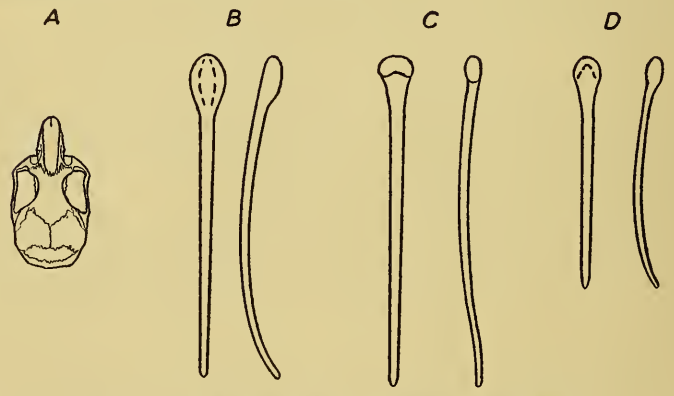


Figure 1. A. Skull of type of *R. burti*, dorsal view, x i.

B–D. Bacula of species of harvest mice, ventral and lateral views, x6. B. *R. megalotis megalotis* (no. 82972). C. *R. burti* (type). D. *R. montanus* (no. 75897).

Vol. 52, pp. 151–154 October 11, 1939

PROCEEDINGS
OF THE
BIOLOGICAL SOCIETY OF WASHINGTON

DESCRIPTIONS OF TWO SUBSPECIES OF POCKET GOPHER (*THOMOMYS BOTTAE*) FROM SONORA.

BY SETH B. BENSON AND DANIEL F. TILLOTSON,
Museum of Vertebrate Zoology, University of California.

Study of pocket gophers from Sonora, Mexico, shows the presence there of two races which previously have not been recognized.

Thomomys bottae occipitalis, new subspecies.

Type.—Adult female, skin and skull, no. 82221 Mus. Vert. Zool., collected at La Misión, 2 miles west of Magdalena, Sonora, Mexico, on March 17, 1938, by Margarito Delgadillo. Original number 4835 Seth B. Benson.

Distribution.—Known only from the type locality.

Diagnosis.—A medium-sized dark-colored race of *Thomomys bottae* characterized by a relatively great extension of the supraoccipital region posterior to the lambdoidal crest.

Comparisons.—Compared with *Thomomys bottae modicus* Goldman, *occipitalis* is larger, less reddish in color. Skull larger, palato-frontal depth and nasal length relatively less, dorsal surface less convex antero-posteriorly, supraoccipital and exoccipital regions more inflated, bulge on supraoccipital above foramen magnum less distinct. Compared with *Thomomys bottae winthropi* Nelson and Goldman, *occipitalis* is smaller, darker and duller in color, with pelage denser and longer. Skull smaller, palato-frontal depth less, interorbital breadth relatively greater, zygomata less widespreading and narrower at squamosal base, zygomata smaller at juncture of jugal and maxillary, paraoccipital processes less prominent, occiput less truncate, mastoid portion of auditory bullae relatively more inflated.

Color (capitalized color terms after Ridgway, Color Standards and Color Nomenclature, 1912).—Dorsal hairs with tips black, subterminal bands Ochraceous-Buff, basal portions Deep Neutral Gray. In mid-dorsal region the subterminal bands are reduced, allowing color of basal portions to dominate. Color of the subterminal bands becomes more dominant and paler toward the flanks where it is Light Ochraceous-Buff. Hairs of ventral

surfaces with bases of Neutral Gray and tips of Light Ochraceous-Buff. Muzzle blackish; throat, anal region, and feet white.

There is some variation in the series in the intensity of pigmentation and in the amount of black along the dorsum. Also, some specimens lack white on the throat and anal region. The specimens of *occipitalis* are definitely less reddish than the specimens of *modicus* and are darker and duller than the specimens of *winthropi*.

Measurements.—Average and extreme measurements, in millimeters, of seven adult females are: Total length, 224.5 (216–233); tail, 71.9 (64–79); hind foot, 29.4 (28–30); basilar length of Hensel, 33.8 (31.8–36.2); greatest mastoidal breadth, 19.9 (18.5–21.0); greatest zygomatic breadth, 23.6 (22.8–26.0); interorbital breadth, 6.9 (6.7–7.3); rostral breadth, 8.1 (7.6–8.6); palato-frontal depth, 14.3 (13.6–15.3); length of nasals, 13.0 (11.8–13.7). Measurements of seven adult males are: Total length, 245.8 (222–261); tail, 81.5 (73–93); hind foot, 30.3 (28–33); basilar length of Hensel, 36.5 (33.4–39.6); greatest mastoidal breadth, 21.5 (20.1–23.1); greatest zygomatic breadth, 26.4 (23.4–28.7); interorbital breadth, 6.9 (6.5–7.8); rostral breadth, 8.8 (8.1–9.4); palato-frontal depth, 15.4 (14.1–16.3); length of nasals, 14.3 (12.6–15.4).

Specimens examined.—Total number, 14, from the type locality.

Thomomys bottae estanciae, new subspecies.

Type.—Adult female, skin and skull, no. 82247 Mus. Vert. Zool., collected at La Estancia, 6 miles north of Nacori, Sonora, Mexico, on May 19, 1938, by Margarito Delgadillo. Original number 5625 Seth B. Benson.

Distribution.—Known only from the type locality.

Diagnosis.—A medium-sized, cinnamon-colored race of *Thomomys bottae* characterized by a relatively narrow occipital region, broad interorbital region, and wide-spreading zygomatic arches, which features make the brain case appear narrow.

Comparisons.—Compared with *Thomomys bottae winthropi* Nelson and Goldman, *estanciae* is smaller, more reddish. Skull smaller, zygomatic breadth and mastoid breadth relatively less, interorbital breadth relatively greater, anterior portion of zygomatic arch forming a more oblique angle with skull, mastoid portion of auditory bullae relatively less inflated. Compared with *Thomomys bottae camoae* Burt, *estanciae* is smaller, dorsum lighter and brighter in color. Skull smaller; mastoidal breadth, zygomatic breadth, and palato-frontal depth relatively less; interorbital breadth relatively greater; supraoccipital region more extended posterior to lambdoidal crest; external auditory meatus smaller; nasals nearly straight (not expanded anteriorly); anterior end of auditory bulla truncate (not rounded); pterygoid hamuli less wide-spreading.

Color.—Dorsal hairs with tips black, subterminal bands Cinnamon-Buff, basal portions Deep Neutral Gray. In mid-dorsal region subterminal bands slightly reduced, revealing basal portions, thus giving dorsal surface a dark aspect. Color of subterminal bands more dominant and paler toward flanks, where color is Light Ochraceous-Buff. Hairs of ventral

surface with bases of Deep Neutral Gray and tips of Light Ochraceous-Buff. Muzzle blackish, cheeks Cinnamon-Buff, feet white.

There is some variation in the series in the intensity of pigmentation and in the amount of black along the dorsum. Compared with *camoae, estanciae* is lighter and brighter on the dorsum. Immature specimens of *estanciae* are definitely paler than those of *camoae.* Compared with *winthropi, estanciae* is slightly more reddish.

Measurements.—Average and extreme measurements in millimeters of three adult females are: Total length, 221.3 (210–228); tail, 68.6 (67–70); hind foot, 29.3 (29–30); basilar length of Hensel, 33.8 (32.5–35.1); greatest mastoidal breadth, 19.8 (19.2–20.3); greatest zygomatic breadth, 24.4 (23.9–24.9); interorbital breadth, 7.0 (6.8–7.2); rostral breadth, 7.9 (7.3–8.4); palato-frontal depth, 14.6 (14.0–15.4); length of nasals, 12.8 (12.8–12.9).

Specimens examined.—Total number, 7, all from the type locality.

Remarks.—Specimens of *T. b. divergens* from northeastern Sonora and western Chihuahua were not available to us for comparison, but judging from the original description of *divergens* (Nelson and Goldman, Journ. Mammalogy, vol. 15, 1934, pp. 122–123), *estanciae* is paler, for *divergens* was stated to be darker than *modicus* and we find *estanciae* to be paler than the palest specimens of *modicus.*

Vol. 52, pp. 155–156 October 11, 1939

PROCEEDINGS

OF THE

BIOLOGICAL SOCIETY OF WASHINGTON

A NEW RACE OF THE MANGROVE SWALLOW FROM NORTHWESTERN MEXICO.

BY A. J. VAN ROSSEM.

In the latter part of April, 1930, while engaged in collecting along the Sonora coast, I was interested to find *Iridoprocne albilinea* not uncommon in the mangrove lagoons of Tobari Bay. This locality, though well within the Arid Tropical Zone, is far to the north of the nearest place (Mazatlan, Sinaloa) from which the species had been reported previously. Unfortunately, only five days could be devoted to Tobari Bay and in the press of making a general collection there only three Mangrove Swallows were taken. Certain peculiarities in these specimens were noted subsequently but were thought to be individual in nature. Recently five additional Sonora specimens taken by J. Elton Green have become available through the courtesy of the Natural History Museum, as well as three specimens in perfect, newly acquired plumage from San Blas, Nayarit, from the California Academy of Sciences. These 11 specimens have been compared with a total of 35 *albilinea* from El Salvador and Costa Rica in the Dickey collection, from Costa Rica and Panama in the Museum of Comparative Zoology, and from Costa Rica in the Los Angeles Museum. As a result the northwestern birds are found to be a distinct race which is here described as

Iridoprocne albilinea rhizophorae, subsp. nov.

Type.—Breeding female adult, no. 30306, Dickey collection; Tobari Bay, Sonora, Mexico, April 30, 1930; collected by A. J. van Rossem, original no. 13021.

Subspecific characters.—Similar to *Iridoprocne albilinea albilinea* (Lawrence) of Panama but upper parts distinctly more bluish (less greenish); white supraloral streaks broader and more conspicuous and usually meeting

across the forehead; rump more purely white with the dusky shaft streaks reduced to very faint lines and with the concealed or semi-concealed subterminal spots obsolete; bill smaller and also more wedge-shaped in vertical profile, its width at frontal antiae equal to the length of the exposed culmen.

Range.—Coast of northwestern Mexico from southern Sonora (Guasimas; Lobos Island; Tobari Bay; Agiabampo), south at least to Nayarit (San Blas).

Remarks.—The dorsal plumage of this species varies considerably with season, birds in fresh plumage being bluish green and becoming progressively bluer until by spring they are steely blue with greenish reflections. In color comparison *rhizophorae* in absolutely fresh plumage is very much like worn *albilinea.* These differences tend to become obscured by wear but, even so, *rhizophorae* in worn plumage averages considerably bluer than *albilinea* in the same condition. In only one of the 11 *rhizophorae* do the white supraloral streaks not meet across the forehead, and even in this case I am not sure that the exception is not due to the "make" of the skin. The bill differences are *much* more conspicuous to the eye than can be shown by linear measurements, the bulk of the bill of *rhizophorae* being about half that of *albilinea.* Incidentally, the bills of immature *albilinea* are sometimes as small as those of adult *rhizophorae,* even in specimens well into the post-juvenal moult.

The winter range of *rhizophorae* I do not know. The species is well known to be a year-round resident as far north as Mazatlan but on two occasions no trace of it has been found in Sonora during the winter months.

Measurements of Bill.

