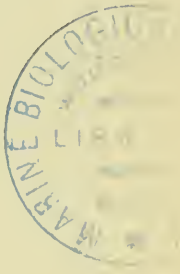
PROCEEDINGS

OF THE

Biological Society of Washington



VOLUME 34
1921

WASHINGTON
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FOR 1921

(ELECTED DECEMBER 11, 1920

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1 Elected May 14, 1921, to succeed William Palmer.

2 Died April 8, 1921.

EX-PRESIDENTS

OF THE

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*Theodore N. Gill, 1881, 1882
*Charles A. White, 1883, 1884
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*Lester F. Ward, 1889, 1890
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*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

* Deceased.

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PLATES

The Committee on Publications declares that each paper of this volume was distributed on the date indicated on its initial page. The Index, title page, and minutes of meetings for 1921 (pp. i–xiv; 193–199) were issued on March 20, 1922.

ERRATA.

Page 82, for **Byachyiulus pusillus,** read **Brachyiulus pusillus.**
Page 119, at top of page, for **June 30, 1911,** read **June 30, 1921.**

Vol. 34, pp. ix-xiv

PROCEEDINGS
OF THE
BIOLOGICAL SOCIETY OF WASHINGTON

PROCEEDINGS.

The Society meets from October to May, on alternate Saturdays, at 8 P. M. All meetings during 1921 were held in the new lecture hall of the Cosmos Club.

January 8, 1921—618th Meeting.[1]

President N. Hollister in the chair; 62 persons present.

Mr. E. G. Runyan elected to membership.

President Hollister announced the membership of the Committee on Publications as follows: Chas. W. Richmond, Chairman, and J. H. Riley, T. E. Snyder, F. C. Lincoln. Also the Committee on Communications: S. A. Rohwer, Chairman, and Chas. E. Chambliss, J. S. Gutsell.

Informal communications: J. M. Aldrich, Exhibition and notes upon caterpillars of *Coloradia pandora* Blake; David Fairchild, Note upon the edibility of certain borers; A. S. Hitchcock, Note upon botanical codes.

Formal communications: L. O. Howard, Some views of the fight in southern France last summer against the Moroccan Locust, and A visit to the home of Henri Fabre; S. F. Blake, Sexual differences in the coloration of the Spotted Turtle.

January 22, 1921—619th Meeting.[2]

President Hollister in the chair; 112 persons present.

New members were elected as follows: Arthur J. Poole and Mrs. Marion G. Brown.

Informal communications: Paul Bartsch, Note upon the

[1] Abstract in Journ. Washington Acad. Sci., vol. 11, p. 241, May 19, 1921.
[2] Abstract in Journ. Washington Acad. Sci. vol. 11, p. 262, June 4, 1921.

acquisition by the National Museum of the Hirase collection of Japanese and Pacific Molluscs; Paul Bartsch, Note upon a Mockingbird wintering in the city of Washington; R. W. Shufeldt, Exhibition of File Fish from Argentina; T. S. Palmer, Note upon the heights at which birds fly; H. M. Smith, Note upon taking the Large Fork-tailed Swift, *Micropus pacificus* (Latham) in the Pribilof Islands; A. H. Howell, Note upon the abandonment of the Crow roost at Laurel, Md. L. O. Howard, Conveyed the greetings of former President F. A. Lucas.

Formal communications: L. H. Miller,[1] Asphalt Beds of Rancho La Brea; H. C. Bryant,[1] Birds and Mammals of Yosemite National Park.

February 5, 1921—620th Meeting.[2]

President Hollister in the chair; 50 persons present.

New members were elected as follows: Glenwood C. Roe, Maurice K. Brady. Deaths of Wm. J. Bennets and W. W. Welsh were announced.

Informal communications: H. M. Smith, Exhibit of artificial pearls, and fish-scale material, and exhibit of the smallest and youngest eel ever captured; R. W. Shufeldt, note upon fractured bones in birds and mammals.

Formal communications: Ivar Tidestrom, Notes upon the Flora of the Iberian Peninsula; R. S. Bassler, Paleontological Work at the National Museum.

February 19, 1921—621st Meeting.[3]

Vice-President Hitchcock in the chair; 48 persons present.

O. M. Freeman was elected to membership.

Informal communications: The Secretary read by title a paper by S. Stillman Berry, entitled Notes on some Japanese Cephalopods; L. O. Howard introduced Prof. E. S. Morse, former president of the Boston Society of Natural History, who addressed the Society.

Formal communications: C. E. McClung, Chromosomes in Relation to Heredity; Sewall Wright, Heredity as a Factor in the Resistance of Guinea Pigs to Tuberculosis.

[1] Introduced by Dr. J. C. Merriam.

[2] Abstract in Journ. Washington Acad. Sci., vol. 11, p. 315, July 10, 1921.

[3] Abstract in Journ. Washington Acad. Sci., vol. 11, p. 316, July 10, 1921.

March 5, 1921—622d Meeting.[1]

Vice-President Hitchcock in the chair; 32 persons present.

M. A. Murray was elected to membership.

Informal communications: I. Tidestrom, Note on the wearing qualities of rag and pulp paper used in books; Paul Bartsch, Note on rapid deterioration of pulp paper in books; H. C. Oberholser, Note on the recent presence of the Whistling Swan in local waters; Paul Bartsch, Note on local presence of Holboell's Grebe.

Formal communications: Dr. H. M. Hall, The Synthetic Method of Botanical Taxonomy.

March 19, 1921—623d Meeting.[2]

President Hollister was in the chair; 55 persons were present.

Informal communications: F. H. Knowlton, Note on the strange antics of a Cardinal.

Formal communications: F. H. Knowlton, Flora of Some Newly Discovered Lake Beds of Southern Colorado; H. C. Oberholser, The Breeding Water Fowl of the Great Plains Region.

April 2, 1921—624th Meeting.[3]

Joint meeting with the Washington Academy of Sciences.

Alfred H. Brooks, President of the Academy, was in the chair; 75 persons were present.

Address of the retiring President: A. D. Hopkins, International Problems in Natural and Artificial Distribution of Plants and Animals.[4]

April 16, 1921—625th Meeting.[5]

President Hollister in the chair; 66 persons were present.

Informal communications: H. C. Oberholser, Note upon Miss M. T. Cooke's Birds of the Washington Region, a publication of the Society.

Formal communications: F. C. Lincoln, The Fall Migration of Ducks from Lake Scutog, Ontario; E. W. Nelson, Alaska and the Reindeer Industry.

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[1] Abstract to appear in Journ. Washington Acad. Sci.

[2] Abstract to appear in Journ. Washington Acad. Sci.

[3] Notice of the meeting in Journal of the Washington Academy of Sciences.

[4] Abstract of the address in Journ. Washington Acad. Sci., vol. 11, p. 223, May 19, 1921.

[5] Notice in Journ. Washington Acad. Sci., vol. 11.

April 30, 1921—626th Meeting.[1]

President Hollister in the chair; 51 persons were present.

Informal communications: M. W. Lyon, Note upon Bison raising; T. S. Palmer, Note on the status of Bison in the United States; R. E. Coker, Exhibition of first copies of the Journal of Ecology; C. C. Adams, Note on the Roosevelt Wild Life Experiment Station; Paul Bartsch, Note upon a scientific column in a local newspaper.

Formal Communications: J. N. Rose, Rediscovery of a Remarkable Cactus from Hayti; Joseph Grinnell, the Principle of Rapid Peering in Birds; T. S. Palmer, Notes on Some Parrots Imported into the United States; E. A. Goldman, Rats in the War Zone.

May 14, 1921—627th Meeting.[2]

President Hollister was in the chair; 28 persons were present.

The following were elected to membership: Rudolph Kuraz, E. C. Leonard, Robert Griggs.

Informal communications: T. S. Palmer, Note upon the origin of Opossums in California; R. W. Shufeldt, Exhibition of new books, 'Early Annals of Ornithology' by John H. Gurney, and 'Life of Samuel White' by Capt. S. A. White; F. C. Lincoln, Note upon an American specimen of Tern taken on the Niger River; R. E. Coker, Announcement of the Conference for the conservation of life in inland waters at Fairport, Iowa; R. M. Libbey, Note upon Bicknell's Thrush; T. S. Palmer, Further Notes upon Bicknell's Thrush; T. S. Palmer, Minute upon the death of William Palmer.

Formal communications: F. G. Ashbrook, Recent Notes on the Fur Trade in the United States; S. A. Rohwer, Injurious and Beneficial Insect Galls.

October 29, 1921—628th Meeting.[3]

Vice-President Gidley in the chair; 36 persons present.

On recommendation of the Council, Frank E. Ashbrook, J. Wade, Julius Parmalee, and Miss Erma Brown were elected to membership.

Informal communications: T. S. Palmer, Announcement of

[1] Abstract in Journ. Washington Acad. Sci.
[2] Abstract in Journ. Washington Acad. Sci.
[3] Abstract in Journ. Washington Acad. Sci.

the annual meeting of the American Ornithologists' Union; H. M. Smith, Records of the Kamchatkan Sea Eagle.

Formal communications: R. S. Bassler, Sex Characters in Fossils; W. E. Safford, The Dahlia, its Origin and Development.

November 12, 1921—629th Meeting.

Joint meeting with the Washington Academy of Sciences and the Botanical Society of Washington, under the Presidency of the Washington Academy.

Program: Professor Arthur de Jaczewski, Director of the Institute of Mycology and Pathology at Petrograd, The Development of Mycology and Pathology in Russia; Professor Nicolas T. Vavilov, Director of the Bureau of Applied Botany and Plant Breeding at Petrograd, Russian Work in Genetics and Plant Breeding; Dr. Vernon L. Kellogg, Permanent Secretary of the National Research Council, The Interrelations of Russian and American Scientists.

November 26, 1921—630th Meeting.[1]

President Hollister was in the chair; 44 persons were present.

The following were elected to membership: Thos. E. Penard and T. Van Hyning.

Formal communications: R. W. Shufeldt, Changes in the skull of the American Badger (*Taxidea americana*); J. W. Gidley, The Primates of the Paleocene; J. M. Aldrich, An Entomologist in Alaska.

December 10, 1921—631st Meeting.[2]

FORTY-SECOND ANNUAL MEETING.

President Hollister presided; 21 persons were present.

Reports were received from the Corresponding and the Recording Secretaries, the Treasurer, and the Committee on Publications.

The death of S. S. Voorhees was announced.

A committee of the Council, consisting of J. N. Rose, C. W. Richmond, Paul Bartsch, and H. C. Oberholser presented a memorial of the late William Palmer.

The following officers and members of the Council were elected:

President, Vernon Bailey.

[1] Abstract in Journ. Washington Acad. Sci.

[2] Abstract in Journ. Washington Acad. Sci.

Vice-Presidents, A. S. Hitchcock, J. W. Gidley, S. A. Rohwer, H. C. Oberholser.

Recording Secretary, J. M. Aldrich.

Corresponding Secretary, T. E. Snyder.

Treasurer, F. C. Lincoln.

Members of the Council, E. A. Goldman, H. H. T. Jackson, R. E. Coker, R. W. Williams, W. R. Maxon.

President Bailey was nominated for one of the Vice-Presidents of the Washington Academy of Sciences.

Informal communications: C. V. Piper, Note upon *Panicum Kuntzii*, Cut Throat Grass, in Florida; L. O. Howard, Suggestion that a meeting be held in the interests of old fashioned Natural History; C. V. Piper, L. O. Howard, and A. A. Doolittle, Notes upon interest in Natural History as reflected in recent books and organization activities; F. C. Lincoln, Note upon feeding habits of the Sharp-tailed Grouse; C. V. Piper, E. A. Goldman, and T. S. Palmer, Notes upon Hungarian Partridge in the United States.

Vol. 34, pp. 1–22 March 31, 1921

PROCEEDINGS

OF THE

BIOLOGICAL SOCIETY OF WASHINGTON

BIRDS OF THE WASHINGTON REGION.

BY MAY THACHER COOKE.

It is probable that the files of the Biological Survey contain a greater amount of data on the movements of birds about Washington than is available for any other section of the country. These records, gleaned from various sources, extend over a period of nearly eighty years, and from the late seventies are nearly continuous. For the past fifteen years, through the efforts of members of the Biological Survey and the local Audubon Society and of other local ornithologists, very full notes have been obtained on the spring migration of birds, but data on the fall migration, especially of many breeding species, are scarce.

In 1861[1] Coues and Prentiss published a list of the birds of the District of Columbia, containing 225 species. With the publication of their revised List in 1883[2] the number was increased to 248. Dr. Richmond's list of 1902[3] records 291 species and subspecies and 1 hybrid. In 1908[4] under the title "Bird Migration in the District of Columbia," Wells W. Cooke published a summary of the data then available, comprising a table of the dates of migration and lists of permanent residents and casual visitants. Five years later,[5] under the same title, he published a revised table for the spring migration. In these two lists the number of birds known to have occurred about

[1] 16th Ann. Rep. Smiths. Inst., 1861 (1862), pp. 299–421.

[2] Avifauna Columbiana, Bull. 26, U. S. Nat. Mus., 1883, pp. 1–133.

[3] Birds of Washington and Vicinity, L. W. Maynard; rev. ed., 1902. List by Dr. Richmond, pp. 178–186.

[4] Proc. Biol. Soc. Wash., XXI, 1908, pp. 107–118.

[5] *Ibid.*, XXVI, 1913, pp. 21–26.

Washington was given as 293,[1] of which 2 are hybrids. The present list comprises 299 species and subspecies, besides 2 hybrids and 2 hypothetical forms. Five of the additional forms—Glaucous Gull, Red-legged Black Duck, White-rumped Sandpiper, Black-bellied Plover, and European Starling—have been detected in the vicinity since the publication of Professor Cooke's papers; the others are included on the basis of old records which have recently come to light. It is probable that before long some of the more recently described subspecies known to migrate through the eastern United States will be added to the Washington list. One species, Barrow's Goldeneye, which was included by Professor Cooke as doubtful, is here omitted since reexamination of the specimen has shown it to be the American Goldeneye. One species, the Sooty Shearwater, has been transferred to the hypothetical list because of insufficient data.

The territory covered in the present paper is approximately that within a radius of about twenty miles from the Capitol, including Sandy Spring, Laurel, Camp Meade, Upper Marlboro, and Marshall Hall, Maryland, and Mount Vernon, Fairfax, and Great Falls, Virginia. This is a slight extension of the limits nominally used in previous lists.

In the following table of migration dates, the figures under the heading "No. of dates" indicate the number of dates of arrival or departure used in calculating the succeeding average dates. Since the object of migration averages is to indicate the normal date of arrival or departure, certain exceptionally early or late dates of occurrence have been recorded as "accidental" and not used in figuring the averages. In the case of spring arrival, dates that are late enough unduly to affect the average have been discarded as not representing first arrivals. In the computation of averages, when the result includes a fraction of less than one-half, the next lower whole number has been used; and in the case of a fraction of more than one-half, the next higher whole number has been used.

The species known to occur in this region are classified under four heads: (1)Permanent Residents, those which are found in the region at all times of year; (2) Regular Migrants, migratory

[1]This was due to an error in counting. The actual number of names in the 1908 list is 294.

species which occur regularly; (3) Rare, Irregular, or Accidental Visitants, those which are stragglers or occur only in small numbers; (4) Hypothetical Species, those concerning which the data is insufficient to allow their inclusion in any other division. For convenience, the table of migration dates of regular migrants is placed at the end of the present paper.

As far as possible the authorities for all records are given. Several years ago, Dr. Charles W. Richmond kindly loaned to the Biological Survey his manuscript notes on the birds of this vicinity which were then copied for the dates only. As the original notes are not just at present available, in many cases it is impossible to tell which are from his own observations, and which from other sources which he considered authentic. In such instances, the records are quoted as "Richmond MS."

I desire to express here my gratitude to those persons, many of whose names appear as authorities for records, whose reports on the birds about Washington have made my work possible. I am especially indebted to Dr. Harry C. Oberholser and Mr. Francis Harper for much valuable advice and assistance.

PERMANENT RESIDENTS.

Wood Duck	*Aix sponsa* (rare)
Black-crowned Night Heron	*Nycticorax nycticorax naevius*
Ruffed Grouse	*Bonasa umbellus umbellus* (very rare)
Bob-white	*Colinus virginianus virginianus*
Turkey Vulture	*Cathartes aura septentrionalis*
[1]Marsh Hawk	*Circus cyaneus hudsonius*
Sharp-shinned Hawk	*Accipiter velox*
Cooper's Hawk	*Accipiter cooperii*
Red-tailed Hawk	*Buteo borealis borealis*
Red-shouldered Hawk	*Buteo lineatus lineatus*
Broad-winged Hawk	*Buteo platypterus platypterus*
Bald Eagle	*Haliaeetus leucocephalus leucocephalus*
American Sparrow Hawk	*Cerchneis sparveria sparveria*
American Barn Owl	*Tyto alba pratincola* (rare)
American Long-eared Owl	*Asio otus wilsonianus* (rare)
Barred Owl	*Strix varia varia*
Screech Owl	*Otus asio naevius*
Great Horned Owl	*Bubo virginianus virginianus* (rare)
Hairy Woodpecker	*Dryobates villosus villosus* (rare)
Downy Woodpecker	*Dryobates pubescens medianus*

[1]Rare in summer.

Pileated Woodpecker	*Phloeotomus pileatus pileatus* (very rare)
[1]Red-headed Woodpecker	*Melanerpes erythrocephalus erythrocephalus*
Red-bellied Woodpecker	*Centurus carolinus*
Northern Flicker	*Colaptes auratus luteus*
Blue Jay	*Cyanocitta cristata bromia*
Southern Crow	*Corvus brachyrhynchos paulus*
Fish Crow	*Corvus ossifragus*
European Starling	*Sturnus vulgaris vulgaris*
Meadowlark	*Sturnella magna magna*
American Goldfinch	*Astragalinus tristis tristis*
English Sparrow	*Passer domesticus domesticus*
[1]Field Sparrow	*Spizella pusilla pusilla*
Song Sparrow	*Melospiza melodia melodia*
Cardinal	*Richmondena cardinalis cardinalis*
Cedar Waxwing	*Bombycilla cedrorum*
[2]Migrant Shrike	*Lanius ludovicianus migrans*
Mockingbird	*Mimus polyglottos polyglottos*
Carolina Wren	*Thryothorus ludovicianus ludovicianus*
White-breasted Nuthatch	*Sitta carolinensis cookei*
Tufted Titmouse	*Baeolophus bicolor*
Carolina Chickadee	*Penthestes carolinensis carolinensis*
[3]Southern Robin	*Planesticus migratorius achrusterus*
Bluebird	*Sialia sialis sialis*

Rare, Irregular or Accidental Visitants.

In the following list are included all the known authentic dates for the species that are but stragglers in the vicinity of Washington, and for a few that occur fairly regularly but only in small numbers.

Holboell's Grebe (*Colymbus holboellii*).—One, November 4, about 1850 (Spec. U. S. Nat. Mus.); one, about 1859 (Spec. U. S. Nat. Mus.); September 30, 1877 (W. F. Roberts); March 26 and December 2, 1916 (L. D. Miner); one, January 20, 1920 (Spec. U. S. Nat. Mus.).

Red-throated Loon (*Gavia stellata*).—One, spring, 1882 (*fide* Smith and Palmer); October 20, 1889 (Richmond MS.); November 15, 1892 (W. Palmer); October 30, 1904 (A. K. Fisher).

Brünnich's Murre (*Uria lomvia lomvia*).—Six specimens, December 14, 1896–January 1, 1897 (collections of P. Bartsch and W. Palmer).

Glaucous Gull (*Larus hyperboreus hyperboreus*).—One, April 5–9, 1914 (E. A. Preble); one, February 20, 1920 (F. Harper)—February 21, 1920 (M. J. Pellew.)

[1]Rare in winter.

[2]Rare in summer.

[3]The Northern Robin (*Planesticus migratorius migratorius*)occurs in migration and may prove to be our wintering bird.

Laughing Gull (*Chroicocephalus atricilla*).—Two, September 24, 1894 (W. Palmer); flock, September 9, 1914 (F. M. Weston, Jr.); several, May 11–12, 1917 (W. Palmer); two, April 27, 1918 (F. Harper); two, October 26, 1919 (F. Harper); four, September 26, 1920 (J. Kittredge, Jr.); other records without dates.

Gull-billed Tern (*Gelochelidon nilotica*).—Occasional in autumn.

Caspian Tern (*Hydroprogne caspia*).—September 29, 1896 (C. W. Richmond); two, October 4, 1896 (Spec. U. S. Nat. Mus.); eight, May 11, 1917 (F. Harper); one, May 5, 1918 (A. Wetmore).

Forster's Tern (*Sterna forsteri*).—One, August, 1859 (Spec. U. S. Nat. Mus.); one, summer 1875 (*fide* P. L. Jouy).

Common Tern (*Sterna hirundo*).—One about 1860 (C. Drexler); flock of twelve, May 7, 1894 (W. Palmer); several, May 11, 1917 (W. Palmer)—May 26, 1917 (I. N. Gabrielson); ten, April 24 and 27, 1918 (R. W. Moore); two, December 23, 1918 (Preble and Wetmore); two, May 2 and 16, 1920 (J. Kittredge, Jr.); twelve, October 31, 1920 (J. Kittredge, Jr.).

Least Tern (*Sternula antillarum antillarum*).—One about 1858–59 (C. Drexler); one, August 17, 1878 (*fide* C. W. Richmond).

Black Skimmer (*Rynchops nigra*).—One, September 8, 1858 (Coues and Prentiss).

Leach's Petrel (*Oceanodroma leucorhoa leucorhoa*).—Four, August, 1842 (Spec. U. S. Nat. Mus.); two, about 1859 (Spec. U. S. Nat. Mus.); one, probably this species, January, 1878 (W. Palmer); one, June 7, 1891 (Spec. U. S. Nat. Mus.).

Hawaiian Petrel (*Oceanodroma castro castro*).—August 28–30, 1893 (W. Palmer).

Wilson's Petrel (*Oceanites oceanicus*).—One, August, 1842 (Auk, XXXV, 1918, p. 85); one about 1859 (Spec. U. S. Nat. Mus.); one, June 27, 1914 (Spec. U. S. Nat. Mus.).

Double-crested Cormorant (*Phalacrocorax auritus auritus*).—One, 1859 (Spec. U. S. Nat. Mus.); one, July 19, 1884 (W. Palmer); one, November, 1884 (*fide* C. W. Richmond); two, April 19, 1896 (A. K. Fisher); one, October 1, 1896 (C. W. Richmond); several, May 11, 1917 (W. Palmer)—May 20, 1917 (Miner and Moore).

American White Pelican (*Pelecanus erythrorhynchos*).—One, 1863 (Spec. U. S. Nat. Mus.); one, April, 1864 (Spec. U. S. Nat. Mus.); two, autumn, 1864 (*fide* Smith and Palmer); one, October, 1878 (*fide* Smith and Palmer).

Red-Legged Black Duck (*Anas rubripes rubripes*).—Occurs in migration but is seldom distinguished from the Black Duck (*A. r. tristis*). The only definite dates are: March 25, 1917 (F. Harper); April 21, 1918 (F. Harper).

Gadwall (*Chaulelasmus streperus*).—February 25, 1860 (Spec. U. S. Nat. Mus.); flock, August 24, 1884 (*fide* C. W. Richmond); two, November 1, 1916 (H. C. Oberholser); one, December 27, 1919 (Preble and Wetmore); three, March 28, 1920 (A. Wetmore).

European Widgeon (*Mareca penelope*).—Spring, 1863 (Spec. U. S. Nat. Mus.); October 16, 1892 (Spec. U. S. Nat. Mus.).

European Teal (*Nettion crecca*).—One, April, 1885 (Spec. U. S. Nat. Mus.).

Shoveler (*Spatula clypeata*).—October 28, 1887 (B. Greenwood); September 21, 1894 (Richmond MS.); October 3, 1901 (B. Greenwood); October 4, 1905 (B. Greenwood); one, September 17, 1911 (W. L. McAtee); one, October 25, 1916 (V. Bailey)—one, October 26, 1916 (F. Harper); three, March 24, 1918 (L. Griscom).

Bufflehead (*Charitonetta albeola*).—Winter 1841–42 (Bull. Nat. Inst.); January 29 and April 1 and 10, 1859 (Spec. U. S. Nat. Mus.); April 3, 1876 (W. Palmer); December 2, 1916 (L. D. Miner); December 23, 1916 (J. P. Young); January 20, 1917 (L. D. Miner) and April 15, 1917 (A. Wetmore); December 26, 1917 (Miner and Moore); March 16, 1918 (L. D. Miner); March 21, 1920 (J. Kittredge, Jr.); December 29, 1920 (E. A. Preble); November 8, year unrecorded (Spec. U. S. Nat. Mus.).

Old-squaw (*Clangula hyemalis*).—November, 1842 (Auk, XXXV, 1918, p. 85); April, 1856 (Spec. U. S. Nat. Mus.); April 15, 1881 (C. W. Richmond); November 20, 1884 (H. W. Henshaw); April 3, 1889 (Richmond MS.); October 20, 1889 (W. Palmer); April 20, 1896 (Richmond MS.); November 6, 1915 (F. M. Weston, Jr.); April 21, 1917 (F. Harper).

American Eider (*Somateria mollissima dresseri*).—One specimen in the collection of the Maryland Academy of Sciences (Kirkwood, Birds of Maryland).

American Scoter (*Oidemia americana*).—December, 1842 (S. F. Baird).

White-winged Scoter (*Melanitta deglandi deglandi*).—December, 1842 (Spec. U. S. Nat. Mus.); November, 1880 (Spec. U. S. Nat. Mus.); October 14, 1882 (*fide* Coues and Prentiss); April 18, 1892 (Spec. U. S. Nat. Mus.); October 28, 1894 (Richmond MS.); one, November 8, 1920 (L. Griscom).

Surf Scoter (*Melanitta perspicillata*).—February, 1842 (Auk, XXXV, 1918, p. 85); December 11, 1858 (Spec. U. S. Nat. Mus.); February 19 and April 10, 1859 (Spec. U. S. Nat. Mus.); one, 1868 (Richmond MS.).

White-fronted Goose (*Anser albifrons albifrons*).—March, 1856 (Spec. U. S. Nat. Mus.).

Brant (*Branta bernicla*).—January, 1844 (Spec. U. S. Nat. Mus.); December 16, 1858 (Spec. U. S. Nat. Mus.).

Whistling Swan (*Olor columbianus*).—Earliest date of fall arrival, 16 years' record, October 15, 1901 (B. Greenwood); average, November 6; rare in spring; January 14 and March 25, 1881 (Richmond MS.); March 22, 1907 (W. W. Cooke) and April 5, 1907 (J. H. Riley); March 18, 1916 (L. D. Miner)—March 20, 1916 (W. W. Cooke).

Glossy Ibis (*Plegadis autumnalis*).—Two about 1817 (*fide* Audubon); one, September, 1900 (J. W. Daniel, Jr.).

Wood Ibis (*Mycteria americana*).—Two, July 2, 1892 (E. M. Hasbrouck); two, July 20, one, July 27, 1896 (W. Palmer).

American Egret (*Casmerodius albus egretta*).—A wanderer from the south occurring nearly every year from July to September. Earliest date of arrival, 9 years' record, July 8, 1894 (W. Palmer); average, July 30;

average date of departure, 3 years' record, September 13; latest, September 22, 1914 (W. D. Appel). Once recorded in spring, May 30, 1891 (C. W. Richmond).

Snowy Heron (*Egretta thula thula*).—One about 1841 (Spec. Mus. Oberlin College).

Little Blue Heron (*Florida caerulea caerulea*).—Occurs nearly every year in late summer. Earliest date of arrival, 13 years' record, July 7, 1894 (Spec. U. S. Nat. Mus.); average, July 30; average date of departure, 6 years' record, September 11; latest, September 24, 1911 (E. A. Preble). Once recorded in spring May 12, 1917 (W. Palmer).

Yellow-crowned Night Heron (*Nyctanassa violacea*).—One, August, 1901 (W. Palmer).

Sandhill Crane (*Megalornis canadensis mexicana*).—One specimen, previous to 1861 (*fide* Coues and Prentiss).

King Rail (*Rallus elegans*).—July 7, 1843; eggs and female June 18, 1887 (H. W. Henshaw); December 16, 1889 (W. Palmer); November 7, 1891 (Spec. U. S. Nat. Mus.); December 21, 1892 (W. Palmer); young, June 26, 1893 (W. Palmer); eggs, May 30, 1910 (S. S. Dickey); May 12, 1913 (W. Palmer); August 30, 1913 (W. D. Appel); August 31, 1913 (G. E. Barnes); August 7, 1914 (W. W. Cooke); December 2, 1914 (Spec. U. S. Nat. Mus.); May 11, 1917 (W. Palmer); August 20, 1917 (R. W. Moore); December 4, 1919 (E. A. Preble).

Clapper Rail (*Rallus crepitans crepitans*).—September 8, 1882 (*fide* Coues and Prentiss).

Yellow Rail (*Coturnicops noveboracensis*).—Autumn, 1843 (Auk, XXXV, 1918, p. 85); October 4, 1879 (Spec. U. S. Nat. Mus.); March 28, 1884 (Spec. U. S. Nat. Mus.); April 14, 1893 (Spec. U. S. Nat. Mus.); November 17, 1893 (W. Palmer); May 20, 1917 (N. Hollister).

Black Rail (*Creciscus jamaicensis jamaicensis*).—September, 1861 (Coues and Prentiss); September 25, 1877 (Spec. U. S. Nat. Mus.); June 6, 1879 (Spec. U. S. Nat. Mus.); May 29, 1891 (E. J. Brown); September 1, 1908 (Spec. U. S. Nat. Mus.); September 15, 1918 (R. W. Moore).