	Exposed culmen	*Width at frontal antiae*
7 male *rhizophorae*	6.5 – 7.0 (*6.7*)	6.5 – 7.0 (*6.6*)
15 male *albilinea*	7.5 – 8.0 (*7.7*)	6.5 – 7.0 (*6.7*)
4 female *rhizophorae*	6.0 – 7.0 (*6.4*)	6.0 – 7.0 (*6.4*)
10 female *albilinea*	7.5 – 8.5 (*7.8*)	6.8 – 7.5 (*7.0*)

Vol. 52, pp. 157–158 October 11, 1939

PROCEEDINGS
OF THE
BIOLOGICAL SOCIETY OF WASHINGTON

A NEW GEOGRAPHIC RACE OF *PEROMYSCUS LEUCOPUS* FROM NOVA SCOTIA.

BY RONALD W. SMITH,
Museum of Vertebrate Zoology, University of California.

Critical comparison of white-footed mice, collected by the writer in Kings County, Nova Scotia, indicates the existence of a new geographic race. This new race may be known as:

Peromyscus leucopus caudatus, subsp. nov.

Type.—Male, adult, skin and skull; no. 84535, Mus. Vert. Zool.; Wolfville, Kings County, Nova Scotia; collected by Ronald W. Smith, November 11, 1937; original no. 1502.

Distribution.—Western Nova Scotia.

Diagnosis.—A race of *Peromyscus leucopus* characterized by long tail, light color, slender rostrum, short maxillary tooth row, anteriorly slender zygomatic arch, and short skull.

Comparison.—Compared with *Peromyscus leucopus noveboracensis*, from eastern Pennsylvania, New York, eastern Massachusetts, and southern Ontario, *caudatus* shows the following differences: Brain-case smaller; skull shorter; rostrum narrower and more tapering anteriorly; maxillary tooth row shorter; zygoma slenderer anteriorly; external auditory meatus larger; pelage paler dorsally, and white, rather than grayish, ventrally; dorsal surface of tail lighter brown; tail longer.

Measurements.—Average and extreme measurements, in millimeters, of ten adult males and females, from Wolfville, Kings County, are as follows: Total length, 179.5 (167–198); tail vertebrae, 93.0 (83.5–105.0); hind foot, 21.3 (21–22); greatest length of skull, 25.5 (24.4–27.3); greatest width of brain-case, 11.7 (11.2–12.0); interorbital constriction, 4.0 (3.9–4.2); nasals, 9.9 (9.1–10.9); anterior width of rostrum, 3.2 (3.0–3.4); posterior width of rostrum, 4.7 (4.3–5.0); shelf of bony palate, 4.1 (3.9–4.6); palatine slits, 5.1 (4.7–5.4); postpalatal length, 9.3 (8.8–10.3); maxillary tooth row, 3.4 3.3–3.6).

Remarks.—In 1909, Osgood (N. Am. Fauna, no. 28, p. 119) commented on the longer tails of six specimens from Digby and Hants counties, Nova Scotia, but referred them to *Peromyscus leucopus noveboracensis* at that

time. These specimens are probably assignable to the newly named race, *caudatus*.

The writer is indebted to Dr. E. Raymond Hall and Dr. Seth B. Benson, of the Museum of Vertebrate Zoology, for advice in the present study, and also to Mr. E. C. Cross, for the loan of specimens in the Royal Ontario Museum of Zoology.

Specimens examined.—Total number, 29, all from Kings County, Nova Scotia, as follows: Wolfville, 19; 1½ miles east of Wolfville, 9; 2½ miles east of Wolfville, 1. Nineteen of these specimens are in the Museum of Vertebrate Zoology and ten are in the Royal Ontario Museum of Zoology.

Vol. 52, pp. 159–162 October 11, 1939

PROCEEDINGS

OF THE

BIOLOGICAL SOCIETY OF WASHINGTON

TWO NEW GOPHERS (MAMMALIAN GENUS THOMOMYS) FROM WESTERN UTAH.

BY STEPHEN D. DURRANT.

In the course of a study of the pocket gophers of Utah, comparisons have revealed that the animals from Clear Lake, in Delta Valley, and those from Stansbury Island, Great Salt Lake, represent two unnamed subspecies of *Thomomys bottae*. The diagnoses are as follows:

Thomomys bottae convexus, subsp. nov.

Type.—Male adult, skin and skull, No. 2482, Museum of Zoology, University of Utah; E. side Clear Lake, 4600 ft., Millard County, Utah; May 20, 1938; collected by S. D. Durrant; original No. 1401.

Range.—Western Utah, in Delta Valley, limits of range unknown.

Diagnosis.—Size medium (see measurements); Color: Upper parts and sides Pinkish Buff, lighter on sides; under parts Pale Pinkish Cinnamon; inguinal and pectoral regions Pale Pinkish Buff; post auricular patches black; nose grayish black; nearly all specimens have white on perineal region. (Capitalized color terms according to Ridgway, Color Standards and Color Nomenclature, Washington, D. C., 1912). Skull: Brain case moderately convex on dorsal surface; rostrum strongly depressed, giving the entire dorsal surface of the skull a "rocker-shape"; zygomatic arches heavy, wide-spreading and widest posteriorly; upper incisors recurved, short and heavy; molars large; alveolar length of upper molar series long; palatal pits deep; foramen magnum quadrangular; auditory bullae moderately inflated, the ventral part extending well ventrad of the basioccipital, and angular on anteriolateral margin; mastoidal breadth relatively and actually wide; interpterygoid space "V"-shaped.

Measurements.—The average and extreme measurements of six adult males and 11 adult females from the type locality are, respectively, as follows: Total length, 212.8 mm. (233–206), 196.8 (204–182); tail vertebrae, 59.3 (68–57), 57.4 (63–43); hind foot, 28.2 (29–27), 26.8 (28–26); ear from notch 4, 4. Skull: basilar length of Hensel, 33.1 (35.0–31.3), 29.9 (30.9–27.9); greatest length of nasals, 14.3 (14.6–13.9), 12.5 (13.4–11.2); zygomatic breadth, 24.9 (26.7–23.8), 21.7 (22.3–21.0); mastoidal breadth, 21.4 (22.0–20.7), 19.3 (19.8–18.8); interorbital breadth, 6.6 (6.8–6.5), 6.6

(7.1–6.2); alveolar length of upper molar series, 8.0 (8.1–7.7), 7.7 (7.9–7.1); extension of premaxillae posterior to nasals, 2.6 (2.8–2.1), 2.6 (3.1–2.1); length of rostrum, 16.2 (17.2–15.2), 14.7 (15.2–13.3); breadth of rostrum, 8.2 (8.6–8.0), 7.4 (7.7–7.1); width of upper incisors at cutting edge, 4.5 (4.7–4.3), 4.0 (4.5–3.8).

Comparisons.—Compared with topotypes of *T. b. wahwahensis* this form is of nearly the same color but lighter throughout. It differs in having the rostrum much more depressed; top of skull convex rather than nearly flat; nasals convex rather than straight; brain case more inflated; auditory bullae larger; foramen magnum nearly quadrangular as opposed to circular; alveolar length of upper molar series longer; molars actually larger; angle of upper incisors and palatine processes of premaxillae more acute; zygomatic arch stronger and wider, especially the zygomatic process of the maxillae.

Compared with topotypes of *T. b. centralis*, these gophers are of nearly the same color but uniformly lighter throughout. This coloration is further significant because both series were taken in May, those of *centralis* on May 28, and those of *convexus* on May 20. *T. b. convexus* shows a nearly uniform white patch on the perineal region, while this color is uniformly lacking in *centralis*. Skull: Smaller and flatter; rostrum much shorter, broader and more depressed; upper incisors wider and markedly shorter; palatal pits much deeper; basioccipital wider, not as "T"-shaped, and less expanded at junction with basisphenoid; auditory bullae more inflated; maxillary plate of zygomatic arch more nearly vertical.

Compared with topotypes of *T. b. aureiventris*, *convexus* is less cinnamon, and more blackish in color; none or very little (gold-color) on under side. Skull: Smaller throughout and flatter; rostrum much more depressed and shorter; auditory bullae more inflated; no comparable enlargement of union of jugal and zygomatic process of maxillae; zygomatic arch heavier, especially in region of jugal, and wider posteriorly rather than anteriorly; interpterygoid space "V"-shaped rather than lyre-shaped; foramen magnum quadrangular as opposed to oval; upper incisors smaller, shorter and more recurved.

T. b. convexus differs from topotypes of *T. b. nesophilus* as follows: Size smaller throughout; color much lighter throughout; rostrum shorter, heavier and much more depressed; zygomatic arch shorter, heavier (and not so flaring); jugal heavier and shorter; brain case more inflated; upper margin of supraoccipital more developed as a crest rather than a plate; interparietal not as uniformly triangular shaped; upper incisors shorter and more recurved; palatal pits deeper; foramen magnum quadrangular as opposed to ovale; auditory bullae more inflated.

Comparatively *T. b. convexus* differs from topotypes of *T. b. albicaudatus* in being much lighter in color throughout; tail uniformly light colored without white caudal half as in *albicaudatus;* claws on front feet weaker. Skull: Smaller, flatter and more compact; rostrum shorter, heavier and more strongly depressed; upper incisors shorter and more recurved; zygomatic arch shorter and heavier; jugal bone more massive; looked at from below the space enclosed within the zygomatic arch shows the same differences as noted in the comparison with *T. b. tivius;* auditory bullae actually smaller,

but more inflated ventrally; foramen magnum quadrangular as opposed to oval; mandibular fossae larger.

Among named races of *Thomomys bottae, convexus* is closest geographically to *tivius*, but differs from topotypes of it as follows: Size slightly larger; color much lighter; no gold color on underside. Skull: While nearly of the same dimensions, the skull of *convexus* is much heavier throughout; average weights of series of skulls of males and females show: *tivius* males, 1.6 grams; females 1.2 grams; *convexus* males, 2.4 grams; females 1.6 grams; rostrum broader and much more depressed; upper incisors shorter, heavier, and more recurved; zygomatic arch much heavier throughout; jugal heavy as contrasted with weak; looked at from below the space enclosed within the zygomatic arch in *convexus* is more nearly quadrangular while that of *tivius* is triangular, and the anteriolateral angle in *convexus* is more nearly a right angle as opposed to obtuse; mandibular fossae larger; auditory bullae more inflated; palatal pits larger and deeper; alveolar length of upper molar series longer; molars larger; hamulae of pterygoids much heavier; foramen magnum more uniformly quadrangular.

Remarks.—These gophers were taken in the sand dunes at the eastern margin of Clear Lake in Delta Valley, Utah. The burrows were numerous in the areas where the sand was trapped by salt grass (*Distichlis stricta*). The animals had invaded the sand dunes proper only when they supported a growth of salt grass. Burrows were found from the upper limits of the salt grass on the dunes, down practically to the water's edge. Some of the burrows had actually been flooded because of fluctuations in the level of the lake. Those burrows right at the water's edge that were habitable at all were still occupied, even though many of them were so wet that the walls collapsed at the slightest touch. In addition to the actual flooding, the desertion might be due to the lack of mechanical support for the burrows.

Specimens examined.—17 skins and skulls from the type locality (all in collection of Museum of Zoology, University of Utah, Salt Lake City, Utah).

Thomomys bottae minimus, subsp. nov.

Type.—Male adult, skin and skull, No. 263942, U. S. National Museum (Biological Survey Collection); Stansbury Island, Great Salt Lake, Tooele County, Utah; June 25, 1938; collected by W. H. Marshall; original No. 141.

Range.—Known only from the type locality.

Diagnosis.—Size small (see measurements); tail relatively long. Color: Upper parts Pinkish Buff, darker on head; under parts Pale Pinkish Buff; (capitalized color terms according to Ridgway, Color Standards and Color Nomenclature, Washington, D. C., 1912); front and hind feet white; nose, chin and post auricular patches black. Skull: Long, slender and nearly devoid of ridges; brain case moderately inflated; interparietal quadrangular; zygomatic arches widest in temporal region but neither wide-spreading nor angular; zygoma weak; angle between zygomatic process of maxilla and side of rostrum obtuse; nasals straight, and nearly truncate posteriorly; extension of premaxillae posterior to nasals great; lacrimal processes small and peg-like; auditory bullae moderately inflated; palatal pits deep;

rostrum short but narrow; interpterygoid space moderately lyre-shaped; dentition weak; upper incisors narrow.

Measurements.—The average and extreme measurements of 2 adult males and 2 adult females from the type locality are, respectively, as follows: Total length, 184 mm. (189–179), 178 (181–175); length of tail, 60 (64–55), 56 (58–54); length of hind foot, 25 (26–24), 25 (25–24); length of ear, 3 (3), 3 (3); basilar length of Hensel, 30.7 (32.8–28.7), 28.2 (28.2–28.1); greatest length of nasals, 11.3 (12.5–10.2), 10.6 (10.8–10.4); zygomatic breadth, 21.3 (22.4–20.2), 19.7 (19.7–19.6); mastoidal breadth, 18.7 (19.6–17.8), 17.4 (17.7–17.1); least interorbital breadth, 6.4 (6.4–6.3), 6.1 (6.1); alveolar length of upper molar series, 7.4 (7.6–7.3), 7.0 (7.0); extension of premaxillae posterior to nasals, 2.5 (2.5), 2.3 (2.3); length of rostrum, 13.9 (15.0–12.9), 13.1 (13.2–13.0); breadth of rostrum, 7.5 (7.9–7.0), 6.7 (6.8–6.5).

Comparisons.—Among named races of *Thomomys bottae*, *Thomomys bottae minimus* is most close related to *Thomomys bottae nesophilus* but differs from the type series of the latter form as follows: Color: A trifle lighter throughout; post auricular patches darker in color and smaller in extent; nose, chin and cheeks much darker. Size: Remarkably smaller in all measurements; claws on front feet much shorter and weaker; tail relatively longer. Skull: Smaller in all measurements; slender and narrow as opposed to wide and robust; zygomatic arches not as wide-spreading and weaker; zygomatic process of maxilla narrower and not as angular; brain case more inflated; interparietal quadrate as opposed to triangular shaped; lambdoidal region more developed as a crest than a plate; extension of premaxillae posterior to nasals relatively greater; palatal pits deeper; auditory bullae actually smaller but relatively larger and more inflated ventrally; dentition weaker; upper incisors shorter and narrower.

Remarks.—The author is indebted to the United States Department of Agriculture, Bureau of Biological Survey, and especially to Major E. A. Goldman for the opportunity of studying these animals and naming this form.

Stansbury Island is situated in the southwest corner of Great Salt Lake, and during the past years of drought (1932–1937) has been connected with the mainland. The intervening territory consists of a white salt flat. This same condition also exists to the east in the case of Antelope Island. This same condition has undoubtedly existed in the past during fluctuations of the lake level. Both of these islands have endemic gophers, which signifies that these dry, barren, white salt flats are as efficient a barrier to these animals as water. Stansbury Island is the northward projection out into the lake of Stansbury Mountains, and the gophers not yet described from these mountains show the closest affinities to *Thomomys b. minimus* of any of the mainland forms. On the other hand *Thomomys bottae nesophilus* shows its affinities with the form *albicaudatus* to the east of the lake.

Specimens examined.—Five, all from the type locality (all in the U. S. National Museum, Biological Survey Collection).

Contribution from the Museum of Zoology, University of Utah, Salt Lake City, Utah, and Museum of Vertebrate Zoology, University of California, Berkeley, California.

Vol. 52, pp. 163–164 October 11, 1939

PROCEEDINGS

OF THE

BIOLOGICAL SOCIETY OF WASHINGTON

A NEW SPECIES OF DICLIPTERA FROM MEXICO.[1]

BY E. C. LEONARD.

In March, 1937, Llewelyn Williams collected in the vicinity of Fortuño, Veracruz, Mexico, several specimens of a peculiar large-bracted acanthaceous plant, which recently were forwarded to the writer by Field Museum of Natural History for identification. They appear to represent a new species of *Dicliptera*, which may be described as follows:

Dicliptera anomala Leonard, sp. nov.

Herba vel suffrutex, caulibus subteretibus vel obscure hexagonis, glabris vel sparse bifariam hirtellis; lamina foliorum oblongo-lanceolata, acuminata, basi angustata, membranacea, leviter crenata, glabra vel in venis parce pubescens; inflorescentia paniculata, grandis, terminalis, cymis 3-floribus; bracteae floriferae exteriores inaequales, posterior grandis ovata, obtusa, plana vel conduplicata, pilosula, viridis vel purpurea, venis reticulatis, anterior oblonga, acuta, pilosa, bracteae interiores lanceolatae, albidae, glanduloso-puberulentae; calycis segmenta lineari-lanceolata, subhyalina, glanduloso-puberulenta; corolla rosea, longa, angusta, curvata; antherae loculi obliqui, inaequaliter affixi, connectivo lato; capsulae ovoideae, brevistipitatae, compressae, minute glanduloso-pubescentes, pilis eglanduliferis instructae; semina plana, fulva, muricata.

Herbaceous or suffrutescent, up to 2 meters high; stems terete or obscurely hexagonal, glabrous or sparingly hirtellous in 2 lines; leaf blades oblong-lanceolate, up to 20 cm. long and 5.5 cm. wide, acuminate, narrowed at base, thin, shallowly crenate, glabrous or the costa and nerves sparingly pubescent, the cystoliths inconspicuous; petioles up to 6 cm. long, rounded and glabrous beneath, channeled and hirtellous above; flowers borne in a large terminal leafy panicle of 3-flowered cymes, the peduncles up to 3 cm. long, sparingly and finely pubescent in 2 lines, the branches of the cymes rather densely pubescent; bracts subtending the peduncles various in size, leaflike, those subtending the cymes linear-lanceolate or subulate, 1 to 1.5 cm. long; outer bracts of the flower cluster dissimilar, the posterior bract ovate, up to 3.5 cm. long and 3 cm. wide, obtuse, abruptly narrowed at base,

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

flat or conduplicate, densely to sparingly pilosulous (the hairs about 0.5 mm. long or a few of them shorter and glandular), veiny, greenish, sometimes with a purplish tinge or the veins purple at maturity, the anterior bract oblong, about 18 mm. long and 6 mm. wide, acute, narrowed at base, pilosulous (some of the hairs glandular), light green, flat, somewhat veiny, the inner bracts lanceolate, about 14 mm. long and 4 mm. wide, acute, whitish. veiny, puberulent, some of the hairs glandular; calyx segments linear-lanceolate, 9 to 10 mm. long, 2 mm. broad at base, acuminate, subhyaline, 3-nerved, glandular-puberulent; corolla pinkish red, finely and sparingly pubescent, up to 6 cm. long, curved, 2 mm. in diameter at base, gradually enlarged to about 5 mm. at mouth, the lips 10 to 15 mm. long, the upper one ovate, about 8 mm. wide, entire, the lower one oblong, about 5 mm. wide, 3-lobed at apex, the lobes rounded, about 1 mm. long; stamens reaching the tip of the upper lip, the anther lobes unequally and obliquely attached by a broad connective; capsule ovoid, 10 mm. long, 5 mm. broad, and 3 mm. thick, short-stipitate, flattened, pubescent with a mixture of short glandular hairs and longer eglandular ones, the flat sides of the capsule thin, the narrow curved sides thick and firm; seeds flat, brown, roughened.

Type in the herbarium of Field Museum of Natural History, no. 896,496, collected at Fortuño, on the Coatzacoalcos River, Veracruz, Mexico, altitude 30 to 50 meters, occurring commonly along roadways and forest trails, March, 1937, by Llewelyn Williams (no. 8308). Nos. 8442 and 8546 of Mr. Williams' collection, from the same locality, are this species also.

This remarkable species is very conspicuous because of its exceedingly large posterior flower bracts. In Veracruz it is commonly called "rosa morada" and "yerba de canilla," but the name "rosa morada" is applied also to *Tabebuia pentaphylla* (L.) Hemsl.,[2] of the Bignonia Family.

[2] Standley in Contr. U. S. Nat. Herb. **23** : 1320. 1926.

Vol. 52, pp. 165–166 October 11, 1939

PROCEEDINGS

OF THE

BIOLOGICAL SOCIETY OF WASHINGTON

A NEW PIT VIPER FROM COSTA RICA.

BY E. R. DUNN.

Contribution from the Department of Biology, Haverford College, No. 44.

The "mano de piedra," *Trimeresurus nummifer* (Rüppell), was described from Mexico. I have examined the type, Senckenberg 9544,la. It has been recorded as far north as Zacualtipan, Hidalgo, and Tuxpan, Vera Cruz, and from the states of Chiapas and Tabasco. In Mexico about half the specimens have 25 dorsal scale rows, and the other half have 23 or 27 in approximately equal numbers. The ventrals range from 121 to 135, the caudals from 26–37, there being little or no difference between the sexes.

Specimens quite similar to Mexican ones have been examined from Nicaragua, four (Tuli, Hacienda Rosa de Jerico, Matagalpa); Costa Rica, ten (El General, Monte Redondo, Chitaria, Cariblanco, Peralta, Guapiles and Siquirres); Panamá, one (Pequeni-Esperanza ridge in Chagres basin).

The specimen from Monte Redondo (a locality above and to the south of San Jose, and fairly similar climatically) is a female with 25 dorsals, 126 ventrals, and 28 caudals. Specimens from La Palma, 4500 feet, north of San Jose and in cloud forest, represent an undescribed form, which agrees with *nummifer* in general but has a much higher ventral count. It may be called:

Trimeresurus nummifer picadoi, sp. nov.

Type.—U. S. N. M. 37753, female.

Type and only known locality: La Palma, Costa Rica.

Diagnosis.—Similar to *T. n. nummifer* but with 146–152 ventrals.

Description.—The type is a female with 25 dorsals, 152 ventrals, 33 caudals.

A female with similar data in the Vienna Museum has 151 ventrals, 34 caudals. I am indebted to Dr. Wettstein for the counts. A female with similar data in the British Museum has 146 ventrals, 37 caudals. I am indebted to Mr. Parker for the counts. I have examined all three of these specimens and they do not differ from typical *nummifer* save in ventral count.

It is a pleasure to name this form after my friend Dr. Picado, who has added so much to our knowledge of the poisonous snakes of Costa Rica.

Vol. 52, pp. 167–170 December 15, 1939

PROCEEDINGS

OF THE

BIOLOGICAL SOCIETY OF WASHINGTON

A NEW SUBSPECIES OF *INEZIA SUBFLAVA* FROM THE NEIGHBORHOOD OF MT. DUIDA, VENEZUELA.

BY JOHN T. ZIMMER.

In the course of recent studies of Peruvian genera of the family Tyrannidae, I have had occasion to examine *Inezia subflava*, a species and genus which does not occur within the Peruvian boundaries. Certain facts have come to light regarding extensions of range and subspecific characters in this species which it may be well to place on record.