Florida Gallinule (*Gallinula chloropus cachinnans*).—One, 1863 (Spec. U. S. Nat. Mus.); October 26, 1876 (Spec. U. S. Nat. Mus.); October 15, 1880 (Spec. U. S. Nat. Mus.); spring, 1882 (*fide* Coues and Prentiss); April 19, 1892 (E. M. Hasbrouck); August 12, 1892 (E. M. Hasbrouck); September 7, 1892 (W. Palmer); September 1, 1893 (W. Palmer); September 30, 1902 (Spec. U. S. Nat. Mus.); September, 1917 (A. Wetmore); eggs, June 3, 1918 and May 30, 1919 (E. J. Court).

Red Phalarope (*Phalaropus fulicarius*).—October 17, 1885 (Spec. U. S. Nat. Mus.).

Northern Phalarope (*Lobipes lobatus*).—August 31, 1891 (Spec. U. S. Nat. Mus.); one, August 29, 1916 (Moore and Shoemaker).

Dowitcher (*Limnodromus griseus griseus*).—September 2, 1878 (W. F. Roberts).

Long-billed Dowitcher (*Limnodromus griseus scolopaceus*).—Seven, April, 1884 (*fide* Smith and Palmer).

Stilt Sandpiper (*Micropalama himantopus*).—September 8, 1885 (H. W. Henshaw); one, October 26, 1916 (F. Harper); one, September 6, 1918 (A. H. Hardisty).

White-rumped Sandpiper (*Pisobia fuscicollis*).—One, October 8 and 24, 1916 (F. Harper); four, May 11, 1917 (W. Palmer); one, September 20, 1918 (A. H. Hardisty).

Baird's Sandpiper (*Pisobia bairdii*).—September 3, 1894 (Spec. U. S. Nat. Mus.); September 25, 1894 (W. Palmer).

Red-backed Sandpiper (*Pelidna alpina sakhalina*).—October 22, 1842 (Spec. U. S. Nat. Mus.); April 22, 1887 (W. Palmer); September 25, 1894 (E. M. Hasbrouck); flock, October 15, 1916 (F. Harper)—November 1, 1916 (H. C. Oberholser); May 11–12, 1917 (H. C. Oberholser); October 17, 1918 (A. H. Hardisty); April 24 (Richmond MS.), year not recorded.

Western Sandpiper (*Ereunetes mauri*).—September 8, 1894 (W. Palmer); September 11, 14 and 22, 1894 (Spec. U. S. Nat. Mus.); August 21 and September 3, 1897 (W. Palmer); September 25, 1919 (Spec. U. S. Nat. Mus.).

Sanderling (*Crocethia alba*).—September, 1874 (Richmond MS.); one, October 24, 1885 (Richmond MS.); three, September 22, 1894 (W. Palmer); two, September 26–30, 1898 (Richmond MS.); September 27, 1898 (E. A. Preble).

Willet (*Catoptrophorus semipalmatus semipalmatus*).—A flock, August 10-11, 1893 (W. Palmer); one, May 16, 1917 (F. M. Bailey); other records without dates.

Ruff (*Philomachus pugnax*).—September 3, 1894 (W. Palmer).

Long-billed Curlew (*Numenius americanus americanus*).—One, April 11, 1842 (Spec. U. S. Nat. Mus.).

Black-bellied Plover (*Squatarola squatarola cynosurae*).—Three, September 26, 1914 (Spec. U. S. Nat. Mus.); one, October 24, 1916 (H. C. Oberholser); one, October 26, 1919 (A. Wetmore).

Golden Plover (*Pluvialis dominica dominica*).—Once taken (D. W. Prentiss).

Semipalmated Plover (*Charadrius semipalmatus*).—August 26, 1877 (W. Palmer); May 9, 1879 (Richmond MS.); May 3, 1884 (Richmond MS.); August 22, 1892 (E. M. Hasbrouck); August 30 to September 22, 1894 (Richmond MS.); August 21, 1897 (Richmond MS.); May 16-25, 1906 (D. E. Lantz); May 10, 1907 (D. E. Lantz); May 10, 1909 (E. A. Preble); June, year not recorded (Spec. Brit. Mus.).

Piping Plover (*Charadrius melodus*).—March 25, 1881 (Richmond MS.); May 3, 1884 (Spec. U. S. Nat. Mus.).

Ruddy Turnstone (*Arenaria interpres morinella*).—Three, about 1860 (Spec. U. S. Nat. Mus.); two, May, 1881 (*fide* Smith and Palmer); June, 1882 (*fide* Smith and Palmer); one, September 2, 1912 (E. R. Adams); other records without dates.

Heath Hen (*Tympanuchus cupido*).—One, April 10, 1859 (Proc. Biol. Soc. Wash., XXXII, 1919, p. 198).

Wild Turkey (*Meleagris gallopavo silvestris*).—Formerly resident, now probably exterminated in the vicinity of Washington, though it still occurs near Occoquan, Va., a little beyond our limits. The latest record is of eggs found near Falls Church, Va., in May, 1903 (J. H. Riley).

Passenger Pigeon (*Ectopistes canadensis*).—Formerly abundant, now extinct; the last large flock was previous to 1860. Records since then are: September 18, 1877; April 3, 1887 (H. W. Henshaw); April 4, 1887 (A. K. Fisher); September 11, 1889 (W. Palmer); October 19, 1889 (Richmond MS.); May 2, 1891 (R. W. Shufeldt).

Ground Dove (*Chaemepelia passerina passerina*).—September 1, 1844; February, 1861; 1865; January 29, February 2, and December 4, 1867 (all specimens U.S. Nat. Mus.); October 14, 1888 (C. W. Richmond).

Black Vulture (*Coragyps urubu urubu*).—Four, March 30, 1895 (Richmond MS.); one, July, 1896 (Richmond MS.); one, December 17, 1899 (P. Bartsch); one, February 21—March 10, 1917 (N. Hollister); two, August 5, 1918 (W. Palmer); five, January 2, 1920 (H. S. Barber).

Swallow-tailed Kite (*Elanoides forficatus forficatus*).—August 3, 1895 (Richmond MS.); April 11, 1897 (P. Bartsch).

American Goshawk (*Astur gentilis atricapillus*).—Previous to 1883 (*fide* Coues and Prentiss); December 27, 1887 (A. K. Fisher); January 1, 1896 (Richmond MS.); September 1 and 2, 1916 (T. A. Davis); December 20, 1917 (T. A. Davis).

American Rough-legged Hawk (*Buteo lagopus sancti-johannis*).—One about 1859 (Richmond MS.); December 29, 1879 (H. W. Henshaw); December 23, 1882 (Spec. U. S. Nat. Mus.); March 17, 1888 (A. K. Fisher); March 30, 1888 (C. W. Richmond); January 1, 1895 (E. A. Preble); December 23 and 31 1916 (Gabrielson and Kalmbach); January 1, 1918 (A. H. Howell).

Golden Eagle (*Aquila chrysaetos*).—December 26, 1857 (Spec. U. S. Nat. Mus.); March 7, 1859 (Spec. U. S. Nat. Mus.); December 8, 1887; November 24, 1890 (Richmond MS.).

Duck Hawk (*Rhynchodon peregrinus anatum*).—December, 1878 (*fide* Coues and Prentiss); October 23, 1900 (Richmond MS.); March 1, 1910 (N. Hollister); May 22, 1918 (L. Griscom); December 23, 1918 (H. H. Sheldon); April 30, 1919 (H. H. Sheldon); has been seen several times in winter about the Post Office Department building.

Short-eared Owl (*Asio flammeus flammeus*).—One, autumn, 1842 (Bull. Nat. Insti.); one, April 12, 1859 (Spec. U. S. Nat. Mus.); one, April 20, 1861 (Richmond MS.); one, March, 1862 (Richmond MS.); one, November 22, 1886 (A. K. Fisher); one, January 28, four, March 5, one, March 28, 1887 (A. K. Fisher); two, November 13, 1887 (H. W. Henshaw); one, January 7 and 23, one, February 13, one, December 10, 1888 (A. K. Fisher); one, March 13, and one, November 29, 1889 (A. K. Fisher); one, December 13 and two, December 20, 1890 (A. K. Fisher); one, November 20, 1891 (A. K. Fisher); March 2, 1913 (A. Wetmore).

Saw-whet Owl (*Cryptoglaux acadica acadica*).—February 12, 1859 (Spec. U. S. Nat. Mus.); November 11, 1878 (Spec. U. S. Nat. Mus.); December, 1880; October 3, 1886 (F. S. Webster); March 12, 1889 (C. W. Richmond); November 1, 1889 (A. K. Fisher); December 31, 1889 (W. A. Merritt); one, December 12, 1890 (W. B. Barrows); three, January 4, one, February 4–5, 1891 (E. M. Hasbrouck); February 19, 1893 (C. W. Richmond); two, 1905 (T. Roosevelt); one, February 6, 1916 (I. N. Gabrielson); one, November 30, 1916 (A. K. Fisher); January, 1914 (R. W. Shufeldt); December 1, 1917 (E. A. Sikken).

Snowy Owl (*Nyctea nyctea*).—December 4, 1858 (Spec. U. S. Nat. Mus.); November 1 and 11, 1885 (Spec. U. S. Nat. Mus.); December 30, 1890 (C. W. Richmond); about 15 taken the winter of 1876–77 (Richmond MS.).

Carolina Paroquet (*Conuropsis carolinensis carolinensis*).—A flock, September, 1865 (*fide* Smith and Palmer).

Chuck-will's-widow (*Antrostomus carolinensis*).—One, July 22, 1895 (R. Ridgway); one, summer, 1896 (C. W. Richmond).

Scissor-tailed Flycatcher (*Muscivora forficata*).—One, about 1865 (Richmond MS.); one, April, 1881 (Richmond MS.).

Arkansas Kingbird (*Tyrannus verticalis*).—September 30, 1874 (Spec. U. S. Nat. Mus.).

Olive-sided Flycatcher (*Nuttallornis borealis*).—Several, September, 1881 (R. Ridgway); May 5, 1912 (A. K. Fisher); one, May 22, 1915 (W. W. Cooke); two, August 13, 1917 (R. W. Moore); one, September 9 and 14, 1918 (R. W. Moore); one, May 10, 1919 (Miner and Moore); one, May 16, 1920 (E. A. Preble); one, May 22, 1920 (M. T. Cooke).

Horned Lark (*Otocoris alpestris alpestris*).—March 3, 1885 (H. W. Henshaw); December 10-11, 1886 (H. W. Henshaw); January 8, 1887 (H. W. Henshaw); April 2, 1887 (Richmond MS.); November 25, 1888 (Richmond MS.); October 29, 1889 (C. W. Richmond); March 29, 1891 (Spec. U. S. Nat. Mus.); February 2, 1895 (A. K. Fisher); November 25, 1903 (A. K. Fisher); February 13, 1910 (H. W. Henshaw); December 15, 1917–March 1, 1918 (F. Harper).

Prairie Horned Lark (*Otocoris alpestris praticola*).—February 8, 1881 (W. Palmer); January 23–February 16, 1888 (W. Palmer); August 11, 1889 (C. W. Richmond); February 10–24, 1918 (F. Harper).

Horned Larks occur in the vicinity of Washington nearly every winter, but in most instances the race is not determinable.

Yellow-headed Blackbird (*Xanthocephalus xanthocephalus*).—One, August 29, 1892 (E. M. Hasbrouck).

Bronzed Grackle (*Quiscalus quiscula aeneus*).—Probably occurs nearly every year in migration, definite dates are: April 17, 1886 (Spec. U. S. Nat. Mus.); April 6, 1887 (Spec. U. S. Nat. Mus.); February 22, 1888 (Spec. U. S. Nat. Mus.); March 8, 1895 (C. W. Richmond); March 28, 1896 (C. W. Richmond); March 4, 1897 (C. W. Richmond); February 22, 1898 (C. W. Richmond); February 14 and 15, 1906 (R. W. Williams); January 21, 1916 (F. M. Bailey); March 18 to April 4, 1918 (H. C. Oberholser).

Pine Grosbeak (*Pinicola enucleator leucura*).—Several, January 23, 1888 (H. W. Henshaw); three, November 26, 1903 (T. H. Levering).

American Crossbill (*Loxia curvirostra minor*).—Irregular winter visitant, sometimes abundant. Has been noted from October 10 (1886, H. W. Henshaw) to June 2 (1902, C. W. Richmond). A female taken May 23, 1884 (R. Ridgway) showed unmistakable evidence of having recently incubated. A young bird barely able to fly was taken with an adult, May 17, 1885 (H. M. Smith). These seem to be the only evidences of the breeding of this species in the vicinity.

White-winged Crossbill (*Loxia leucoptera*).—One, about 1864 (C. Drexler); one, about 1874 (*fide* Coues and Prentiss); one, November, 1906 (C. W. Richmond); one, August 11, 1907 (spec. brought to Biol. Surv.); flock, October 23, 1913 (R. W. Williams); many, December 10, 1916 (W. L. McAtee)—January 16, 1917 (D. C. Mabbott).

Redpoll (*Acanthis linaria linaria*).—One, February 19, 1875 (Richmond MS.); seven, February 12, 1899 (Richmond MS.); small flock, March 9, 1914 (R. W. Moore)—March 12, 1914 (M. T. Cooke).

Snow Bunting (*Plectrophenax nivalis nivalis*).—February or March, 1842 (Auk, XXXV, 1918, p. 85); one, November, 1886 (W. Palmer); large flock, February 18–22, 1905 (Piper and Cary); one, December 19, 1917 (C. H. M. Barrett).

Lapland Longspur (*Calcarius lapponicus lapponicus*).—Several, December 11, 1886 (H. W. Henshaw).

Nelson's Sparrow (*Ammospiza caudacuta nelsoni*).—One, September, 1862 (Spec. U. S. Nat. Mus.); one, September 18, 1893 (W. Palmer); September 26, 1898 (Richmond MS.); two, May, 1906 (Richmond MS.).

Lark Sparrow (*Chondestes grammacus grammacus*).—One, August 25, 1877 (W. F. Roberts); two, August 27, 1877 (R. Ridgway); August 8, 1886 (H. W. Henshaw).

Montana Junco (*Junco oreganus montanus*).—April 28, 1890 (R. Ridgway).

Bachman's Sparrow (*Peucaea aestivalis bachmani*).—April 29, 1896 (J. D. Figgins); one all summer, 1912, near Lanham, Md. (W. R. Maxon); May 12, 1913 (Maxon and Kearney); June 1, 1913 (A. Wetmore); April 26, 1914 (A. Wetmore); May 9, 1915 (A. Wetmore); May 2, 1918 (R. W. Moore); one, May 22, 1920 (L. D. Miner); regular visitor for many years to a field near Congress Heights (P. Bartsch).

Dickcissel (*Spiza americana*).—Formerly a common breeder, but disappeared about 1875, and is now only an accidental visitor. One, May 31, 1887 (H. W. Henshaw); one, summer, 1894 (C. W. Richmond).

Northern Shrike (*Lanius borealis borealis*).—February 10, 1846 (Spec. U. S. Nat. Mus.); one, winter 1859–60 (Richmond MS.); one, early 1865 (Richmond MS.); November 7, 1884 (Richmond MS.); November 6 and 13, 1887 (H. W. Henshaw); December 26, 1887 (Spec. U. S. Nat. Mus.); November 17, 1888 (Spec. U. S. Nat. Mus.); January 10, 1891 (Richmond MS.); February 10, 1896 (Richmond MS.); December 28, 1917 (Oberholser and Swales); January 26, 1920 (G. W. Field); other specimens without dates.

Prothonotary Warbler (*Protonotaria citrea*).—One or two noted in twelve different years, the earliest date of arrival being April 26, 1916 (R. W. Moore); the average of 9 years' records, May 4. Twice noted in June, possibly breeding.

Brewster's Warbler (*Vermivora leucobronchialis*) (hybrid).—May 8, 1885 (W. Palmer); May 1, 1895 (Spec. U. S. Nat. Mus.).

Lawrence's Warbler (*Vermivora lawrencei*) (hybrid).—May 12, 1907 (W. H. Osgood).

Orange-crowned Warbler (*Vermivora celata celata*).—October 13, 1889 (H. W. Henshaw); October 14, 1894 (W. Palmer).

Northern Parula Warbler (*Compsothlypis americana pusilla*).—A common migrant, but the records are in most cases not separable from those of the Parula Warbler. May 26 and 30, 1905 (H. C. Oberholser); May 9, 1912 (W. L. McAtee); May 12, 1913 (H. C. Oberholser); October 5, 1917 (M. T. Cooke).

Cerulean Warbler (*Dendroica cerulea*).—October, 1859 (Spec. U. S. Nat. Mus.); May, 1861 (Spec. U. S. Nat. Mus.); May 5, 1888 (E. M. Hasbrouck); May 11, 1890 (E. M. Hasbrouck); May 12, 1899 (Richmond MS.); May 29, 1902 (Richmond MS.); May 9, 1904 (W. W. Cooke); May 15, 1904 (A. K. Fisher); May 3 and 11, 1907 (W. W. Cooke); May 13, 1909 (R. W. Shufeldt).

Kirtland's Warbler (*Dendroica kirtlandii*).—September 25, 1887 (W. Palmer).

Palm Warbler (*Dendroica palmarum palmarum*).—Probably occurs every year in migration, but is not distinguished from the Yellow Palm Warbler. Has been noted in spring from April 22, 1885 (Richmond MS.) to May 20, 1917 (McAtee and Holt); and in autumn, from September 18, 1887 (Richmond MS.) to October 11, 1861 (R. Ridgway).

Grinnell's Water-thrush (*Seiurus noveboracensis notabilis*).—May 11, 1879 (W. Palmer); May 5, 1885 (W. Palmer); August 5, 1886 (Richmond MS.).

Northern Yellowthroat (*Geothlypis trichas brachidactyla*).—Abundant in migration but is not distinguished from the Maryland Yellowthroat; September 23, 1902 (C. W. Richmond); May 11, 1917 (M. T. Cooke).

Bewick's Wren (*Thryomanes bewickii bewickii*).—Has been noted in spring in fourteen different years, the earliest date of arrival being March 26, 1897 (Richmond MS.), and the average, April 8; accidental, February 8, 1918 (J. H. Riley); twice noted in autumn, November 11, 1889 (Richmond MS.); December 22, 1890 (C. W. Richmond); although it has been noted in summer, it has never been known to nest.

Short-billed Marsh Wren (*Cistothorus stellaris*).—May 9, 1890 (E. M. Hasbrouck); May 3, 1893 (W. Palmer).

Black-capped Chickadee (*Penthestes atricapillus atricapillus*).—January 1, 1859 (Spec. U. S. Nat. Mus.); December 10, 1859 (Spec. U. S. Nat. Mus.); December 24, 1876 (W. Palmer); December 25, 1878 (W. Palmer); January 2, 1879 (W. Palmer); February 2, 1879 (Richmond MS.); common, February 21, 1885 (H. W. Henshaw)—April 19, 1885 (W. Palmer); April 19, 1896 (H. W. Henshaw); October 19, 1896 (Richmond MS.).

Bicknell's Thrush (*Hylocichla minima minima*).—October 3, 1885 (Richmond MS.); May 14 and 18, 1888 (Spec. U. S. Nat. Mus.); May 17, 1892 (E. A. Preble); May 24, 1893 (E. A. Preble).

Hypothetical Species.

Sooty Shearwater (*Puffinus griseus stricklandi*).—"*Puffinus cinereus* from Potomac River," a specimen presented to the National Institute for the Promotion of Science at the meeting, September 12, 1842,[1] is probably referable to this species. This record is very likely the basis for the inclusion of the Audubon Shearwater in previous Washington lists.

Prairie Chicken (*Tympanuchus americanus americanus*).—A specimen taken March 17, 1885, was undoubtedly an introduced bird, as about that time birds taken in the west were liberated in Kent County, Maryland.

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[1]Proc. Nat. Inst. Prom. Sci., Bull. III, 1842–45, p. 251.

Regular Migrants.

Species.	No. of dates.	Earliest date of spring arrival.	Average date of spring arrival.	No. of dates.	Average date of spring departure.	Latest date of spring departure.	No. of dates.	Earliest date of fall arrival.	Average date of fall arrival.	No. of dates.	Average date of fall departure.	Latest date of fall departure.
Horned Grebe *Colymbus auritus*	....	Winters	.....	8	April 26	May 16, 1917 (*F. M. Bailey*)	6	July 15, 1899 (*C.W.Richmond*)	Aug. 28	....	.....	.....
Pied-billed Grebe *Podilymbus podiceps podiceps*	8	Mar. 9, 1918 (*Miner & Moore*)	April 1	11	May 3	May 15, 1920[1] (*J. S. Aspinwall*)	5	Aug. 22, 1900 (*P. Bartsch*)	Aug. 30	4	Nov. 2	Nov. 8, 1920 (*L. Griscom*)
Common Loon *Gavia immer*	....	Rare, winter	.....	7	May 12	June 2, 1907 (*A. K. Fisher*)	5	Oct. 25, 1887 (*Richmond MS.*)	Nov. 4	....	.....	.....
Herring Gull *Larus argentatus argentatus*	....	Winters	.....	11	May 4	May 20, 1917 (*A. Wetmore*)	7	Oct. 16, 1919[2] (*J. Kittredge, Jr.*)	Nov. 5	....	.....	.....
Ring-billed Gull *Larus delawarensis*	7	Rare, winter	Feb. 9	8	April 21	May 20, 1917 (*A. Wetmore*)	3	Sept. 14, 1914 (*W. D. Appel*)	Oct. 16	2	Dec. 22	.....
Bonaparte's Gull *Chroicocephalus philadelphia*	13	Mar. 25, 1881[3] (*Richmond MS.*)	April 11	12	May 9	May 30, 1884 (*H. W. Henshaw*)	4	Oct. 23, 1893 (*Spec.U.S.N.M.*)	Oct. 27	3	Dec. 14	Dec. 25, 1877 (*W. Palmer*)
Black Tern *Chlidonias nigra surinamensis*	....	May 3, 1917[4] (*M. T. Cooke*)	.....	....	.....	May 17, 1917 (*A. Wetmore*)	8	Aug. 11, 1914 (*W. D. Appel*)	Aug. 17	6	Sept. 14	Sept. 22, 1894 (*Spec.U.S.N.M.*)
American Merganser *Mergus americanus*	....	Winters	.....	5	May 4	May 26, 1905 (*H.C.Oberholser*)	2	Oct. 13, 1889 (*B. Greenwood*)	Oct. 19	....	.....	.....
Red-breasted Merganser *Mergus serrator*	....	Winters	.....	4	Mar. 30	May 2, 1920 (*J. Kittredge, Jr.*)	3	Oct. 23, 1892 (*Richmond MS*)	Oct. 29	....	.....	.....
Hooded Merganser *Lophodytes cucullatus*	....	Winters	.....	6	April 11	May 11, 1917 (*F. Harper*)	9	Sept. 17, 1895 (*Richmond MS*)	Oct. 21	....	.....	.....
Mallard *Anas platyrhyncha*	....	Winters	.....	4	April 27	May 11, 1918 (*A.Wetmore*)	12	Aug. 28, 1896 (*B. Greenwood*)	Sept. 22	....	.....	.....
Black Duck *Anas rubripes tristis*	....	Winters	.....	6	April 25	May 11, 1917 (*F. Harper*)	13	Aug. 1, 1887 (*A. K. Fisher*)	Sept. 17	....	.....	.....
American Widgeon *Mareca americana*	....	Winters	.....	4	April 3	April 14, 1918 (*L. Griscom*)	....	Sept. 4, 1905 (*B. Greenwood*)	.....	....	.....	.....
Green-winged Teal *Nettion carolinense*	....	Winters	.....	2	Mar. 21	Mar. 31, 1918 (*L. Griscom*)	12	Sept. 18, 1903 (*B. Greenwood*)	Oct. 5	....	.....	.....
Blue-winged Teal *Querquedula discors*	....	Winters	.....	8	April 23	June 2, 1892 (*Richmond MS.*)	18	Aug. 18, 1889 (*B. Greenwood*)	Sept. 6	....	.....	.....

[1] Accidental, June 10, 1919 (*R. W. Moore*). [2] Accidental, July 19, 1865 (*Richmond MS.*). [3] One record in January. [4] Recorded only once in spring.

American Pintail		Winters		5	April 11	May 2, 1920 (*B. H. Swales*)	9	Sept. 13, 1890 (*B. Greenwood*)	Oct. 6				
Dafila acuta tzitzihoa													
Canvasback		Winters		5	Mar. 24	Mar. 31, 1918 (*L. Griscom*)	18	Oct. 15, 1903 (*B. Greenwood*)	Oct. 22				
Aristonetta valisineria													
Redhead		Winters		5	Mar. 30	April 21, 1912 (*W. D. Appel*)	12	Oct. 5, 1901 (*B. Greenwood*)	Oct. 13				
Marila americana													
Greater Scaup		Winters		3	May 20	May 27, 1906 Once nested	6	Sept. 26, 1920 (*J. Kittredge, Jr.*)	Oct. 11				
Marila marila													
Lesser Scaup		Winters		6	May 17	June 1, 1913 (*A. Wetmore*)	12	Sept. 25, 1903[1] (*B. Greenwood*)	Oct. 9				
Marila affinis													
Ring-necked Duck		Winters		2	Mar. 24	April 4, 1920 (*J. Kittredge, Jr.*)	6	Oct. 6, 1901 (*B. Greenwood*)	Oct. 21				
Marila collaris													
American Goldeneye		Winters		5	April 8	April 27, 1918 (*F. Harper*)	12	Oct. 8, 1901 (*B. Greenwood*)	Oct. 24				
Glaucionetta clangula americana													
Ruddy Duck		Winters		4	May 10	June 21, 1877 (*W Palmer*)	19	Aug. 20, 1889 (*B. Greenwood*)	Sept 28				
Erismatura jamaicensis													
Canada Goose		Winters		7	Mar. 30	April 18,1920 (*B. H. Swales*)	21	Oct. 5, 1888 (*B. Greenwood*)	Oct. 20				
Branta canadensis canadensis													
American Bittern	12	Mar. 22, 1894 (*Richmond MS.*)	April 8			Breeds				4	Sept. 15	Nov. 7, 1860 (*Spec. U.S.N.M.*)	
Botaurus lentiginosus													
Least Bittern	5	May 9, 1912 (*A. K. Fisher*)	May 14			Breeds				4	Sept. 6	Sept. 19,1881 (*Richmond MS.*)	
Ixobrychus exilis													
Great Blue Heron	14	Rare, winter	Mar. 29	8	June 3	June 23, 1907 (*A. K. Fisher*)	7	July 14, 1907 (*A. K. Fisher*)	July 30	3	Nov. 12		
Ardea herodias herodias													
Green Heron	20	April 9, 1905 (*A. K. Fisher*)	April 21			Breeds				9	Sept. 12	Oct. 2, 1910 (*W. W. Cooke*)	
Butorides virescens virescens													
Virginia Rail	2	April 2,1903 (*W. W. Cooke*)	April 4			Eggs taken 1917 (*E. J. Court*)						Dec. 9, 1889 (*Spec. U.S.N.M.*)	
Rallus virginianus													
Sora		April 22, 1914 (*T. Ulke*)		2	May 13	May 20, 1917 (*Miner & Moore*)	16	July 8, 1918 (*R. W. Moore*)	Aug. 12	9	Oct. 19	Nov. 9, 1878 (*Spec. U.S.N.M.*)	
Porzana carolina													
American Coot	5	Mar. 9, 1918 (*L. D. Miner*)	Mar. 25	6	May 5	June 8,1918 (*K. H. Stuart*)	13	Sept. 1, 1890 (*B. Greenwood*)	Sept. 24	13	Nov. 7	Dec. 19, 1920 (*J. Kittredge, Jr.*)	
Fulica americana													
American Woodcock	20	Feb. 6, 1916 (*E. A. Preble*)	Mar. 8			Breeds				13	Nov. 22	Dec. 30, 1905 (*J. H. Riley*)	
Philohela minor													
Wilson's Snipe	28	Feb. 17, 1897 (*B. Greenwood*)	Mar. 13	11	May 4	May 14, 1910 (*W. W. Cooke*)	7	Aug. 30, 1894 (*C.W.Richmond*)	Sept. 11	4	Nov. 22	Dec. 22, 1912 (*E. R. Adams*)	
Gallinago delicata													
Pectoral Sandpiper		Mar. 26, 1916 (*A. Wetmore*)				April 22, 1887 (*W. Palmer*)	5	Aug. 10, 1914 (*W. W. Cooke*)	Sept. 7	2	Oct. 27	Nov. 1, 1916 (*H.C.Oberholser*)	
Pisobia maculata													
Least Sandpiper		April 19, 1880 (*W. Palmer*)		3	May 14	May 16, 1917 (*L. D. Miner*)	4	Aug. 10, 1914 (*W. W. Cooke*)	Aug. 23	2	Nov. 12	Nov. 22, 1917 (*C.H.M.Barrett*)	
Pisobia minutilla minutilla													
Semipalmated Sandpiper		May 10, 1909 (*E. A. Preble*)		2	May 20	May 22, 1862 (*Spec.U.S.N.M.*)	7	July 27, 1891 (*D. W. Prentiss*)	Aug. 15	4	Oct. 15	Oct. 28, 1916 (*L. D. Miner*)	
Ereunetes semipalmatus													

[1] Accidental, Aug. 20, 1896 (*Richmond MS.*).