A good series of *I. s. caudata* from Dutch Guiana, the lower Orinoco in Venezuela, and the Rio Surumú in northeastern Brazil shows great consistency in the clear white or pale yellow of the entire outer web of the outermost rectrix, sometimes with a very slight incursion of brown from the inner web across the shaft just before the tip. This character is shared by *I. s. intermedia* (as exemplified by a specimen from the lower Magdalena, Colombia) but not by *I. s. subflava*. In the lower Amazonian form, there is a narrow pale margin along the outer edge of the outer web of the outermost rectrix but it does not reach the shaft, except where the pale tip of the feather crosses both webs, and it sometimes is obsolete. This character appears to have escaped the notice of students of the species. The buffy tinge of the breast and throat in *caudata*, the relatively broad whitish area of the chin, the pale tint of yellow on the belly, and the usually positive brown hue of the upper parts are other, better known characters of this subspecies.

I. s. subflava is represented in the collections at hand from localities as far west as the right bank of the Rio Madeira, south of the Amazon, and from the north bank on the Rio Jamundá and the lower left bank of the Rio Negro. Heretofore it has been known only from the Tocantins and the Tapajoz, both south of the Amazon.

A series of birds from the upper Orinoco, the vicinity of Mt. Duida, the Río Cassiquiare, and the upper Rio Negro shows a closer affinity to *subflava* than to *caudata*, especially with respect to the markings on the outer tail-feathers and the bright colors of the under parts but the birds have good distinctive characters of their own and deserve separate recognition as follows:

Inezia subflava obscura, new subspecies.

Type.—from Esmeraldas, Mt. Duida, Venezuela; altitude 325 feet. No. 435,778, American Museum of Natural History. Adult female collected March 16, 1929, by the Olalla brothers.

Diagnosis.—Nearest to *I. s. subflava* of the lower Amazon, Brazil, but upper parts much darker and browner; under part duller yellow with heavier shading on the sides of the breast and broadly along the flanks; bill and tarsus averaging longer. Differs from *I. s. caudata* of the Guianas and the lower Orinoco by having the upper under parts deeper yellow with heavier shading on the sides and flanks but without any tinge of buff on the throat and chest; white chin-spot more restricted and more sharply defined; outer rectrices with only a relatively narrow outer margin whitish or yellowish, not reaching the shaft; bill longer but tarsus shorter.

Range.—Upper Orinoco, Venezuela, from Munduapo to the foot of Mt. Duida and the Cassiquiare, ranging southward along the upper Rio Negro, Brazil, at least to San Gabriel and Camanaos.

Description of type.—Upper parts dark Olive with indistinctly darker centers on the feathers; uropygium a little brighter but upper tail-coverts like the mantle. A large dusky spot reaching from the front of the orbit to the gape; rest of lores, nasal feathering, a narrow superciliary line, and a broader subocular space involving the bases of the auricular feathers clear white; the superciliary line gradually disappears over the auriculars, becoming tinged with yellowish posteriorly; tips of auriculars, postocular space, and sides of neck paler olive than the back; chin narrowly white, connecting with the white subocular space; throat Primrose Yellow, becoming tinged with Light Yellowish Olive laterally and on the malar region; breast centrally dull Primrose Yellow; sides decidedly darker, Citrine Drab (X Yellowish Olive) continued broadly down the flanks; belly medially Reed Yellow X Citron Yellow; under tail-coverts Primrose Yellow. Remiges near Clove Brown; primaries with outer margins very inconspicuously and finely paler and with inconspicuous pale terminal margins; secondaries similar but with pale edges and tips broader, becoming most pronounced on the inner feathers; tertials with outer margins and tips still broader, whitish, and sharply defined; lesser upper wing-coverts like the back; middle and greater series warm brown with conspicuous yellowish white tips, forming two pronounced wing-bars; under wing-coverts Primrose Yellow; inner margins of remiges narrowly yellowish white. Tail strongly rounded; outer rectrices 9 mm. shorter than the median ones), warm, dark brown with outer margins of the rectrices narrowly olivaceous, and with conspicuous, buffy whitish tips on all the feathers, narrowest on the median pair; outer web of outermost rectrix with only the faintest trace of a thread-like, pale outer margin. Bill (in dried skin) blackish; feet dark slate. Wing, 51 mm.; tail, 48.5; exposed culmen, 10.5; culmen from base, 14; tarsus, 16.

Remarks.—Males like the female.

Although the type and some other specimens of *obscura* have almost no trace of a pale outer margin on the outermost rectrices, still other examples have such a margin, very narrow, and occasionally accompanied by an obvious lightening of the tone of brown on the rest of the outer web. The same type of variation is shown by typical *subflava* but I have seen no

specimen of either form in which the whole outer web of the outermost rectrix is whitish as it is in *caudata* and, presumably, *intermedia*.

Occasional specimens from Muirapinimá, lower Rio Negro, approach *obscura* while others are typical *subflava*. I have no material from the Rio Negro between Muirapinimá and Camanaos and hence am unable to say where the dividing line between the two subspecies may best be placed. Two examples from Frechal, Rio Surumú, near the junction of Brazil, Venezuela, and British Guiana, are *caudata*.

Specimens Examined.

I. s. subflava.—

Brazil:

Rio Tocantins, Ilha das Pavas, 1 ♂;
Rio Ririí, Santa Julia, 1 ♀;
Rio Xingú, Porto de Moz, 1 ♂;
Rio Tapajoz, Tauary, 4 ♂, 1 ♀;
Igarapé Brabo, 2 ♂;
Caxiricatuba, 2 ♀;
Aramanay, 1 ♀;
Rio Amazonas, Villa Bella Imperatríz, 1 (?);
Rio Madeira, Borba, 1 ♂, 1 ♀, 1 (?);
Rio Negro, Igarapé Cacao Pereira, 5 ♂, 2 ♀, 1 (?);
Muirapinimá, 2 ♂, 2 ♀, 2 (?);
Rio Jamundá, Faro, 8 ♂, 7 ♀, 2 (?).

I. s. obscura.—

Brazil:

Rio Negro, Camanaos, 1 ♂, 1 ♀;
San Gabriel, 1 ♂, 3 ♀;
Tatú, 1 ♀.

Venezuela:

Mt. Duida, Esmeralda, 2 ♂, 4 ♀ (incl. type);
Río Orinoco, mouth of Río Ocama, 2 ♀;
Munduapo, 1 ♂;
Río Cassiquiare, El Merey, 1 ♀.

I. s. caudata.—

Venezuela:

Río Orinoco, Caicara, 3 ♂, 3 ♀, 1 (?);
Quiribana de Caicara, 1 ♀;
Altagracia, 2 ♂, 1 ♀;
Ciudad Bolívar, 1 ♀;
Agua Salada de Ciudad Bolívar, 1 ♀;
Las Barrancas, 1 ♂;
Río San Feliz, La Cascabel, 1 ♀.

Dutch Guiana:

Near Paramaribo, 3 ♂.

Brazil:

Rio Surumú, Frechal, 2 ♀.

I. s. intermedia.—

Colombia:

Río Magdalena, Algodonal, 1 ♂.

Vol. 52, pp. 171–176 December 15, 1939

PROCEEDINGS
OF THE
BIOLOGICAL SOCIETY OF WASHINGTON

THE NORTH AMERICAN SPECIES OF THE GENUS LAELIUS ASHMEAD (HYMENOPTERA: BETHYLIDAE).

BY C. F. W. MUESEBECK,
Bureau of Entomology and Plant Quarantine, U. S. Department of Agriculture.

Laelius is a poorly known genus of which only occasional individuals have been either collected or reared. Accordingly, I was surprised recently to receive from E. A. Back, of this Bureau, twenty specimens which had been reared by him from the furniture carpet beetle, *Anthrenus vorax* Waterh., at Washington, D. C. This series was found to represent an undescribed species, and since a name for it had been requested by Dr. Back, a description was prepared. It has seemed advisable, however, to publish at the same time a synopsis of the North American species of the genus in order to facilitate recognition of these forms and to indicate certain obvious new synonymy. The following brief review is based on the material in the collection of the U. S. National Museum. This is too inadequate to permit a completely satisfactory study of the genus, and the present paper can, therefore, be regarded as only a preliminary effort to define the few North American species that are now known.

The genus *Laelius*, which was established by Ashmead in 1893 (Bull. U. S. Natl. Mus. 45 : 50), may be briefly characterized as follows: Antennae 13-segmented; eyes bare (incorrectly described by Ashmead as hairy) and always far removed from posterior margin of head; pronotum long, immargined, narrowed anteriorly; mesoscutum short, the notaulices not or weakly indicated in the female, often well marked, though rarely complete, in the male; scutellum separated from mesoscutum by a deep furrow; propodeum with dorsal surface much longer than the abruptly declivous posterior surface, separated from the latter by a transverse carina, and provided with one or more longitudinal carinae that are better developed in the female than in the male, lateral margins carinate; femora, especially

anterior and posterior femora of female, somewhat swollen; wings well developed, anterior wing with median and submedian cells closed, without a true stigma but with a short thickened marginal vein, with basal vein unbranched and with radius very short, at most only a little longer than the short basal vein.

Genotype.—*Laelius trogodermatis* Ashmead (by original designation).

KEY TO THE NORTH AMERICAN SPECIES OF LAELIUS.

1. Wings entirely clear hyaline; pedicel of male antenna at least as long as first flagellar segment 2
   Anterior wing distinctly somewhat clouded; pedicel of male antenna shorter than first flagellar segment (male of *occidentalis* unknown) 3
2. Distance from eye to vertex nearly equal to eye height; ocellar triangle equilateral; radius as long as basal vein in both sexes; notaulices not apparent; propodeum of female with 3 complete longitudinal carinae centrally and without transverse rugae between the carinae ..... *voracis*, new species
   Distance from eye to vertex little more than half eye height; ocellar triangle not equilateral; radius, at least in female, much shorter than basal vein; notaulices distinct in male; propodeum of female with five longitudinal carinae centrally and with transverse rugae between the carinae ..... *trogodermatis* Ashmead
3. All femora and the scape piceous to blackish 4
   All femora and the scape yellow ..... *tricarinatus* Ashmead
4. The three central carinae of dorsal face of female propodeum complete. Male unknown ..... *occidentalis* Whittaker
   Only the median carina of dorsal face of female propodeum complete, the two others of the central group obsolescent apically ..... *utilis* Cockerell

Laelius voracis, new species.

In its completely hyaline wings and darkened legs, as well as in the structure of the male antenna, this species resembles *trogodermatis* Ashmead, while in the uniform development of the three central carinae of the female propodeum it is most similar to *tricarinatus* Ashmead. It may be distinguished from all described North American species, however, by its relatively long and slightly curved stigmal vein and the uniform reticulation of the central areas on the female propodeum.

Female.—Length 2.2 mm. Frons weakly reticulate and strongly shining; distance from eye to vertex about equal to eye height; vertex closely, shallowly punctate and subopaque; ocellar triangle equilateral; ocellocular line at least twice as long as postocellar line; pedicel of antenna fully one and one-half times as long as first flagellar segment; flagellar segments subequal in length, slightly longer than broad. Mesonotum strongly shining, weakly reticulate; notaulices not apparent; dorsal face of propodeum about as wide at apex as at base, subopaque and finely reticulate, with three complete longitudinal carinae centrally, also with a short basal one each

side of this group nearer to submedian carina than to lateral margin and extending barely to middle, the areas enclosed by the central carinae not transversely rugose; posterior face of propodeum evenly but delicately reticulate, with a weak median longitudinal carina; metapleuron sculptured like posterior face of propodeum; radius about as long as basal vein, slightly curved, its apical half a little thickened. Abdomen smooth and polished.

Black; antennae, mandibles and legs brownish to piceous; wings completely hyaline, veins hyaline.

Male.—Essentially like the female except in the following particulars: Pedicel slightly longer than first flagellar segment; dorsal face of propodeum narrowing a little caudad, with the three central carinae incomplete, extending barely to the apical third; median carina of posterior face of propodeum indistinct or wanting.

Type.—U. S. National Museum, No. 53567.

Type locality.—Washington, D. C.

Host.—*Anthrenus vorax* Waterhouse.

Described from seventeen females and three males reared by E. A. Back.

Laelius trogodermatis Ashmead.

Laelius trogodermatis Ashmead, Bull. U. S. Natl. Mus. 45 : 51, 1893.

This species is readily distinguished by the characters mentioned in the key. In addition to the usual three longitudinal carinae on the middle two-fifths of the dorsal face of the propodeum there is a somewhat weaker and more irregular, but distinct, longitudinal ridge between the median carina and each of the other two principal carinae of the central group; the dorsal face of the male propodeum is finely obliquely aciculate within the apical lateral angles. The notaulices are indicated posteriorly in the female and are distinct on at least the posterior half of the mesoscutum in the male. As in *voracis* and *utilis* the antennal scape and the legs, especially the femora, are piceous.

Known only from the type and allotype, which were reared from *Trogoderma* larvae found in an insect collection at Washington, D. C., and from a single female taken in Jacksonville, Fla., which was incorrectly included by Ashmead in his type series of *tricarinatus*. All three specimens are in the collection of the U. S. National Museum.

Laelius tricarinatus Ashmead.

Laelius tricarinatus Ashmead, Bull. U. S. Natl. Mus. 45 : 51, 1893.

Laelius rufipes Ashmead, Bull. U. S. Natl. Mus. 45 : 51, 1893. New synonymy.

Laelius nigripilosus Ashmead, Bull U. S. Natl. Mus. 45 : 52, 1893. New synonymy.

Bethylus constrictus Ashmead, Bull. U. S. Natl. Mus. 45 : 53, 1893. New synonymy.

Laelius fumipennis Brues, Bull. Wisc. Soc. Nat. Hist. 8 (1) : 45, 1910. New synonymy.

Laelius försteri Kieffer (n. n. for *rufipes* Ashmead, preoccupied), Das Tierreich, Lief. 41, Bethylidae, p. 565, 1914.

The types of all the names listed above, except *fumipennis*, are in the National Museum and have been studied. I have not seen the type of *fumipennis*, which was distinguished by Brues on the basis of the conspicuously fuscous apical half of the fore wing. However, since there is considerable variation in the intensity of infuscation of the fore wing in the specimens examined that are regarded as *tricarinatus*, I do not believe *fumipennis* can be held distinct on this character. Miscounting the number of antennal segments, Ashmead was led to place *constrictus* in *Bethylus*. The type, however, has 13-segmented antennae and, in my opinion, not only belongs in *Laelius* but is conspecific with the type of *tricarinatus*.

Female.—Eye only slightly longer than the distance from it to posterior margin of head; pedicel longer than first flagellar segment; ocelli in an equilateral triangle; notaulices indicated posteriorly; propodeum finely transversely rugulose with three well developed complete central longitudinal carinae and a short basal one each side midway between the outer central carina and the lateral margin, this short carina not extending beyond middle of propodeum; scape and all femora entirely yellow; anterior wing somewhat infuscated on apical half.

Male.—Eyes relatively a little larger than in the female; first flagellar segment of antenna distinctly longer than pedicel; notaulices distinct at least from posterior margin to middle of mesoscutum; propodeum not transversely rugulose but evenly shallowly punctate, the punctures contiguous, none of the longitudinal carinae complete. Otherwise essentially like the female.

The available material is not adequate to give a satisfactory picture of the distribution of the species. There is a single specimen from West Cliff, Colo., and *rufipes* is said by Ashmead to be from the "Western States"; all the remaining specimens examined are from the Atlantic Seaboard. On what grounds *rufipes* was recorded from the West can not now be determined; the two specimens comprising the type material bear no locality data, and when Ashmead entered the species in the National Museum type catalogue the space for the locality was left blank.

Only two specimens of those studied have host records associated with them. Both are labeled as reared from *Anthrenus verbasci* (L.) by E. A. Back, one at Washington, D. C., the other at Pacolet, S. C.

Laelius occidentalis Whittaker.

Laelius occidentalis Whittaker, Trans. Ent. Soc. Lond., 1928, p. 387, fig. 3.

I know this species only from the original description. It appears to resemble *utilis* very closely but to be distinguished, in the female, by having all three of the central propodeal carinae complete. The wings are said to be slightly clouded and the antennae, coxae and femora black.

The unique type, from Chilliwack, British Columbia, is in the Whittaker Collection. It is the only known specimen.

Laelius utilis Cockerell.

Laelius utilis Cockerell, Canad. Ent. 52 : 34, 1920.

As stated under *occidentalis*, that species and *utilis* appear to be extremely similar, the only basis for distinguishing them, so far as I can determine without having specimens of *occidentalis* for study, consisting in the development of the three central propodeal carinae of which only the median one is complete in *utilis*.

The female holotype and a paratype, both recorded as having developed on anthrenid larvae in an insect collection at Lynchburg, Va., are in the collection of the U. S. National Museum, which contains five additional specimens of this species. One of these is labeled as "found with *Trogoderma tarsale*," at Washington, D. C.; two are from uncertain localities and without indication of probable hosts; one is from Hagerstown, Md., and one from Salisbury, N. C. The last is recorded as reared from *Bruchus brachialis* Fahr., but this record seems open to some question.

Vol. 52, pp. 177–184 December 15, 1939

PROCEEDINGS
OF THE
BIOLOGICAL SOCIETY OF WASHINGTON

BUTTERFLIES FROM VIRGINIA.

BY AUSTIN H. CLARK AND LEILA F. CLARK.

In Frederick County, Virginia, we had found occasional individuals of *Glaucopsyche lygdamus*, a number of examples of *Euchloë olympia*, and a single *Pieris virginiensis*. It was evident that these butterflies were merely casuals in this region, and that there real home was somewhere else, presumably to the westward in nearby West Virginia. Indeed, our young friends William Orsinger and W. Herbert Wagner, had shown us small series of *G. lygdamus* and *E. olympia* taken on Ice Mountain and had told us that these two species were common there.

We visited the region in the middle of April, stopping at Winchester, but continuous rain and cold prevented any collecting during our stay. We again visited the region in early May, in company with Mr. and Mrs. Ernest L. Bell of New York, and this time we were lucky enough to have three perfect days. In our field work on the first day we had the pleasure of the company of Dr. Walter S. Hough.

We found *Euchloë olympia* abundant in the Ice Mountain region, and *Glaucopsyche lygdamus* locally common. The most productive locality in this area is reached by taking the unimproved road marked "Ice Mountain" running south by east from Slanesville on route 45. *Euchloë olympia* is abundant along the ridge beyond which the road dips into the valley of the North River, and *Glaucopsyche lygdamus* is common in the rich woods between this point and Slanesville, wherever the Carolina vetch (*Vicia caroliniana*) grows.

Another excellent collecting ground is located a mile or so west of the Virginia border on the Bloomery road which runs west from route 7 slightly less than 2 miles north of Cross

Junction, Frederick County, at the sign reading "Forks of Cacapon." Here in a wooded bottom along a stream *Pieris virginiensis* is quite at home, and *Glaucopsyche lygdamus* is common about the patches of vetch.

The occurence in numbers of these three species so close to the Virginia border explains their appearance in western Frederick County.

In June we visited the Dismal Swamp region in company with Mr. and Mrs. Jackson H. Boyd and Messrs. John and Alexander Boyd of Southern Pines, North Carolina. On the return trip we found *Argynnis diana* in James City and Charles City Counties, from which it had not previously been reported—at least not since 1779. Early in July we revisited this region in company with Mr. and Mrs. Bell, securing our first July record of *Nymphidia pumila.*

Toward the end of July we spent ten days in Highland County, where we took *Strymon titus titus,* and found *Argynnis diana* generally distributed though nowhere common. In the middle of September we spent two days on Tangier Island, Accomac County.

We are privileged at this time to add four new butterflies to the Virginia list. Professor Lorus J. Milne of Randolph-Macon Woman's College, Lynchburg, and Mrs. Milne, have given the U. S. National Museum a fine specimen of *Erora laeta* which they secured at Mountain Lake; Mr. Carroll E. Wood, Jr., of Salem, has presented the Museum with an excellent specimen of *Incisalia polios* which he took near Salem; Mr. Otto Buchholz, of Westfield, New Jersey, has been so kind as to permit us to include a notice of his capture of *Atrytone pilatka* near Munden; and we ourselves secured *Strymon titus titus* at three localities near Monterey. The number of butterflies now definitely known from Virginia is 148.

In western Frederick County and in adjacent Hampshire County, West Virginia, we secured a long series of *Euchloë olympia rosa,* not previously known from the East. Whatever may be its status in the western states, it is in this region simply a varietal form of *E. olympia.*

Twice during the season we were so fortunate as to be guests of Mr. Theodor M. Mussaeus at his cabin on the cliffs above the Shenandoah at Limeton. Last year at the base of a large tree

in front of the cabin we found a nest of a large hornet. A worker from this nest was kindly identified for us by Miss Grace A. Sandhouse. It proved to be the European *Vespa crabro*, heretofore not recorded from Virginia. We hoped to get additional specimens this year, but failed to find it.

Argynnis diana (Cramer).

James City Co.: Jamestown, June 14, 1939; Barrett's Ferry, June 14, 1939. *Charles City Co.:* Charles City, June 14, 1939. *Highland Co.:* Jack Mountain, July 23, 1939; McDowell, July 23, 1939; Headwaters, July 23, 1939; near Palo Alto, July 23, 1939; Cow Pasture River at route 250, July 23, 1939; Lantz Mountain, July 25, 1939; Buckeye, July 27, 30, 1939.

Remarks.—During the past season we found this magnificent species in three additional counties. The type specimen was presumably captured somewhere in the vicinity of Jamestown or adjacent Williamsburg. Our male from Jamestown represents the first capture of this insect in that region since it was described in 1779. We have noticed that some of the males from the coastal plain have three broad light dashes between the cell of the fore wing and the light outer border in the interspaces from veins 2 to 5.

Nymphidia pumila Boisduval and LeConte.

Princess Anne Co.: Near Lake Tecomseh, July 3, 1939.

Remarks.—This butterfly was very common in a weedy field. It has the curious habit of settling with outstretched wings in the center of a group of the white flower heads of *Achillea millefolium*, just about the most conspicuous place it could select. Many of its tropical relatives in South America have a similar habit. We have found this species very local in Virginia, though abundant in the restricted areas in which it occurs.

All our previous records for this butterfly in Virginia have been in September or early October. There is presumably a spring brood in April, but so far we have not found it.

Glaucopsyche lygdamus (Doubleday).

Roanoke Co.: Martin's Farm, near Salem, April 13, 1938 (C. W. Gottschalk). *Rockbridge Co.:* Camp Powhatan, near Natural Bridge, May 1, 1938 (C. W. Gottschalk). West Virginia: *Hampshire Co.:* Ice Mountain, May 7, 1939; Forks of Cacapon (or Capon), May 8, 1939.