Species.	No. of dates.	Earliest date of spring arrival.	Average date of spring arrival.	No. of dates.	Average date of spring departure.	Latest date of spring departure.	No. of dates.	Earliest date of fall arrival.	Average date of fall arrival.	No. of dates.	Average date of fall departure.	Latest date of fall departure.
Greater Yellowlegs	5	April 8, 1917 (*A. Wetmore*)	April 22	5	May 13	May 20, 1917 (*Miner & Moore*)	2	July 24, 1890 (*C.W.Richmond*)	July 29	3	Oct. 17	Nov. 2, 1919 (*J. Kittredge, Jr.*)
Totanus melanoleucus												
Lesser Yellowlegs	5	April 12, 1878[1] (*H. W. Henshaw*)	April 23	8	May 12	May 17, 1917 (*A. Wetmore*)	5	Aug. 21, 1894 (*Richmond MS.*)	Aug. 27	3	Oct. 19	Nov. 1, 1916 (*H.C.Oberholser*)
Totanus flavipes												
Solitary Sandpiper	23	Mar. 30, 1883 (*H. W. Henshaw*)	April 29	20	May 17	May 21, 1906 (*W. W. Cooke*)	6	July 15, 1899 (*E. A. Preble*)	Aug. 2	6	Oct. 2	Oct. 28, 1916 (*L. D. Miner*)
Tringa solitaria solitaria												
Bartramian Sandpiper	5	Mar. 21, 1896 (*R. W. Shufeldt*)	April 5	4	April 27	May 11, 1917 (*L. D. Miner*)	7	July 29, 1902 (*W. W. Cooke*)	July 14	6	Aug. 28	Sept. 26, 1919 (*A. Wetmore*)
Bartramia longicauda												
Spotted Sandpiper	31	April 2, 1905 (*W. L. McAtee*)	April 18	....	.....	Breeds	....	.....	.....	4	Oct. 4	Oct. 28, 1906 (*A. K. Fisher*)
Actitis macularia												
Killdeer	19	Rare, winter	Mar. 7	....	.....	Breeds	....	.....	.....	6	Nov. 8	.....
Oxyechus vociferus vociferus												
Mourning Dove	24	Rare, winter	Mar. 16	....	.....	Breeds	....	.....	.....	6	Nov. 12	.....
Zenaidura macroura carolinensis												
Pigeon Hawk	4	Mar. 21, 1920 (*J. Kittredge, Jr.*)	April 11	3	April 30	May 11, 1917 (*H.C.Oberholser*)	3	Sept. 4, 1890 (*Richmond MS.*)	Sept. 12	5	Oct. 23	Nov. 11, 1891[2] (*W. Palmer*)
Tinnunculus columbarius columbarius												
Fish Hawk	25	Mar. 19, 1905 (*C. R. Ellis*)	April 11	....	.....	Breeds	....	.....	.....	6	Oct. 23	Nov. 30, 1907 (*A. K. Fisher*)
Pandion haliaetus carolinensis												
Yellow-billed Cuckoo	13	May 3, 1907 (*W. W. Cooke*)	May 6	....	.....	Breeds	....	.....	.....	12	Oct. 6	Oct. 13,1889 (*A. K. Fisher*)
Coccyzus americanus americanus												
Black-billed Cuckoo	19	May 2, 1908 (*C.R.Shoemaker*)	May 7	....	.....	Breeds	....	.....	.....	8	Sept. 27	Oct. 8, 1916 (*E. A. Preble*)
Coccyzus erythropthalmus												
Belted Kingfisher	17	Rare, winter	Mar. 23	....	.....	Breeds	....	.....	.....	4	Nov. 24	.....
Streptoceryle alcyon alcyon												
Yellow-bellied Sapsucker	....	Winters	.....	26	April 23	May 17, 1917 (*A. Wetmore*)	25	Sept. 10, 1905 (*W. W. Cooke*)	Oct. 3	....	.....	.....
Sphyrapicus varius varius												
Whippoorwill	34	April 1, 1913 (*E. J. Brown*)	April 18	....	.....	Breeds	....	.....	.....	10	Sept. 22	Oct. 13, 1889 (*H. W. Henshaw*)
Setochalcis vocifera vocifera												
Nighthawk	24	April 18, 1919 (*H.H.T.Jackson*)	May 3	6	May 25	Rare, summer	10	.....	Aug. 15	13	Sept. 27	Oct. 11, 1914 (*E. A. Preble*)
Chordeiles minor minor												

[1]Accidental, March 12, 1906 (*W. W. Cooke*). [2]Accidental, Dec. 23, 1918 (*H. H. Sheldon*).

Chimney Swift *Chaetura pelagica*	34	April 5, 1914 (*M. W. Curry*)	April 16	....	.....	Breeds	....	.....	.....	16	Oct. 10	Oct. 25, 1906 (*W. W. Cooke*)
Ruby-throated Hummingbird *Archilochus colubris*	28	April 16,1912 (*W. R. Maxon*)	May 2	....	.....	Breeds	....	.....	.....	15	Sept. 20	Oct. 20, 1913 (*A. K. Fisher*)
Kingbird *Tyrannus tyrannus tyrannus*	38	April 18, 1914 (*E. R. Kalmbach*)	April 27	....	.....	Breeds	....	.....	.....	12	Sept. 1	Sept. 23, 1905 (*F. E. L. Beal*)
Crested Flycatcher *Myiarchus crinitus crinitus*	37	April 19, 1914 (*W. W. Cooke*)	April 28	....	.....	Breeds	....	.....	.....	14	Sept. 11	Sept. 29, 1907 (*R. W. Williams*)
Phoebe *Sayornis phoebe*	41	Jan. 10, 1909 (*T. H. Kearney*)	Mar. 11	....	.....	Breeds	....	.....	.....	16	Oct. 28	Dec. 31, 1883 (*H. W. Henshaw*)
Wood Pewee *Myiochanes virens*	36	April 29,1914 (*W. W. Cooke*)	May 5	....	.....	Breeds	....	.....	.....	23	Sept. 20	Oct. 12, 1906 (*A. K. Fisher*)
Yellow-bellied Flycatcher *Empidonax flaviventris*	20	May 9, 1902 (*A. K. Fisher*)	May 14	7	May 28	June 1, 1917 (*F. Harper*)	8	July 28, 1859 (*Spec.U.S.N.M.*)	Aug. 15	7	Sept. 18	Oct. 6, 1881 (*Richmond MS.*)
Acadian Flycatcher *Empidonax virescens*	33	April 29, 1845 (*Spec.U.S.N.M.*)	May 6	....	.....	Breeds	....	.....	.....	11	Sept. 9	Sept. 15, 1912 (*W. W. Cooke*)
Alder Flycatcher *Empidonax traillii traillii*	16	May 8, 1906 (*H.C.Oberholser*)	May 13	9	May 23	June 1, 1917 (*F. Harper*)	3	Aug. 16, 1886 (*A. K. Fisher*)	Aug. 23	3	Sept. 14	Sept. 17, 1890 (*C.W.Richmond*)
Least Flycatcher *Empidonax minimus*	29	April 20, 1881 (*W. Palmer*)	May 2	15	May 18	May 27, 1917 (*A. Wetmore*)	5	Aug. 13, 1887 (*A. K. Fisher*)	Aug. 27	10	Sept. 13	Oct. 1, 1916 (*D. C. Mabbott*)
Bobolink *Dolichonyx oryzivorus*	27	April 26, 1896 (*H. Oldys*)	May 2	17	May 21	June 6, 1909 (*H. W. Henshaw*)	20	July 23, 1904 (*S. D. Judd*)	Aug. 18	12	Oct. 6	Nov. 14, 1885 (*A. K. Fisher*)
Cowbird *Molothrus ater ater*	17	Rare, winter	Mar. 19	....	.....	Breeds	....	.....	.....	7	Nov. 5	.....
Red-winged Blackbird *Agelaius phoeniceus predatorius*	21	Rare, winter	Mar. 1	....	.....	Breeds	....	.....	.....	4	Nov. 20	.....
Orchard Oriole *Icterus spurius*	33	April 25, 1908 (*A. H. Howell*)	May 3	....	.....	Breeds	....	.....	.....	5	Aug. 27	Sept. 14, 1919 (*F. Harper*)
Baltimore Oriole *Icterus galbula*	35	April 24, 1912 (*H.H.T.Jackson*)	May 2	....	.....	Breeds	....	.....	.....	6	Aug. 26	Sept. 14, 1919 (*F. Harper*)
Rusty Blackbird *Euphagus carolinus*	....	Winters	.....	22	April 18	May 11, 1917 (*E. G. Holt*)	13	Sept. 16, 1885 (*H. W. Henshaw*)	Oct. 21	....	.....	.....
Purple Grackle *Quiscalus quiscula ridgwayi*	28	Rare, winter	Feb. 23	....	.....	Breeds	....	.....	.....	5	Nov. 17	.....
Purple Finch *Carpodacus purpureus purpureus*	....	Winters	.....	26	May 8	May 29, 1860 (*Spec.U.S.N.M.*)	13	Aug. 31, 1919 (*J.Kittredge,Jr.*)	Oct. 2	....	.....	.....
Pine Siskin *Spinus pinus pinus*	....	Winters	.....	8	May 12	May 19, 1888 (*W. Palmer*)	6	Oct. 15, 1916 (*F. Harper*)	Oct. 22	....	.....	.....
Vesper Sparrow *Pooecetes gramineus gramineus*	31	Feb. 18, 1890[1] (*W. Palmer*)	Mar. 22	17	April 13	Rare, summer	7	.....	Oct. 9	7	Nov. 6	Nov. 21, 1886 (*A. K. Fisher*)
Savannah Sparrow *Passerculus sandwichensis savanna*	27	Feb. 14, 1891 (*Spec.U.S.N.M.*	Mar. 26	17	May 4	May 12, 1918 (*L. Griscom*)	8	Sept. 21, 1903 (*W. W. Cooke*)	Oct. 8	6	Oct. 29	Nov. 22, 1886[2] (*H. W. Henshaw*)
Grasshopper Sparrow *Ammodramus savannarum australis*	28	Mar. 30, 1895[3] (*Richmond MS.*)	April 22	....	.....	Breeds	....	.....	.....	8	Oct. 22	Nov. 20, 1899 (*E. A. Preble*)

[1]Two records of wintering. [2]Three records in late December. [3]Accidental, Feb. 8, 1900 (*S. D. Judd*).

Species.	No. of dates.	Earliest date of spring arrival.	Average date of spring arrival.	No. of dates.	Average date of spring departure.	Latest date of spring departure.	No. of dates.	Earliest date of fall arrival.	Average date of fall arrival.	No. of dates.	Average date of fall departure.	Latest date of fall departure.
Henslow's Sparrow	23	April 1, 1917 (*M. T. Cooke*)	April 19	....	.....	Breeds	....	.....	.....	6	Oct. 11	Oct. 21, 1892 (*Richmond MS.*)
Nemospiza henslowii susurrans												
White-crowned Sparrow	9	April 11, 1905[1] (*W. W. Cooke*)	April 28	12	May 14	May 19, 1917 (*M. T. Cooke*)	7	Oct. 1, 1910 (*W. L. McAtee*)	Oct. 13	3	Nov. 20	Nov. 28, 1886 (*H. W. Henshaw*)
Zonotrichia leucophrys												
White-throated Sparrow	....	Winters	.....	27	May 23	June 14, 1899 (*A. H. Howell*)	29	Sept. 14, 1918[2] (*Miner & Moore*)	Oct. 4	....	.....	.....
Zonotrichia albicollis												
Tree Sparrow	....	Winters	.....	21	Mar. 27	April 24, 1861[3] (*Spec.U.S.N.M.*)	14	Oct. 3, 1859 (*Spec.U.S.N.M.*)	Nov. 8	....	.....	.....
Spizella arborea arborea												
Chipping Sparrow	32	Feb. 9, 1902 (*H. W. Maynard*)	Mar. 22	....	.....	Breeds	....	.....	.....	15	Nov. 14	Dec. 17, 1899 (*P. Bartsch*)
Spizella passerina passerina												
Slate-colored Junco	....	Winters	.....	27	May 1	May 17, 1908 (*A. M. Stimson*)	26	Sept. 14, 1918 (*Miner & Moore*)	Oct. 7	....	.....	.....
Junco hyemalis hyemalis												
Lincoln's Sparrow	8	April 21, 1918 (*L. Griscom*)	May 6	8	May 20	May 30, 1917 (*A. Wetmore*)	3	Sept. 30, 1894 (*Richmond MS.*)	Oct. 6	2	Oct. 19	Oct. 21, 1888 (*W. Palmer*)
Melospiza lincolnii lincolnii												
Swamp Sparrow	21	Occ. winter	Mar. 26	31	May 12	May 27, 1917 (*A. Wetmore*)	14	Sept. 28, 1890[4] (*C.W. Richmond*)	Oct. 9	9	Nov. 8	.....
Melospiza georgiana												
Fox Sparrow	22	Rare, winter	Mar. 4	14	April 17	May 11, 1917 (*M. J. Pellew*)	19	Oct. 3, 1906 (*A. K. Fisher*)	Oct. 28	9	Nov. 19	.....
Passerella iliaca iliaca												
Chewink	32	Rare, winter	Mar. 28	....	.....	Breeds	....	.....	.....	14	Oct. 30	.....
Pipilo e. erythrophthalmus												
Rose-breasted Grosbeak	28	April 17, 1902 (*H. W. Maynard*)	May 3	15	May 19	June 3, 1917 (*I.N.Gabrielson*)	4	Aug. 29, 1887 (*Spec.U.S.N.M.*)	Sept. 4	10	Oct. 1	Oct. 16, 1920 (*J. Kittredge, Jr.*)
Hedymeles ludovicianus												
Blue Grosbeak	7	May 1, 1878 (*W. Palmer*)	May 5	....	.....	Breeds	....	.....	.....	7	Sept. 14	Sept. 20, 1884 (*Spec. U.S.N.M.*)
Guiraca caerulea caerulea												
Indigo Bunting	35	April 18, 1918 (*E. A. Chapin*)	May 1	....	.....	Breeds	....	.....	.....	15	Oct. 10	Dec. 13, 1887 (*Richmond MS.*)
Passerina cyanea												
Scarlet Tanager	32	April 17, 1896 (*Richmond MS*)	April 30	....	.....	Breeds	....	.....	.....	16	Oct. 4	Nov. 13, 1896 (*Richmond MS.*)
Piranga olivacea												
Summer Tanager	19	April 18, 1896 (*Richmond MS.*)	May 1	....	.....	Breeds	....	.....	.....	7	Sept. 14	Sept. 19, 1906 (*H. Oldys*)
Piranga rubra rubra												
Purple Martin	25	Mar. 9, 1908 (*I. R. Hitt*)	Mar. 29	....	.....	Breeds	....	.....	.....	12	Aug. 30	Sept. 21, 1920 (*F. C. Lincoln*)
Progne subis subis												

[1] One record in January (*J. H. Gaut*). [2] Accidental, Aug. 9, 1907 (*N. R. Wood*). [3] Accidental, May 11, 1917 (*A. M. Stimson*).
[4] Accidental, Aug. 21, 1913 (*W. D. Appel*).