Remarks.—In Hampshire County, West Virginia, not far from the Virginia line, this butterfly is common, as we reported in 1938 (Proc. Biol. Soc. Washington, vol. 51, p. 180, 1938). Its food plant, or at least its chief food plant, in this region is the Carolina vetch (*Vicia caroliniana*), and the butterfly is to be found in rich woodland wherever this plant grows. It is easily secured in quantities by remaining near a patch of this plant and catching the butterflies as they come to it. It is a very active little insect, flying with surprising speed very near the ground. In its habits it is much

more like the little copper (*Lycaena phlaeas hypophlaeas*) than like either of the other local blues (*Lycaenopsis argiolus pseudargiolus* and *Everes comyntas*). In fresh individuals the under side of the wings is very dark and slaty, wholly different from the light brown seen in faded museum specimens.

Strymon titus titus (Fabricius).

Highland Co.: Strait Creek, July 25, 1939; Monterey, July 26, 1939; Buckeye, July 27, 1939.

Remarks.—It was a matter of much interest to us to find this form in Highland County, although its occurrence there was to have been expected. The southern subspecies, *S. t. mopsus*, is the one we have found on the piedmont and about Washington, and as far west as Warren County.

We regard *Strymon titus watsoni* described by William Barnes and Foster H. Benjamin (Bull. So. California Acad. Sci., vol. 25, part 3, p. 94) from Kerrville, Texas, as a synonym of *S. t. mopsus*, with which the authors were unacquainted. When freshly emerged these butterflies are dark slaty in color, but in the sunlight they soon fade to a fairly light brown. Old museum specimens often become pale brown.

Mr. Benjamin himself first suggested the identity of *watsoni* and *mopsus*. On being shown by the senior author some specimens of the latter from Washington—*mopsus* was considered a synonym of *titus* at the time—he at once suggested that *watsoni* was probably the same as *mopsus*.

Strymon m-album (Boisduval and LeConte).

Accomac Co.: Tangier Island, September 16, 1939.

Strymon cecrops (Fabricius).

Highland Co.: Buckeye, July 27, 30, 1939.

Remarks.—This is our most northern record for this species.

Incisalia polios Cook and Watson.

Roanoke Co.: Orphanage Falls, at the foot of Fort Lewis Mountain, Carroll E. Wood, Jr., April 5, 1938.

Remarks.—Mr. Wood was so generous as to present his specimen, which is quite typical, to the U. S. National Museum. The capture of this species in southwestern Virginia represents a notable extension of the known range. What its food plant is in this region remains to be determined.

Erora laeta (W. H. Edwards).

Giles Co.: Mountain Lake, Lorus J. and M. J. Milne, June 23, 1938.

Remarks.—Professor Milne has been so very kind as to present his specimen, a very fine one, to the U. S. National Museum. One of Mr. William Henry Edwards' original specimens was captured at Coalburgh, West Virginia, not so very far from Mountain Lake. The species has not since been found in West Virginia.

Pieris virginiensis W. H. Edwards.

WEST VIRGINIA: *Hampshire Co.:* Forks of Cacapon (or Capon), May 8, 1939.

Remarks.—In low damp woods along a stream we found this species not infrequent, flying in somewhat indolent fashion among the trees. We also noticed what we assumed were individuals of this species in a number of other similar localities in nearby West Virginia. We agree with Dr. A. B. Klots that the habitat of this species is so very different from that of *Pieris rapae* that there can be no question of direct competition between them. *Pieris rapae* is an open country butterfly. The early spring form in this region frequents the edges of woods, but does not enter them, when frightened flying off over the fields. We have found both species on the same groups of flowers by the roadside at different times, but this is unusual.

Euchloë olympia form *rosa* (W. H. Edwards).

Frederick Co.: Cross Junction, May 8, 1939; west of Cross Junction, May 8, 1939. WEST VIRGINIA: *Hampshire Co.:* Ice Mountain, May 7, 1939; Forks of Cacapon (or Capon), May 8, 1939.

Remarks.—On April 24, 1938, we took typical *Euchloë olympia* at the two localities in Frederick County, and we have seen a number of specimens of typical *olympia* taken earlier in the same month in the region of Ice Mountain by Messrs. William Orsinger and W. Herbert Wagner. On May 7 and 8 of this year, although we took a few battered individuals of more or less typical *olympia*, nearly all that we captured were almost, or quite, typical *rosa*.

At the time of our visit to the region in 1938 the weather was cold, and there had been no warm weather earlier in the season. When we were there early in May of this year it was hot, and had been hot for some time. It can scarcely be doubted that all of the individals of this butterfly in this region are of the same stock. If this is so the natural conclusion is that in the cool weather of early spring this species appears in the form *olympia*, but later in the season after warm weather has become established it changes over to the form *rosa*. These two forms, therefore, are primarily cool and warm weather forms of the species, and not geographical races.

Western and southwestern specimens that we have seen are all referable to *rosa*, while northern specimens from Michigan and elsewhere are referable to *olympia*. In northwestern Virginia and in adjacent West Virginia, both forms occur, *olympia* early in the season when it is still cool, *rosa* later after it has become hot. It is quite probable that the form *rosa* does not occur every year, as hot weather in late April and early May is exceptional.

In the region of Ice Mountain we noticed that *Euchloë olympia* kept to the crests of the ridges and to the higher elevations generally, where it was very common, one or more being almost continuously in sight. Here *Anthocharis genutia* was infrequent. But in the bottoms of the valleys *A. genutia* was fairly common and *E. olympia* absent.

Papilio polyxenes asterius Cramer.

Accomac Co.: Tangier Island, September 16, 17, 1939.

Remarks.—This was the only swallowtail on the wing on Tangier Island at the time of our visit. It was not very common. As all the individuals were fresh we assume that in this region this species has three broods.

Pyrgus centaureae wyandot (W. H. Edwards).

Frederick Co.: Cross Junction, May 8, 1939; west of Cross Junction, May 8, 1939; Gainesboro, May 9, 1939; Whitacre, May 9, 1939. West Virginia: *Hampshire Co.:* Ice Mountain, May 7, 1939; Forks of Cacapon (or Capon), May 8, 1939.

Remarks.—All over this region in late April this butterfly is very common and generally distributed, but its numbers begin to decrease toward the end of the month and it becomes progressively scarcer in May.

Erynnis lucilius (Scudder and Burgess).

Highland Co.: Middle Mountain, glade along woods near bog, June 12, 1939 (John E. Graf). *Surry Co.:* Spring Grove, July 1, 1939.

Remarks.—The specimen from Spring Grove, which was identified by Mr. Ernest L. Bell, who was with us when it was caught, represents the first record of this species from the coastal plain.

Poanes viator (W. H. Edwards).

Richmond Co.: At the end of the bridge across the Rappahannock River from Tappahannock, June 27, 1937. *King William Co.:* Port Richmond, June 7, 1936. *James City Co.:* Jamestown, June 14, July 5, 1939. *Isle of Wight Co.:* Smithfield, June 15, 1938, June 10, 1939. *Nansemond Co.:* Chuckatuck, June 15, 1938. *Princess Anne Co.:* Knott's Island, July 5, 1939.

Remarks.—This butterfly is exceedingly local, but wherever it is found it is exceedingly abundant. It occurs in incredible numbers in the marshes between Jamestown Island and the mainland in the areas where the wild rice (*Zizania palustris*) is common. On our visit to this locality on July 5, 1939, we found most of the individuals fresh males.

Poanes aaroni (Skinner).

District of Columbia: Washington, E. M. Aaron, July 24, 1903.

Remarks.—Dr. Eugene Murray Aaron has been so kind as to give us the details of his capture of a specimen of this species, named for him by Dr. Henry Skinner.

Mr. Aaron lived at the time just north of the western end of Summit Place on the top of the cliff at the bottom of which were the bears' dens in the National Zoological Park. Just across Summit Place was the residence of Mr. George Brown Goode, Assistant Secretary of the Smithsonian Institution. Between Mr. Goode's house and the cliff was a flower bed. The butterfly was captured on this flower bed while hovering over an agave in a tub. Adams Mill Road now passes over the spot.

This species no longer occurs in the vicinity of Washington, presumably having been extirpated by the filling in of the extensive marshes along the Potomac. *Poanes viator*, which formerly occurred in Washington (Bull. 157, U. S. Nat. Mus., p. 229, 1932), was probably extirpated at the same time.

Atrytone dukesi Lindsey.

Norfolk Co.: Gum swamp south of the Chesapeake and Albemarle canal at North Landing, June 12, 13, 23, July 2, 1939; Pocaty Creek, June 12, 1939.

Remarks.—This species appears to be quite common throughout the gum swamp that occupies the eastern extension of Norfolk County. We have found it at the point where route 190 approaches the bridge over Pocaty Creek, and also where route 165 approaches the drawbridge over the Chesapeake and Albemarle canal. Dr. G. W. Rawson found it along the southern edge of the canal near the drawbridge.

Atrytone pilatka (W. H. Edwards).

Princess Anne Co.: Munden, Otto Buchholz, June 21, 1939.

Remarks.—This large skipper forms a very interesting addition to the fauna of Virginia. The most northerly known locality heretofore was Oriental, North Carolina.

Calpodes ethlius (Cramer).

Accomac Co.: Tangier Island, September 18, 1939.

Remarks.—This record is based upon a single half grown caterpillar found on a canna in Mrs. T. J. Pruitt's garden.

Panoquina panoquin (Scudder).

Accomac Co.: Tangier Island, September 16–18, 1939.

Remarks.—This skipper, which was abundant everywhere on the extensive salt marshes, was the only common butterfly on the island at the time of our visit.

Vol. 52, pp. 185–186 December 15, 1939

PROCEEDINGS

OF THE

BIOLOGICAL SOCIETY OF WASHINGTON

A SOUTHERN RACE OF THE JACANA.

BY PIERCE BRODKORB.

Although Hellmayr[1] states that jacanas from Guiana, eastern Brazil, and Paraguay, are all alike, comparison of a large series of birds from the southern part of the range of the species shows certain constant differences which I propose to recognize by name.

Jacana spinosa dorsalis, subsp. nov.

Type.—Univ. Mich. Mus. Zool., No. 93245; ♂ ad.; Horqueta, Paraguay; February 19, 1937; Alberto Schulze, orig. no. 3159.

Characters.—Differs from *Jacana spinosa jacana* (Linnaeus)[2] of northeastern South America in having the back paler (hazel instead of liver brown); rump and upper tail coverts Hessian brown instead of diamine brown; flanks and under wing coverts chestnut instead of bay, the latter area much less marked with blackish, the color of flanks often encroaching more on belly.

Young also paler above.

Range.—Paraguay, Bolivia, and northern Argentina.

Remarks.—There is some seasonal difference in color, freshly molted birds being darker than those in worn plumage.

The tarsus averages a little shorter in *dorsalis*, but the difference is so slight that it is of no use in identifying specimens. Eight adult males and six adult females of both forms compare in tarsal length as follows—males: *dorsalis* 49.5–57 (53.1), *jacana* 53.5–60.5 (56.8); females: *dorsalis* 57–62.5 (59.7), *jacana* 56.5–64 (60.3 mm.).

A male from Capitán Bado, Paraguay, has a trifid frontal lobe, the character on which Sharpe erected the genus *Asarcia* for the jacanas of Costa Rica and northwards.

Material examined.—*Jacana spinosa jacana*—British Guiana: Aurora 3, Omai Mine, Essiquibo River 1. French Guiana: Cayenne 2, Mana 1.

[1] A contribution to the ornithology of northeastern Brazil, Publ. Field Mus. Nat. Hist., zool. ser., 12, No. 18, 1929, p. 490.

[2] *Parra Jacana* Linnaeus, Syst. Nat. ed. 12, 1766, p. 259. Restricted type locality, Surinam (Berlepsch, Nov. Zool., 15, 1908, p. 304).

Northern Brazil: Rocana, Uassá Swamp 4, Caviana Island 3, Boa Vista, Marajó Island 1. *Jacana spinosa dorsalis*—Paraguay: Horqueta 7, Capitán Bado 5, 40 kilometers west-southwest of Capitán Bado 2, Kilometer 265, west of Puerto Casado 1. Bolivia: Buenavista 1, not specified 1. Argentina: Embarcación, Salta 1. Sarmiento, Tucumán 1.

I am indebted to Miss Ruth Trimble for lending me some skins from the collection of the Carnegie Museum.

Vol. 52, pp. 187–196 December 15, 1939

PROCEEDINGS

OF THE

BIOLOGICAL SOCIETY OF WASHINGTON

MEXICAN HERPETOLOGICAL NOVELTIES.

BY HOBART M. SMITH.[1]

Among the specimens collected in Mexico during the months of October through March of 1938 and 1939, a few highly interesting novelties have come to light. Some of them are discussed in this paper.

A large proportion of the rarer material was discovered in one of two habitats not frequently searched: bromeliads and bananas. The former has been known for some time as a fruitful source of material, at least at certain times of the year. Dead and dry bromeliads were found to conceal many snakes; however, the snakes deserted them after heavy showers, during which the plants accumulated considerable water.

Bananas afforded the most amazing results. The loose outer leaves on the trunks of the plants hold sufficient moisture to protect amphibians during the dry season, when they seek refuge there in untold numbers. For example, in one large banana patch, three men including myself collected 537 specimens in two hours; had we saved all the specimens of the most common species (*Oedipus rufescens*) the number would have been nearer 750. The total number of species found in, on or under bananas in this region was 23.

The material discussed was secured through aid of the Walter Rathbone Bacon Travelling Scholarship. I am also deeply indebted to Mr. and Mrs. Dyfrig McH. Forbes for assistance in obtaining specimens, and to Dr. E. H. Taylor for aid in studying them.

Eleutherodactylus spatulatus, sp. nov.

(Figures 4 and 5, Plate II.)

Type.—Female, U. S. Nat. Mus., H. M. Smith field number 3787, January 5, 1939, Cuautlapan, Veracruz.

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

Paratypes.—Seven, all from the type locality, collected on January 5 and 16, 1939 (numbers 3786, 3788, 4391, 4411, 4467, 4470, 4488).

Diagnosis.—Tips of digits expanded; disks with terminal transverse grooves, four times as broad as narrowest part of corresponding digit, twice size of tympanum; vocal sac present; a few large pustules on eyelid; a dark interorbital bar; limbs with distinct, dark bands; labia barred. Maximum size of female, 32 mm.; of male, 23.6 mm.

Description of type.—Head somewhat flattened; lores oblique, slightly concave; canthi distinct, rounded; tip of snout vertical; nares very near tip of snout, a very distinct median depression between them; diameter of eye equal to distance between eye and naris; interorbital distance slightly less than diameter of eye; tympanum vertically oval, nearly round, its greatest diameter considerably less than half that of orbit; a very distinct, supratympanic fold terminating posteriorly in a tubercle.

Vomerine teeth in two short groups between and behind posterior level of choanae, nearer each other than choanae; tongue subcircular, sides and posterior edge free.

First finger distinctly shorter than second, which in turn is distinctly shorter than the fourth; terminal disk of first finger very slightly expanded; disk of second finger a little more than half the width of disks of third and fourth fingers; latter disks nearly twice the size of tympanum; disks truncate, distinctly notched medially; subarticular tubercles of hand large, single; supernumerary tubercles present, small; an elongate tubercle at the base of first finger and another at base of third; no trace of web; three enlarged tubercles in a row on posteroventral margin of lower foreleg.

Tibio-tarsal articulation reaching a little in front of orbit; heels overlap slightly; subarticular tubercles of foot large, single; outer metatarsal tubercle elongate, padlike; inner metatarsal tubercle small, rounded; supernumerary tubercles small; tarsal fold present, not very distinct, beginning at inner metatarsal tubercle and extending nearly the full length of tarsus; disks on toes small, the largest (of fourth toe) somewhat smaller than disk of second finger; no trace of web.

Skin over most of dorsal surfaces rugose; a faint but distinct, very fine middorsal ridge extending from snout to anus; a dermal ridge extending from posterior border of orbit posteriorly and medially to a distinct tubercle on extreme posterior occipital region; a short series of tubercles, more or less continuous with the preceding ridge, continues in a posterolateral direction; a number of enlarged pustules on eyelid; ventral surfaces of body and hind legs distinctly granular; ventral disk very indistinct.

Color. Ground color of back olive-gray; large dark brown blotches on back forming on sides a barred effect made very distinct because of the white ground color of the sides; a crescentic black line on each side curving posteriorly from posterior corner of eye toward middle of back, extending posteriorly to a point above and behind axilla; limbs with distinct dark bands separated from each other by light interspaces subequal in width to the dark bands; these dark bands particularly distinct on concealed surfaces of hind leg.

A broad, dark interorbital bar, with a narrow anterior border; labia

Table of Measurements (in mm.).

Number	3788	3786	4391	4467	4488	4470	3787	4411
Sex	♂	♂	♂	♂	♀	♀	♀	♀
Snout to vent	22.2	22.6	23.0	23.6	27.5	31.0	31.0	32.0
Head length	7.7	7.6	7.8	8.3	9.7	10.0	10.0	10.0
Head width	8.5	8.6	9.2	9.2	11.2	11.1	12.8	12.8
Tympanum	1.1	1.2	1.2	1.3	1.6	1.6	1.6	1.5
Arm	16.8	17.6	16.0	16.7	22.0	22.0	24.0	24.7
Leg	39.0	39.0	38.2	39.0	55.2	52.0	57.5	57.0
Tibia	12.7	13.0	12.7	12.8	18.0	16.5	18.7	18.6
Foot	16.0	16.0	15.2	16.0	22.0	20.9	23.0	24.0

barred, the subocular bar very distinct; throat stippled with darker color; belly stippled, with white alveolae; ventral surfaces of limbs dimly mottled, the darker areas stippled.

Inner, maxillary flange of upper jaw stippled with darker color.

Variation. One female has a broad white line down the middle of the back. The interorbital dark bar is rather indistinct in some specimens. The markings on the back are irregular, except the crescentic suprascapular mark, which is constant in all. An oblique dark mark behind the axilla seems relatively constant.

Comparisons. The species most closely related to *spatulatus* is *alfredi*. The two form a group widely different from other Mexican species. The present species differs from *alfredi* in a number of characters, the most conspicuous of which is the much smaller tympanum. In *alfredi* its diameter is more than half (about two-thirds) the diameter of the eye, and equal to or greater than the width of the third fingertip. In *spatulatus* the diameter of the tympanum is less than half that of the eye, and only about half the width of the third fingertip. In *alfredi* the dark bands on the legs are indistinct and narrowly departed from each other by light interspaces; the back is more or less uniform olive gray, with scattered white flecks.

Habitat. All specimens were found in banana plants, in the axils of the trunk leaves. The species seems rather rare. *Eleutherodactylus alfredi* was found much more frequently in the same identical habitat.

Anotheca coronata (Stejneger).

(Figures 1, 2, 3 Plate I, and 6, Plate II.)

A large series of 103 specimens[2] of the rare *Gastrotheca coronata* Stejneger was secured in the months of January and February, 1939, at Cuautlapan, Veracruz. In densely shaded, mixed groves of coffee trees and banana plants, they were found in the axils of the loose outer leaves on the trunks of bananas. They did not appear to exist in plants exposed to open sunlight, or in small plants.

Previous knowledge of the species has been based upon two specimens. One is immature, from Córdova, Veracruz (British Museum 1930. 4. 10. 1); the other is an adult male (type) from Palomo, Valle de Orosi, Cartago, Costa Rica. The description of the type (Proc. U. S. Nat. Mus., 41, 1911, pp. 287–8) leaves no doubt that the Cuautlapan specimens are conspecific.

Females of *coronata* have the spines of the transverse occipital crest very poorly developed, while males have them strongly developed. Sexes may easily be distinguished on the basis of this character.

An examination of the females brought to light a highly interesting fact: there is no dorsal brood pouch. Other members of *Gastrotheca* do have a brood pouch so far as known.

Further, the sacral diapophyses (fig. 2) are strongly dilated. The terminal phalanges are claw-shaped.

These characters remove *coronata* not only from the genus *Gastrotheca*,

[2] Depósited in the National Museum; H. M. Smith field numbers 2575, 2924, 2928–33, 2935–6, 3199–3209, 3211–3, 3564–94, 3813, 3815–8, 3820, 3830–8, 4130–50, 4262–74.

but also from the subfamily Hemiphractinae.[3] Its association with the subfamily Hylinae seems clear.

There are no palatine or parasphenoid teeth; the snout is not produced forward; the internal metatarsal tubercle is not free; pupil round; mandible with no toothlike projections.

Certain peculiarities of the pectoral apparatus are shown in figure 1. A cartilaginous rod extends from the posteromedial margin of the procoracoid on each side to the internal surface of the sternum, to which it is attached by fascia. The girdle is arciferal.

The urostyle is peculiar in possessing a transverse process on each side near its base (fig. 3).

These characters in combination differentiate *coronata* from all other casque-headed Hylinae (*Diaglena, Triprion, Pternohyla, Nyctimantis, Hemiphractus, Corythomantis,* and a few *Hyla* species). I therefore propose the generic name *Anotheca* for it. Its diagnosis follows. Derm of head completely involved in the cranial ossification; posterior edge of casque studded with high, conical, erect bony spines; a similar series of spines above tympanum; supraorbital crest tubercular; canthus granular; vomerine teeth present; no palatine or pterygoid teeth; snout not produced; pupil round; internal metatarsal tubercle padlike; no marsupium.

Leiolopisma cherriei (Cope).

(Figure 7, Plate II.)

A series of thirteen specimens from Veracruz (U. S. Nat. Mus., H. M. Smith field nos. 1612–3, 1724–5, 2052–3, 2082–3, 2117, 2226, 2278–9, from Potrero Viejo, December 13 to 26, 1938; no. 2964, Cuautlapan, January 3, 1939) are not referable to any species generally recognized from Mexico. Dr. L. C. Stuart informs me that they are identical with *cherriei* specimens from Central America.

Diagnosis.—A member of the "Mocoa" group; 30 to 32 scale rows about the middle of the body; 65 to 72 transverse rows from occiput to base of tail (a line connecting posterior margins of thighs); adpressed limbs slightly separated (maximum five scales), touching or overlapping slightly (maximum three scales), usually overlapping in males, usually separated in females. It differs remarkably from *assatum* in having a *blue* tail instead of pink; lateral dark line complete to groin; sides of neck and abdomen darkly mottled; postocular stripe covering dorsal half of lower secondary temporal; primary temporal usually as long as high.