Cliff Swallow	13	April 10, 1887	April 24	9	May 21	June 7, 1877	2	July 6, 1889	July 8	2	Aug. 7	Aug. 11, 1882
Petrochelidon albifrons albifrons		(*A. K. Fisher*)				(*W. Palmer*)		(*Spec.U.S.N.M.*				(*H. W. Henshaw*
Barn Swallow	29	Mar. 30, 1890	April 12	....	.....	Breeds	....	.....	.....	11	Sept. 7	Sept. 21, 1920
Hirundo rustica erythrogastris		(*C.W.Richmond*)										(*F. C. Lincoln*)
Tree Swallow	29	Mar. 24, 1914	April 11	20	May 14	May 26, 1889	12	July 3, 1912	July 31	7	Sept. 22	Oct. 14, 1911
Iridoprocne bicolor		(*R. W. Moore*)				(*C.W. Richmond*		(*A. H. Howell*)				(*A. K. Fisher*)
Bank Swallow	21	April 4, 1918	April 20	....	.....	Breeds	....	.....	.....	11	Sept. 5	Sept. 21, 1920
Riparia riparia riparia		(*I. N. Gabrielson*)										(*F. C. Lincoln*)
Rough-winged Swallow	33	Mar. 31, 1912	April 10	....	.....	Breeds	....	.....	.....	4	Sept. 2	Sept. 11, 1920
Stelgidopteryx s. serripennis		(*W. W. Cooke*)										(*H.C.Oberholser*)
Red-eyed Vireo	37	April 21, 1895	April 29	....	.....	Breeds	....	.....	.....	15	Oct. 12	Nov. 11, 1888
Vireosylva olivacea		(*H. Oldys*)										(*Richmond MS.*)
Philadelphia Vireo	4	May 6, 1918	May 9	2	May 25	May 30, 1917	4	Sept. 7, 1919	Sept. 10	7	Sept. 22	Oct. 5, 1919
Vireosylva philadelphica		(*A. Wetmore*)				(*A. Wetmore*)		(*A. K. Fisher*)				(*A. Wetmore*)
Warbling Vireo	29	April 21, 1895	May 2	....	.....	Breeds	....	.....	.....	5	Aug. 30	Sept. 12, 1903
Vireosylva gilva gilva		(*H. Oldys*)										(*W. W. Cooke*)
Yellow-throated Vireo	34	April 16, 1916	April 25	....	.....	Breeds	....	.....	.....	12	Sept. 13	Sept. 29, 1907
Lanivireo flavifrons		(*S.W.Mellott*)										(*R. W. Williams*
Solitary Vireo	27	April 6, 1905	April 18	13	May 14	May 25, 1918	11	Sept. 6, 1903	Oct. 1	16	Oct. 21	Nov. 3, 1906
Lanivireo solitarius solitarius		(*T. H. Levering*)				(*I. N. Gabrielson*)		(*W. L. McAtee*)				(*S. W. Mellott*)
White-eyed Vireo	41	April 10, 1912	April 22	....	.....	Breeds	....	.....	.....	9	Oct. 7	Oct. 28, 1910
Vireo griseus griseus		(*W. D. Appel*)										(*M. D. Suter*)
Black and White Warbler	47	Mar. 30, 1908	April 16	....	.....	Breeds	....	.....	.....	21	Sept. 22	Oct. 18, 1890
Mniotilta varia		(*H. Oldys*)										(*C.W.Richmond*)
Worm-eating Warbler	30	April 25, 1908	May 2	....	.....	Breeds	....	.....	.....	10	Aug. 31	Sept. 13, 1879
Helmitheros vermivorus		(*A. K. Fisher*)										(*Richmond MS.*)
Blue-winged Warbler	21	April 24, 1917	May 3	9	May 22	Once nested	2	Aug. 13, 1889	Aug. 19	3	Sept. 2	Sept. 5, 1916
Vermivora pinus		(*I. N. Gabrielson*)				(*C.W.Richmond*)		(*C.W.Richmond*)				(*Miner & Moore*)
Golden-winged Warbler	22	April 27, 1913	May 3	10	May 15	May 20, 1882	....	Aug. 8, 1889	.....	2	Aug. 25	Aug. 29, 1886
Vermivora chrysoptera		(*W. D. Appel*)				(*H.W.Henshaw*)		(*C.W.Richmond*)				(*A. K. Fisher*)
Nashville Warbler	21	April 23, 1918	May 3	10	May 16	May 20, 1917	4	Sept. 5, 1882	Sept. 13	4	Oct. 6	Oct. 13, 1918
Vermivora r. ruficapilla		(*I. N. Gabrielson*)				(*D. C. Mabbott*)		(*Richmond MS.*)				(*C. H. Rogers*)
Tennessee Warbler	9	May 4, 1919	May 8	5	May 29	June 3, 1917	3	Aug. 31, 1890	Sept. 5	11	Oct. 11	Oct. 19, 1919
Vermivora peregrina		(*H.H.T.Jackson*)				(*I. N. Gabrielson*)		(*Spec.U.S.N.M.*)				(*M. J. Pellew*)
Parula Warbler	36	April 17, 1912	April 24	....	.....	Breeds	....	.....	.....	18	Oct. 4	Oct. 17, 1919
Compsothlypis a. americana		(*W. L. McAtee*)										(*M. J. Pellew*)
Cape May Warbler	19	April 19, 1914	May 3	13	May 17	May 30, 1917	13	Aug. 4, 1892	Sept. 5	17	Oct. 18	Dec. 16, 1916
Dendroica tigrina		(*J. H. Riley*)				(*A. Wetmore*)		(*Richmond MS.*)				(*C.W.Richmond*)
Yellow Warbler	46	April 2, 1916	April 22	....	.....	Breeds	....	.....	.....	4	Sept. 17	Oct. 12, 1910
Dendroica aestiva aestiva		(*W. L. McAtee*)										(*E. J. Brown*)
Black-throated Blue Warbler	41	April 19, 1896	May 1	24	May 21	May 30, 1888	14	Aug. 21, 1887	Sept. 8	16	Oct. 8	Oct. 29, 1913
Dendroica c. caerulescens		(*Richmond MS.*)				(*C.W.Richmond*)		(*A. K. Fisher*)				(*L. D. Miner*)
Myrtle Warbler	26	Few, winter	Mar. 16	24	May 18	May 30, 1917	26	Sept. 14, 1918[1]	Oct. 6	6	Nov. 23	.....
Dendroica coronata coronata						(*A. Wetmore*)		(*Miner & Moore*)				

[1]Accidental, Aug. 7, 1859 (*Richmond MS.*).

Species.	No. of dates.	Earliest date of spring arrival.	Average date of spring arrival.	No. of dates.	Average date of spring departure.	Latest date of spring departure.	No. of dates.	Earliest date of fall arrival.	Average date of fall arrival.	No. of dates.	Average date of fall departure.	Latest date of fall departure.
Magnolia Warbler	36	April 22, 1891	May 5	16	May 26	June 4, 1917	16	Aug. 15, 1886	Aug. 31	17	Oct. 1	Oct. 28, 1916
Dendroica magnolia		(*C.W.Richmond*)				(*J. N. Gabrielson*)		(*A. K. Fisher*)				(*L. D. Miner*)
Chestnut-sided Warbler	37	April 19, 1902	May 2	20	May 22	June 2, 1917	15	Aug. 10, 1894	Aug. 24	11	Sept. 29	Oct. 14, 1906
Dendroica pensylvanica		(*H.W.Maynard*)				(*L. D. Miner*)		(*C.W.Richmond*)				(*A. K. Fisher*)
Bay-breasted Warbler	27	May 2, 1896	May 10	12	May 25	June 5, 1917	10	Sept. 1, 1896	Sept. 9	14	Oct. 8	Nov. 6, 1887
Dendroica castanea		(*H. Oldys*)				(*J. N. Gabrielson*)		(*W. Palmer*)				(*H.W.Henshaw*)
Blackpoll Warbler	38	April 21, 1916	May 5	33	June 1	June 16, 1907	18	Aug. 17, 1912[1]	Sept. 11	22	Oct. 12	Oct. 26, 1908
Dendroica striata		(*R. W. Moore*)				(*R.W.Williams*)		(*H.C.Oberholser*)				(*R. W. Williams*)
Blackburnian Warbler	32	April 23, 1920	May 4	18	May 22	June 3, 1907	14	Aug. 2, 1872	Aug. 27	11	Sept. 26	Oct. 10, 1919
Dendroica fusca		(*A. Wetmore*)				(*W. W. Cooke*)		(*E.Coues*)				(*M. J. Pellew*)
Yellow-throated Warbler	17	April 5, 1910	April 18	....	.....	Breeds	....	.....	.....	3	Aug. 31	Sept. 7, 1881
Dendroica dominica dominica		(*W. W. Cooke*)										(*Richmond MS.*)
Black-throated Green Warbler	32	April 18, 1920	April 29	17	May 22	June 10, 1917	15	Aug. 26, 1888	Sept. 7	23	Oct. 6	Oct. 21, 1888
Dendroica virens		(*B. H. Swales*)				(*D. C. Mabbott*)		(*A. K. Fisher*)				(*Spec. U.S.N.M.*)
Pine Warbler	29	Mar. 6, 1910	Mar. 31	....	.....	Breeds	....	.....	.....	12	Oct. 7	Oct. 24, 1916
Dendroica vigorsii vigorsii		(*W. W. Cooke*)										(*H.C.Oberholser*)
Yellow Palm Warbler	27	Mar. 31, 1889	April 8	27	April 27	May 12, 1913	6	Sept. 4, 1887	Sept. 19	16	Oct. 20	Nov.18, 1914
Dendroica palmarum hypochrysea		(*H.W.Henshaw*)				(*H.H.T.Jackson*)		(*H. W. Henshaw*)				(*J. H. Riley*)
Prairie Warbler	39	April 12, 1883	April 23	....	.....	Breeds	....	.....	.....	10	Sept. 16	Oct. 3, 1910
Dendroica discolor		(*H. W. Henshaw*)										(*E. J. Brown*)
Ovenbird	38	April 10, 1904	April 22	....	.....	Breeds	....	.....	.....	18	Oct. 3	Nov. 13, 1887
Seiurus aurocapillus		(*J. H. Riley*)										(*H. W. Henshaw*)
Northern Water-thrush	29	April 18, 1920	April 29	18	May 25	June 2, 1907	11	July 21, 1894	Aug. 9	13	Sept. 24	Oct. 16, 1919
Seiurus n. noveboracensis		(*B. H. Swales*)				(*A. K. Fisher*)		(*Richmond MS.*)				(*M. J. Pellew*)
Louisiana Water-thrush	22	Mar. 31, 1918	April 9	....	.....	Breeds	....	.....	.....	5	Sept. 16	Sept. 30, 1919
Seiurus motacilla		(*A. Wetmore*)										(*M. J. Pellew*)
Kentucky Warbler	21	April 26, 1917	May 3	....	.....	Breeds	....	.....	.....	5	Aug. 28	Sept. 5, 1920
Oporornis formosus		(*M. T. Cooke*)										(*A. K. Fisher*)
Connecticut Warbler	4	April 30, 1911	May 15	....	.....	May 30, 1882	19	Aug. 28, 1886	Sept. 21	10	Oct. 14	Oct. 24, 1889
Oporornis agilis		(*H.H.T.Jackson*)				(*H. W. Henshaw*)		(*Richmond MS.*)				(*W. Palmer*)
Mourning Warbler	14	May 6, 1896	May 15	6	May 28	June 7, 1917	3	Aug. 17, 1894	Aug. 19	2	Sept. 30	Oct. 1, 1894
Oporornis philadelphia		(*W. Palmer*)				(*F. Harper*)		(*Richmond MS.*)				(*W. Palmer*)

[1]Accidental, July 30, 1893 (*E. J. Brown*).

Maryland Yellow-throat	48	April 13, 1891[1]	April 21			Breeds					15	Oct. 7	Nov. 2, 1919[1]	
Geothlypis trichas trichas		(*W. Palmer*)											(*F. Harper*)	
Yellow-breasted Chat	44	April 14, 1917	April 30			Breeds					4	Sept. 13	Sept. 28, 1906	
Icteria virens virens		(*H. P. Childs*)											(*A. K. Fisher*)	
Hooded Warbler	29	April 13, 1919	May 1			Breeds					6	Sept. 14	Oct. 1, 1899	
Wilsonia citrina		(*A. Wetmore*)											(*J. H. Riley*)	
Wilson's Warbler	35	May 1, 1876	May 8	18	May 24	May 31, 1891	4	Aug. 22, 1910	Aug. 27	7	Sept. 19	Oct. 13, 1919		
Wilsonia pusilla pusilla		(*H. W. Henshaw*)				(*F. C. Kirkwood*)		(*W. W. Cooke*)					(*M. J. Pellew*)	
Canadian Warbler	30	May 3, 1908	May 8	26	May 25	June 2, 1917	11	July 31, 1887	Aug. 18	12	Sept. 16	Oct. 11, 1908		
Wilsonia canadensis		(*C. R. Shoemaker*)				(*F. Harper*)		(*A. K. Fisher*)					(*R. W. Williams*)	
American Redstart	43	April 15, 1877	April 22			Breeds				28	Sept. 19	Oct. 8, 1916		
Setophaga ruticilla		(*W. Palmer*)											(*D.C.Mabbott*)	
American Pipit	15	Feb. 16, 1908	Mar. 13	6	April 30	May 14, 1910	5	Oct. 1, 1916	Oct. 7	8	Nov. 14	Dec. 17, 1915		
Anthus spinoletta rubescens		(*W. W. Cooke*)				(*E. A. Preble*)		(*F. Harper*)					(*A. Wetmore*)	
Catbird	38	Mar. 14, 1918[2]	April 22			Breeds				14	Oct. 25	Dec. 6, 1917[3]		
Dumetella carolinensis		(*C. M. Shaw*)											(*B. H. Swales*)	
Brown Thrasher	34	Mar. 4, 1867[4]	April 3			Breeds				14	Sept. 24	Nov. 13, 1887		
Toxostoma rufa		(*Spec. U.S.N.M.*)											(*H. W. Henshaw*)	
House Wren	39	Mar. 26, 1910	April 18			Breeds				11	Oct. 16	Nov. 26, 1914		
Troglodytes aedon aedon		(*E. B. Gregg*)											(*F.M.Weston,Jr.*)	
Winter Wren		Winters		15	April 21	May 1, 1882	17	Sept. 27, 1889[5]	Oct. 7					
Nannus troglodytes hiemalis						(*H. W. Henshaw*)		(*C.W.Richmond*)						
Long-billed Marsh Wren	26	April 15, 1896	April 30			Breeds				9	Oct. 14	Nov. 12, 1885[6]		
Telmatodytes palustris palustris		(*W. Palmer*)											(*H. W. Henshaw*)	
Brown Creeper		Winters		19	April 24	May 1, 1907[7]	18	Sept. 22, 1858	Oct. 5					
Certhia familiaris americana						(*W. W. Cooke*)		(*Spec.U.S.N.M.*						
Red-breasted Nuthatch		Winters		13	May 6	May 20, 1917	17	Aug. 22, 1903	Sept. 24					
Sitta canadensis						(*I.N.Gabrielson*)		(*W. L. McAtee*)						
Golden-crowned Kinglet		Winters		25	April 15	April 27, 1888	18	Sept. 20, 1910	Oct. 6					
Regulus regulus satrapa						(*Richmond MS.*)		(*E. J. Brown*)						
Ruby-crowned Kinglet	30	Occ. winter	April 7	34	May 4	May 17, 1917	21	Sept. 14, 1913	Oct. 1	11	Nov. 9			
Corthylio calendula calendula						(*I.N.Gabrielson*)		(*W. W. Cooke*)						
Blue-gray Gnatcatcher	35	Mar. 6, 1916[8]	April 8			Breeds				5	Sept. 26	Nov. 23, 1890		
Polioptila caerulea caerulea		(*L. D. Miner*)											(*C.W.Richmond*)	
Wood Thrush	42	April 13, 1888	April 25			Breeds				13	Oct 2	Oct. 30, 1913		
Hylocichla mustelina		(*E.M.Hasbrouck*)											(*A. H. Howell*)	
Wilson's Thrush	30	April 20, 1889	May 1	17	May 21	June 2, 1907	3	Aug. 18, 1889	Aug. 23	9	Sept. 14	Oct. 1, 1916		
Hylocichla f. fuscescens		(*A. K. Fisher*)				(*A. K. Fisher*)		(*C.W.Richmond*)					(*L. D. Miner*)	
Gray-cheeked Thrush	23	May 7, 1912	May 11	18	May 26	June 4, 1917	10	Sept. 1, 1860	Sept. 22	10	Oct. 9	Oct. 20, 1903		
Hylocichla minima aliciae		(*W. W. Cooke*)				(*I.N.Gabrielson*)		(*Spec.U.S.N.M.*)					(*A. K. Fisher*)	
Olive-backed Thrush	36	April 19, 1896	May 4	17	May 24	June 2, 1917	15	Sept. 2, 1888	Sept. 15	10	Oct. 11	Nov. 1, 1886		
Hylocichla ustulata swainsoni		(*Richmond MS.*)				(*F. Harper*)		(*A. K. Fisher*)					(*A. K. Fisher*)	
Hermit Thrush	19	Rare, winter	Mar. 8	25	May 1	May 17, 1902	22	Sept. 18, 1900	Oct. 18	10	Nov. 20			
Hylocichla guttata pallasii						(*W. W. Cooke*)		(*R.W.Shufeldt*)						