Description (from no. 2053, male).—Parietals enclose interparietal; frontoparietal entire; four supraoculars, second largest; frontal slightly longer than frontoparietal; two prefrontals, separated by contact of frontal and internasal; nasal entire; anterior loreal much higher than long, posterior loreal slightly higher than long; two superimposed preoculars; seven superciliaries, the anterior the largest; seven supralabials, the subocular (fifth) the longest, the sixth or seventh the highest.

Anterior temporal subequal in size to sixth supralabial, slightly higher than long, separated from parietal by a small scale; upper secondary tem-

[3] Noble, G. K. 1931. The biology of the amphibia. McGraw-Hill Book Co.

poral largest of all temporals, in contact with parietal; lower secondary temporal slightly smaller than anterior temporal.

Mental with a labial border somewhat greater than that of rostral; seven infralabials; one undivided postmental, larger than mental, followed by four postmentals on each side, separated from each other medially by one or more scales.

Ear slightly vertically oval, its longitudinal diameter two-thirds the distance between eye and posterior edge of nostril, and its vertical diameter two-thirds the diameter of orbit; diameter of orbit equal to distance between eye and anterior edge of nostril; distance between eye and ear equal to distance between eye and tip of snout.

Scales around middle of body 32; scales from parietals to base of tail 68; adpressed limbs separated by two scales; lamellar formula of fourth toes 17–18; diminutive tubercular keels present on lateral body scales, especially in lateral nuchal region, and behind axilla, but very indistinct.

Two median anal scales bounded laterally by two smaller scales on each side; scales preceding anals slightly enlarged; subcaudals slightly larger than dorsal caudals, not transversely enlarged.

Color.—Dorsal surface of body light brown, somewhat more olive middorsally; head uniform light brown above; tail dark olive-blue above, with numerous dark flecks; a few dark flecks in middorsal body region. A dark stripe beginning in loreal region, faintly visible about nostril, passes through the eye, above tympanum and axilla to groin, where it disappears; it is broadest (three scales wide) between ear and foreleg, and begins to taper and break up behind the foreleg; it occupies the lower half of the upper secondary temporal and the upper half of the lower secondary temporal; a dark streak below the anterior part of the eye; several dark spots on the supra- and infralabials; smaller dark flecks below ear and below lateral dark stripe on neck; still smaller and more numerous dark flecks on sides of body. Ventral surfaces immaculate save a few flecks on the sides of the gular region and scattered flecks on the tail. Base of tail faintly pink.

Comparisons.—Both subspecies of *assatum* possess pink tails, while *cherriei* has a blue tail. The lateral dark stripe passes above the lower secondary temporal in *assatum*, through it in *cherriei*. The sides of the body are mottled more strongly, and the general ground color is darker in the former than in the latter.

Differences in scutellation are minor. Usually the primary temporal is as long as or longer than broad in *cherriei*, broader than long in *assatum*.

The general habitus is different, *cherriei* having a more robust body than *assatum*. The tail appears to be proportionately longer.

Leptodeira frenata (Cope).

(Figure 8, Plate II.)

On December 28, 1938, and January 8, 1939, three specimens of *Leptodeira* (deposited in the U. S. Nat. Mus.; H. M. Smith field numbers 2356, 2357, 3771) were secured from dead, dry bromeliads near Palma Sola, about 10 miles east of San Juan de la Punta, Veracruz. The locality is on a very dry plain, characterized by scattered low trees, short grass and few palms.

TABLE OF MEASUREMENTS AND SCALE COUNTS OF *Leiolopisma cherriei* (IN MM.).

Number	2278	2279	1612	1725	2226	1724	2053	2117	2964	1613
Sex	yg	♂	♂	♂	♀	♂	♂	♂	♂	♀
Snout to vent	33.0	46.0	48.5	49.0	50.1	51.0	52.3	53.0	55.0	56.0
Snout to ear	2.1	2.8	3.0	3.0	2.9	3.3	3.2	3.2	3.7	3.0
Snout to foreleg	11.8	16.0	16.0	16.5	16.0	17.8	17.0	18.0	18.0	17.0
Axilla to groin	17.1	24.5	26.0	26.0	28.3	27.0	28.5	29.0	30.0	28.0
Tail	52.0	------	------	------	------	90.0	98.0	------	82.0	------
Head to parietal	5.9	7.5	8.0	8.0	8.0	8.5	8.5	8.5	9.0	8.0
Arm	7.3	10.2	11.0	11.2	10.1	11.3	12.0	11.2	11.3	10.0
Leg	10.2	16.0	17.8	17.0	16.5	18.0	18.0	17.5	18.0	17.0
Fourth toe	4.5	6.0	6.6	6.5	6.7	6.8	6.7	6.3	6.4	6.0
Scales around body	30	32	30	30	30	32	32	32	32	30
Dorsals	68	69	70	70	65	72	68	66	69	71
Lamellae 4th toe	18–19	20–21	18–19	18–18	17–17	17–18	17–18	17–18	20–20	16–18

The specimens seem referable to the rare *Sibon frenatum* described by Cope in 1886 (Proc. U. S. Nat. Mus., 9, p. 184) on the basis of a specimen from Jalapa, Veracruz. Since its description no further specimens have appeared in collections and, moreover, the single type has apparently been lost.

The type description, with emendations based on the present three specimens, follows:

"Scales in twenty-three longitudinal series [19–21–15 (♂), 21–21–17 (2 ♀), with very short intercalated rows on anterior part of body, in two specimens, bringing the maximum count to 23]. Body rather slender, tail rather short, head very distinct and depressed. Superior labials nine [by error; should be eight], eye resting on the fourth and fifth, and only separated from the third by the small inferior preocular. All are higher than long, excepting the eighth and ninth [eighth only], which are longer than high; the sixth and eleventh are the largest. Inferior labials, eleven [in error; should be ten; one specimen has nine]. Postgeneials much longer than pregeneials [equal or slightly longer]. Loreal plate subquadrate; oculars 2–2 [three preoculars on one side in one specimen]; the superior anterior not reaching the frontal plate [does on both sides of one specimen]. Temporals, 1–2–3. Frontal twice as long as wide [somewhat less in two], with parallel sides. Occipitals moderate, reaching to above middle of eighth superior labials.[4] Gastrosteges, 188 [183 ♂, 180 ♀, 178 ♀]; anals, 1–1; urosteges, 69 [79 ♂, 70 ♀, 65 ♀].

"*Colors.*—Above black [bands entirely black or with dark brown centers], below white [bands encroach on edges of ventrals]. At distance of from six to nine [four to ten] scales, narrow cross-bands of one scale in width [on or near middle of body] rise from the abdominal border color, and meet or terminate in alternating positions, on or near the middle line of the back. These bands are more or less gray, sometimes darker in the middle [and expand on sides of body to a width of two or three scales; on each side they usually enclose a small dark spot involving the first scale row and the edges of the adjacent ventrals]. The top of the head is gray densely mottled with blackish, leaving a crescentic space of light gray between a black spot behind the headshields and the beginning of the black of the superior surfaces. A broad, black band passes downwards and posteriorly from the eye, and crossing the angle of the mouth covers the side of the neck and unites with the black of the following regions. The superior labials are light gray with black borders; the dark borders of the inferior labials are less distinct.

"Total length, 305 mm. [483 mm. ♂, 496 mm. ♀, 532 mm. ♀]; of tail, 66 mm. [107 mm., 9.7 mm., 112 mm., respectively]; of head to canthus oris, 11 mm. No. 298 (of the Comisión Geográfica Exploradora de México collection exhibited at the New Orleans Exposition). Jalapa, Mexico."

[4] This statement leads me to believe Cope erred in counting nine supralabials (and therefore eleven infralabials), for in the present three specimens also the occipitals reach to the middle of the eighth (and last) supralabial. The scale following the eighth supralabial resembles a labial, but is not.

The number of bands on the body of the male is 26 or 27; of the females, 28 or 29 in one, 30 in the other. The number of tail bands in the male is 12 or 14; of the females, 12 or 14 in one, 11 or 12 in the other.

The fangs are strongly grooved.

Explanation of Figures.

Fig. 1. Ventral view of right half of pectoral girdle of *Anotheca coronata*. Cartilage lightly stippled.

Fig. 2. Sacral vertebra of *Anotheca coronata*. Cartilage lightly stippled.

Fig. 3. Urostyle of *Anotheca coronata*.

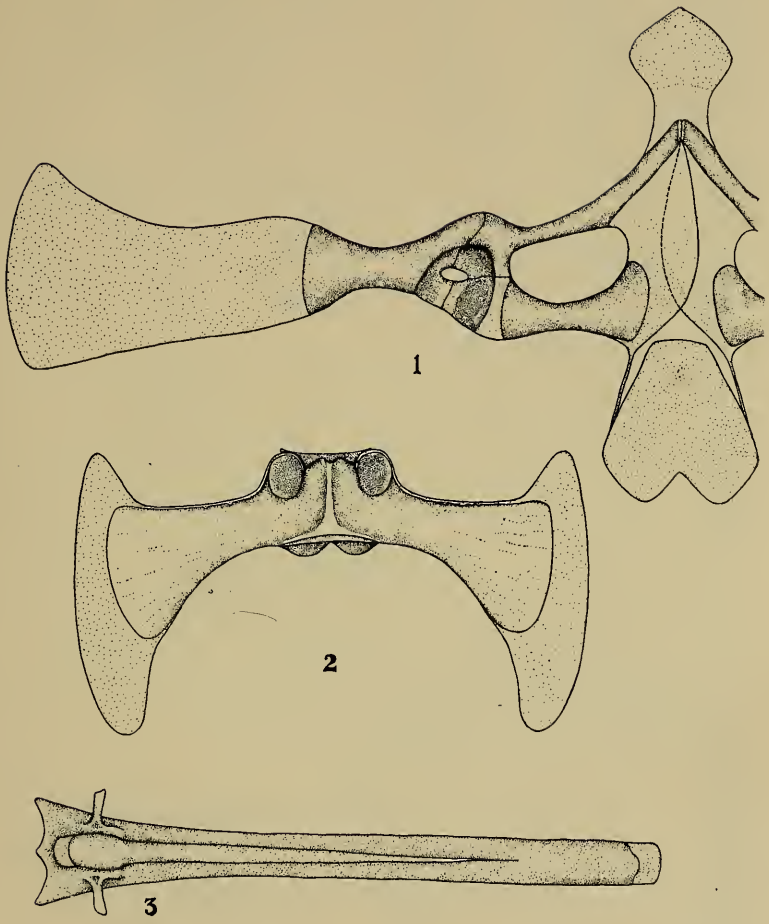
Fig. 4. Type of *Eleutherodactylus spatulatus*. Snout-vent measurement 32 mm.

Fig. 5. Paratype of *Eleutherodactylus spatulatus*. Snout-vent measurement 32 mm.

Fig. 6. *Anotheca coronata*, male.

Fig. 7. Left, *Leiolopisma assatum assatum*, E. H. Taylor–H. M. Smith collection number 10065, Tapachula, Chiapas, 48 mm. snout to vent. Right, *Leiolopisma cherriei*, H. M. Smith field number 2053, Potrero Viejo, Veracruz, snout-vent measurement 52.3 mm.

Fig. 8. *Leptodeira frenata*, male, 483 mm. total length.



Anotheca coronata.

Mexican Herpetological Novelties.

INDEX

New Names are given in **heavy face**, as are also principal page references.

B

C

Q

T

U

V

E. Kannos