[1]Accidental, March 5, 1859 (*Spec. U. S. N. M.*), and Dec. 29, 1913 (*McAtee and Preble*). [2]Accidental, Feb. 21, 1915 (*S. W. Mellott*).
[3]Accidental, Dec. 25–31, 1883 (*H. W. Henshaw*). [4]Accidental, Feb. 22, 1916 (*Miner & Moore*). [5]Accidental, Aug. 10, 1876 (*Spec. U. S. N. M.*).
[6]Accidental, Dec. 27, 1914–Jan. 3, 1915 (*W. W. Cooke*). One wintered 1919–20 (*F. Harper*). [7]Accidental, June 2, 1912 (*A. G. Whitney*).
[8]Accidental, Jan. 1, 1917 (*M. T. Cooke*).

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PROCEEDINGS

OF THE

BIOLOGICAL SOCIETY OF WASHINGTON

THE SMALLEST KNOWN LEAF HOPPER.

BY E. D. BALL.

The writer received from Mr. Moznette some time ago a number of very minute pale leaf hoppers said to be attacking the avocado at Miami, Florida. This proved to be an *Empoasca* and not only the smallest species in that genus but also the smallest leaf hopper yet described. Later sendings of material included examples highly ornamented with black stripes and markings of a very variable amount, two of the most stable patterns of which have been designated *as varieties*. It is very likely that this species will prove to be an introduced one peculiar to the avocado.

Empoasca minuenda, n. sp.

Golden or pale yellow, minute, with a roundingly right-angled vertex. Length, 2 mm.

Vertex distinctly produced, roundingly right-angled, shorter than its basal width, broadly rounding to the front. Pronotum slightly longer than the vertex. Elytra longer than in *typhlocyboides*, resembling *mali* in form. Venation of hind wing typical; elytron with the first apical cell very broad and extending nearly one-third its length beyond the base of the second cell which is parallel margined; the third cell very variable, usually small and triangular but varying to long and parallel depending on whether the second and third nervures arise as a single nerve and forking later or as separate nervures which in extreme cases are parallel.

Color.—Varying from a pale lemon to golden yellow with the scutellum touched with orange and white. Eyes fuscous, tip of ovipositor often brown above. The more golden specimens often show a pruinose white area midway on the costa.

Genitalia.—Female segment moderately rounding posteriorly, the margin entire. Male plates long, triangular, the attenuate tip curved upward and slightly individually rounded at the apices.

Described from eight examples from G. F. Moznette, taken on avocado at Miami, Florida. Type ♀ and allotype ♂ in the author's collection, paratypes in the author's and Mr. Moznette's collection.

Empoasca minuenda var. **moznettei,** n. var.

Size and form of *minuenda*, golden or lemon yellow with a variable number of oval black spots. Usually a widely separated pair of spots on the disk of the pronotum, a larger and adjacent pair on the scutellum and a similar pair on the first three or four abdominal segments. Each elytron may have six spots, three on the costa, two on the claval suture and one on the corium. The first costal spot is at the base, the other five spots form a square with a central dot; two specimens show traces of fuscous clouds in the apical cells.

Described from six examples received with the others.

Empoasca minuenda var. **clavigerana,** n. var.

Similar to variety *moznettei* in form and color but with additional marking forming two dark brown stripes extending from just back of the vertex margin across the pronotum, scutellum and along the inner margin of the elytra. The stripes are narrow and definite on the vertex where they are separated by about their own width, on the pronotum they often widen and rarely fuse, on the scutellum they usually fuse except for a single light spot. In light examples these stripes are often interrupted appearing as elongate spots on vertex and pronotum.

Described from six examples from Miami, Florida. Type distribution of both varieties the same as for the species.

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PROCEEDINGS

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A NEW CLASSIFICATION OF THE SHIPWORMS AND DESCRIPTIONS OF SOME NEW WOOD BORING MOLLUSKS.

BY PAUL BARTSCH.[1]

In the preparation of a monograph on the American shipworms a lot of interesting facts have come to light, among which are points pertaining to classification. These are deemed of sufficient importance to merit this preliminary paper, which furnishes a simple key to the generic and subgeneric groups of the shipworms. I have also added descriptions of a number of new forms, the latter having attracted considerable attention of late on account of the economic problems associated therewith. All these forms will be fully illustrated in the monograph which is almost ready for the press. It has been deemed unnecessary to cite the rather extensive, involved synonymy in the synopsis. This also will be done in the monograph.

A Key to the Genera and Subgenera of the Family Teredidae.

Pallettes consisting of a series of cone-in-cone structures . . . . . *Bankia.*
Cone-in-cone elements entirely free at their distal end.
Distal ends of the cones terminating in a thin membrane.
Membrane of the cones fimbriated distally.
Lateral fimbriations developed into long awnlike projections *Bankia.*
Lateral fimbriations not developed into long awnlike projections.
Membrane of the cones not fimbriated distally.
Membrane of the cones denticulated distally . . . . **Neobankia.**
Membrane of the cones not denticulated distally.
Membrane of the cones entire distally . . . . . **Bankiella.**
Cone-in-cone elements not entirely free at their distal end.
Cones almost fused on the outside where they are covered by a thick periostracum . . . . . *Nausitora.*

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

Palletes not consisting of a series of cone-in-cone structures . . . *Teredo.*
Pallettes paddle-shaped.
Terminal portion of the blade cupped.
Cup single . . . . . *Teredo.*
Cup not single.
Cup rendered double by a median septum . . . **Teredothyra.**
Terminal portion of the blade not cupped.
Terminal portion of the blade ending in a forked tip . . . *Lyrodus.*
Terminal portion of the blade not ending in a forked tip.
Terminal portion ending in a calcified knob . . . . **Teredops.**
Pallettes not paddle-shaped.
Pallettes spoon shaped.
Terminal portion of the blade cupped . . . . . *Neoteredo.*
Terminal portion of the blade not cupped . . . . . **Teredora.**

Bankia was proposed by Gray in 1840,[1] and *Teredo bipalmulata* Lamarck was designated as type by him in 1847.[2]

Neobankia new subgenus, type *Bankia* (*Neobankia*) *zeteki* new species.

Bankiella new subgenus, type *Bankia* (*Bankiella*) *mexicana* new species.

Nausitora was proposed by Wright in 1864[3] type *Nausitora dunlopei* Wright.

Teredo was proposed by Linnæus in 1758,[4] type *Teredo navalis* Linnæus.

Teredothyra new subgenus, type *Teredo* (*Teredothyra*) *dominicensis* new species.

Lyrodus was proposed by Gould in 1870,[5] type *Lyrodus chlorotica* Gould.

Teredops new subgenus, type *Teredo diegensis* Bartsch.

Neoteredo Bartsch, 1920,[6] type *Teredo* (*Neoteredo*) *reynei* Bartsch.

Teredora new subgenus, type *Teredo malleolus* Turton.

Bankia (Neobankia) zeteki, new species.

Shell subglobular, white, the extreme anterior portion with the usual sinus and reflected smooth callus at its external border, the main portion bearing the dental ridges, which radiate from the anterior margin, where they are closely crowded, backward to the junction with the posterior median portion. Here they are separated by spaces about twice as wide as the ridges. These ridges are finely denticulated at their free margin. Seventy of these ridges are apparent, but at least twenty more appear to have been eroded at the umbonal end. The anterior median area is rather broad, and bears the closely crowded, strongly denticulated ridges, which are separated by mere lines. These ridges terminate in a straight line posteriorly. The middle portion of the median part is marked by the usual groove that extends from the umbones to the basal margin, and this groove

[1] Synop. Brit. Mus., p. 76.
[2] Proc. Zool. Soc. London, p. 188.
[3] Trans. Linn. Soc., vol. 24, pp. 451–4.
[4] Syst. Nat., 10th ed., p. 651.
[5] Inv. Mass., p. 34.
[6] Proc. Biol. Soc. Washington, vol. 33, pp. 69-70.

is crossed by strong lines of growth, which extend over the posterior median part. The anterior part forms a strong auricle, which is conspicuously separated from the posterior median portion, the shell here bending strongly inward. The auricle is marked by more or less curved lines of growth, which give one the false impression of raised cords. The interior of the shell is bluish white. The umbone projects inward as a strong knob, and the blade springs from deep within the umbones, and makes a decided curve, the early portion having the broad side of the blade parallel to the inner surface of the shell, that is within the umbones, while within the median portion of the shell the blade becomes twisted, so that it assumes an oblique position to the inner surface of the shell. The suture of the anterior and the median portion is marked by a slightly tumid area. The middle median portion is decidedly roughened and bears the usual knob at the ventral margin. The auricle extends over the median portion on the inside as a strong shelf. The inside of the auricle shows the same translucent cordlike lines apparent on the exterior. The pallettes are of the cone-in-cone shape variety, the individual cones being semicircular in cross section, the inner free border being straight, while the outer is curved. The cone elements are rather distantly spaced. The free margin of the membrane of these cone-in-cone elements is finely denticulated.

The type, Cat. No. 341,128, U. S. N. M., was taken from greenheart timber of the canal locks at Balboa, Canal Zone, by Mr. James Zetek, and measures: length, 10.2 mm.; altitude, 9.5 mm. The pallettes measure: length, 12 mm., but they are probably longer because the basal stalk seems slightly broken. 8 mm. of this length go to the blade. Diameter of pallettes, 3.4 mm.

Bankia (Bankiella) mexicana, new species.

Shell subglobular. Anterior portion, excepting the extreme smooth calloused area, brown; the rest of the shell white. The extreme anterior portion forms a sinus from which a thin callus is reflected over the anterior dental ridge bearing portion. The dental ridges radiate from this anterior smooth area backward, spreading out more or less fan-shaped, the spaces between the ridges becoming wider toward their distal end, where they are about twice as wide as the dental ridges. These dental ridges are rather coarsely denticulated at their free margin. Fifty-one of these ridges can be counted, though it is possible that some of the earlier ones have been lost through the erosion of the umbones. The denticles on these dental ridges are not nearly as strong as those on the anterior median portion. The dental ridges on this part are closely crowded and separated by mere impressed lines. They terminate posteriorly in a straight line that extends from the umbones to the ventral margin. The middle median portion is a slightly concaved area extending from the umbone to the ventral margin, and this part is crossed by curved rough wrinkles which evanesce on the posterior median portion. The median groove bears a strongly rounded knob at the ventral margin. The posterior portion forms a strong auricle which is separated from the median by a sudden depression in the curve of the shell. The interior of the shell is bluish white. A strong knob marks the umbones,

from the inside of which the slender blade curves downward into the cavity of the shell. This blade has its broad side obliquely placed to the inner curvature of the shell. The anterior portion is separated from the median by a thickened cord, and a roughened area marks the middle median portion of the shell. The posterior area projects over the posterior median portion as a shelf. The pallettes are of the cone-in-cone type, the distal margin of the cones being entire.

The type, Cat. No. 194,176a, and a lot of additional specimens, were collected by Mr. C. R. Orcutt on dead mangroves at Sinaloa, Mexico. The type measures: length, 7 mm.; altitude, 6.5 mm. The pallettes are all fragmentary, and hence it is impossible to give their measurement.

Teredo (Teredo) parksi, new species.

Shell subglobular, milk white; interior bluish white. The anterior portion is edged by a thick, decidedly curved callus-like smoothish area, from which the dental ridges curve at first downward and then gradually and steadily outward, forming almost straight lines for the major portion of their length. These dental ridges are a little narrower than the spaces that separate them, and are of triangular shape, sloping a little more gently ventrally than dorsally. The extreme edge is exceedingly, finely denticulated. The posterior edge of the anterior portion joins the anterior edge of the median portion in such a way that the dental ridges of the two form almost right angles. About ninety-five of these dental ridges can be counted on the anterior part. The anterior median portion is crossed by slender dental ridges, which are separated by very narrow grooves and bear rather prominent denticles. The erosion of the umbone makes it impossible to see exactly how many of these dental ridges occur, but there must be at least as many as we found on the anterior part. The middle median portion is a narrow roughened zone extending from the umbones to the ventral margin, which is not concave, as is usually the case. The posterior part of the median portion is marked by rather strong irregular upward curved lines of growth. The posterior portion forms a short auricle, which is crossed by rather regular lirations, which are really intensified lines of growth that coincide with the outer margin in disposition. In the interior a somewhat thickened ridge marks the junction of the anterior and median portions. The middle median portion is marked by a strong, irregular roughened area, while the posterior portion overlaps the posterior median portion in such a way as to form a slight shelf having a decided cavity behind it. A strong, flattened, broad, rough, irregular blade extends two-thirds of the distance from behind the knoblike umbones toward the ventral edge of the shell. The outer border of this blade keeps almost at an even distance from the shell. The basal portion of the median part has a strong knob which extends as a thickening for some little distance into the interior of the shell. The pallettes are spatulate, having a very long, very slightly curved flexuous stalk, the spatulate portion being decidedly excavated at the tip, and covered with a brown epidermis. The siphons in this species are almost equal and project in the alcoholic material about half the length

of the pallettes beyond these. The base of the siphons and the base of the pallettes are surrounded by a membrane that forms a cuplike structure. The siphons extend about the length of the pallettes beyond the termination of the pallettes and are separated throughout the distance that extends beyond the pallettes.

The type, Cat. No. 341,132, U. S. N. M., was taken by the author from pilings in Pearl Harbor, Oahu, Hawaiian Is. It measures: height, 9 mm., length, 8.5 mm.; thickness, 9 mm. The pallettes measure: length, 6 mm., of which 2.5 mm. go to the blade, which has a diameter of 2 mm.

I take great pleasure in naming this shipworm for Admiral C. W. Parks, Chief of the Bureau of Yards and Docks, to whom I am indebted for much help in connection with shipworm problems.

Teredo (Teredo) beachi, new species.

Shell subglobular, with a strong posterior auricle. Exterior milk white, excepting the umbones and a streak in the median middle portion, which are rose colored; interior bluish white. The anterior portion forms a deep sinus which is bordered by a narrow smooth edge, the external margin of which is reflected over the anterior portion as a smooth callus, which is translucent and permits the dental ridges covered by it to be seen through it. The dental ridges radiate from this anterior smooth portion fanshaped backward over the rest of the anterior area. There are about thirty-five of these in the type, although some of the earlier ones may have been lost through the erosion of the umbones. The dental ridges, which are finely denticulated at their free margin, are about one-third as wide as the flattened spaces that separate them at the junction of the anterior with the median portion. The flattened interspaces are finely striated, the striations coinciding with the dental ridges. The dental ridges of the anterior portion meet those of the posterior median portion at almost right angles. The dental ridges of the posterior median portion are closely crowded, being separated by a mere line only. They are very strongly denticulated. The middle median portion is a somewhat depressed area, which extends from the umbone to the ventral margin. There is a strongly impressed line marking the center of this area, which is crossed by rather rough, curved incremental lines which extend equally rough over the posterior median portion. The posterior portion forms a strong auricle, which is marked by rough lines of growth. The interior has the umbones strongly curved inward, forming a prominent knob, from the inside of which a strong, broad, thin blade extends, which maintains almost an equidistance from the inside of the shell throughout its entire length, the broad side of the blade being placed obliquely to this. The junction of the anterior and median portion is marked by a slightly thickened ridge on the inside. The center of the median portion is marked by a roughened area which extends from the umbones to the ventral margin, where the usual strong knob is present. The auricle extends over the posterior median portion and forms a narrow, thin, free shelf, with very little of a cavity behind it. The auricle is marked by strong, curved lines of growth. The pallettes are spatulate, very short stalked and very broad,

the distal dark portion being decidedly hollowed out, almost suggesting a basal joint of *Bankia*. Of the animal we may say that the siphons are of unequal thickness but almost of equal length. They are tipped with numerous rose colored spots. They extend about half the length of the spatulate portion of the pallettes, and are split to the base of the spatulate portion. A broad collar in the shape of a membrane surrounds the stalked portion of the pallettes and extends down over the rest of the animal for a length equal to the exposed part of the siphons.

The type, Cat. No. 341,155, U. S. N. M., was collected in San Pablo Bay, California. It measures: height, 5.5 mm.; length, 6 mm.; thickness, 7 mm. The pallettes measure: length, 5.5 mm., of which 2 mm. go to the stalk; width, 2 mm.

Thanks to the help of Captain Edward L. Beach, the Commandant of the Mare Island Naval Station, who placed at my disposal the necessary equipment for extracting and examining infested pilings, I was able to make a large collection of this species, which has been causing the extensive ravages in San Pablo Bay and the adjacent region in recent years. I therefore take great pleasure in naming this species in honor of the Captain.

Teredo (Teredothyra) dominicensis, new species.

Shell subglobular, compressed, cream yellow, the extreme anterior portion bearing a notch whose external border is reflected as a smooth fold over the outer portion of the shell, but not appressed to it. Immediately back of this are the dental ridges, which appear to radiate more or less fanlike from the anterior margin. They are closely crowded at the anterior margin, but become regularly more distantly spaced as they pass from the anterior to the posterior termination. At the latter place they are about two and a half times the width of the ridges. These ridges are exceedingly finely denticulated at their free margin; thirty-four of these are visible, but this is not all, for the earliest are partly covered by the anterior reflection, and some have probably been lost by the erosion of the umbones. These ridges join the dental ridges of the anterior median portion in a little more than a right angle. The latter are very closely crowded, the spaces between them being mere impressed lines. The dental ridges of the anterior median portion are a little more strongly denticulated than the dental ridges on the anterior portion. In about the middle of their length they separate from their closely packed condition, taking a decidedly backward slant on the early portion of the shell, and a lesser angle on the last portion The middle of the median portion is but a roughened groove, which extends from the umbone to the ventral margin. The posterior portion is about twice as wide as the anterior median, and is marked by rather strong lines of growth. In fact, it would almost seem as if the attenuated dental ridges, after bending over the median groove, continued as smooth raised threads over the posterior median portion. The median portion, compared with *Teredo* in general, is rather narrow. The posterior portion forms a moderately large auricle which on the external surface is marked by lines of growth and a few roughened ridges. The interior of the shell is bluish white. The um-

bones project into the interior of the shell as a strong boss, from the under side of which the slender blade curves downward basally. The narrow portion of the blade is parallel with the inside of the shell. The median portion is smooth, although it shows the groove that corresponds with the external depression, and bears the usual knob at the ventral margin. The posterior auricle does not project into the cavity of the interior to form a shelf, but fuses smoothly with the median portion. The auricle shows lines of growth markings on the inside. The pallettes are short stalked, the stalk being more or less irregularly curved. The expanded blade is hollow throughout its length, the cavity being divided into two chambers by a median septum.

The type and some additional specimens, Cat. No. 341,129, U. S. N. M., come from a small piece of wood collected by the U. S. Coast Survey Steamer Blake at Station 192, in 138 fathoms off Dominica, West Indies. The type measures: length, 2.3 mm.; altitude, 2.2 mm. The pallette measures: length, 2.5 mm., of which 1.2 mm. belong to the stalk. Width of pallette, 1.1 mm.

XYLOPHAGA.

An examination of the West American specimens belonging to the genus *Xylophaga* Turton in the collections of the United States National Museum shows that in addition to *Xylophaga mexicana* Dall we will have to recognize two new species. The three species have quite distinctive characters, and also occupy separate zoogeographic ranges.

The exterior surface of the shell *Xylophaga* is not unlike that of *Teredo* and *Bankia* but the posterior end does not gape and the posterior auricular portion is not differentiated from the median. A broad median sulcus extends over the exterior of the shell from the umbones to the ventral margin and a strong lamina a little anterior to the middle of the sulcus reinforces the shell on the inside. This lamina is marked at more or less regular intervals by slight constrictions which give to it an articulated appearance.

Xylophaga, like *Teredo* and *Bankia*, burrows in wood, but lacking the long siphonal portion characteristic of those genera, the burrows are correspondingly shallow. They are usually quite abundant and their burrows may completely honeycomb and riddle the piece of wood affected.

The following key will help to differentiate the species:

Ridges on the anterior portion strong and distantly spaced . . *washingtona*
Ridges on the anterior portion not strong and distantly spaced.
  Ridges on the anterior portion slender and closely spaced.
    Anterior median area broad . . . . . *mexicana*
    Anterior median area narrow . . . . . *californica*

Xylophaga mexicana Dall.

In *Xylophaga mexicana* there are twenty denticulated ridges to the millimeter in the center of the posterior area and the denticulated ridge bearing posterior median portion is 1.7 mm. in width at the angle of the junction of the posterior with the median part.

The type (Cat. No. 172,947, U.S.N.M.) comes from the U. S. Bureau of Fisheries Albatross Station 3422, off Acapulco, Mexico, dredged in 141 fathoms on mud bottom. The type measures: length, 5.1 mm.; altitude, 4.5 mm.

Xylophaga californica, new species.

In *Xylophaga californica* there are about fourteen denticulated ridges to a millimeter in the center of the posterior area, and the denticulated ridge bearing posterior median portion is .7 mm. in width at the angle of junction of the posterior with the median part.

The type, Cat No. 209,876, U. S. N. M., comes from the U. S. Bureau of Fisheries Albatross Station 4525, off Pt. Pinos Light, California, in 75–108 fathoms, on mud bottom. The type measures: length, 4.9 mm.; altitude, 4.7 mm.

Xylophaga washingtona, new species.

In *Xylophaga washingtona* there are about ten denticulated ridges to a millimeter in the center of the posterior area and the denticulated ridge bearing posterior median portion is 1.2 mm. in width at the angle of junction of the posterior with the median part.

The type, Cat. No. 344,479, U. S. N. M., was collected by Dr. C. C. Engberg at San Juan Island, Washington. The type measures: length, 5.7 mm.; altitude, 5.5 mm. There are two additional specimens entered from the same station under the same catalogue number. Cat. No. 226,151, U. S. N. M., represents two specimens from the U. S. Bureau of Fisheries Albatross Station 2867, off the coast of Washington, taken from a piece of wood dredged in 37 fathoms. Cat. No. 331,683, U. S. N. M., contains 13 specimens dredged at U. S. Bureau of Fisheries Albatross Station 5432, off Oregon. Cat. No. 341,157, U. S. N. M., contains 95 specimens from U. S. Bureau of Fisheries Albatross Station 3456, off Washington, dredged in 136 fathoms on gray sand bottom, bottom temperature 42.2°. Cat. No. 341,158, U. S. N. M., contains 5 specimens collected by Mrs. Oldroyd in Departure Bay, British Columbia. These were taken from a dead twig. An additional lot from the same place is in Mrs. Oldroyd's collection.

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PROCEEDINGS

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NEW MARINE MOLLUSKS FROM THE WEST COAST OF AMERICA.

BY PAUL BARTSCH.[1]

There have come to the National Museum from time to time among miscellaneous lots of mollusks sent here for determination, forms which have not been previously described. Nine of these from the northwest coast of America are named in the present communication. I should very much like to publish illustrations of these in connection with these descriptions, but lack of the necessary artist precludes doing so at the present time. I would withold these descriptions until that deficiency could be supplied, were it not for the fact that I am urged by our correspondents to give a status to these species, since they are to figure in a larger report on the shells of the Puget Sound region, by Mrs. Oldroyd. I wil' say, however, that the shortcoming will be made up in the next communication on West American marine shells.

Turbonilla (Strioturbonilla) kincaidi, new species.

Shell rather broadly elongate conic, yellowish white. Nuclear whorls decollated. The remaining turns are moderately well rounded and somewhat overhanging, appressed at the summit, decidedly constricted at the suture, marked by rather depressed, slightly retractively slanting axial ribs, of which eighteen occur upon the first of the remaining turns, and twenty upon all the other turns. The spaces which separate the ribs are moderately impressed and terminate roundly about one-eighth of the distance between the summit and the suture, anterior to the suture. Periphery of the last whorl well rounded. Base short, inflated, well rounded, marked by the feeble continuation of the axial ribs, which become evanescent before reaching the umbilicus. In addition to the above sculpture the entire surface of the spira and base is marked by very fine closely spaced spiral striations. Aperture rather large, very broadly oval, almost subquadrate; pos-

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

terior angle obtuse; outer lip thin, showing the external sculpture within; inner lip slender, somewhat sinuous, reflected over and appressed to the base for three-fourths of its length; parietal wall covered by a moderately thick callus.

The type, Cat. No. 340,844, U. S. N. M., comes from Dogfish Bay, Puget Sound; it has eight whorls remaining and measures: length, 5.5 mm.; diameter, 1.7 mm.

Odostomia (Chrysallida) cumshewaensis, new species.

Shell broadly elongate conic, milk white, nuclear whorls at least two, obliquely immersed in the first of the postnuclear whorls, above which about two-thirds of the nuclear spire projects. Postnuclear whorls strongly rounded, constricted at the periphery, marked by strong, retractively slanting axial ribs, of which sixteen occur upon the first, eighteen upon the second, twenty-two upon the third and the penultimate turn. These ribs are crossed by four strong spiral cords which are a little wider than the ribs, and render the axial ribs tuberculated, the first row of tubercles at the summit being decidedly smaller than the two that succeed it. All three of these have the tubercles strongly, evenly rounded. The fourth immediately above the periphery, however, has the spiral cord stronger than the axial ribs, and appears as an almost uninterrupted cord with feebler tubercles. The pits enclosed between the ribs and spirals cords are strongly impressed and rounded. Suture strongly constricted, a part of the first basal cord showing at the suture of the last two turns. Periphery well rounded, marked by a strong spiral cord. Base moderately long, marked by five spiral cords on the anterior three-fourths, which become succeedingly narrower and feebler, the last two being indicated merely by the incised lines that separate them. The anterior fourth of the base is smooth, excepting incremental lines. The spaces between the spiral cords on the base are crossed by fine axial threads. Aperture very broadly oval; posterior angle obtuse; outer lip thin, showing the external sculpture within; inner lip strongly curved, reflected over and appressed to the base, a very narrow chink remaining behind the lip, indicating a very slight umbilicus; parietal wall covered by a thick callus.

The type, Cat. No. 340,860, U. S. N. M., was collected by Mrs. Oldroyd at Cumshewa Inlet, British Columbia. It has five postnuclear whorls and measures: length, 2.7 mm.; diameter, 1.2 mm.

This species suggests *Odostomia (Chrysallida) astricta* Dall and Bartsch from Monterey, but differs from it in being more conic, with the whorls more rounded and having the base shorter and more rounded, as well as in minor details of sculpture.

Cerithiopsis fraseri, new species.

Shell elongate conic, chestnut brown. Nuclear whorls decollated. Postnuclear whorls almost flattened, marked by moderately strong, rounded, slightly retractively slanting axial ribs, of which eighteen occur upon the first, sixteen upon the second to fourth, eighteen upon the fifth, twenty

upon the sixth and seventh, twenty-six upon the eighth and the last whorl. Intercostal spaces about half as wide as the ribs. The spiral sculpture consists of three strong cords, of which the first, at the summit, is a little less strong on the early whorls than the other two, but on the last two whorls it equals the other two cords. The intersection of the axial ribs and spiral cords forms strong tubercles rounded on the first cord, slightly truncated posteriorly on the median cord, and strongly rounded anteriorly and strongly truncated on the third cord posteriorly, and gently sloping anteriorly. The spaces enclosed between the axial ribs and spiral cords are well rounded pits. Suture strongly impressed, the extreme appressed portion of the summit appearing as a slender sinuous spiral thread. Periphery of the last whorl marked by a sulcus about half as wide as that separating the median from the third cord. Base short, well rounded, marked by the feeble continuations of the axial ribs which extend more or less threadlike over the base, and two strongly impressed spiral lines on the posterior fourth of the base. The space separating the first from the second of these spiral lines is about as wide as that separating the first from the peripheral sulcus. There is no spiral cord at the insertion of the columella. Aperture decidedly channeled anteriorly; posterior angle obtuse; outer lip thin, rendered wavy at the edge by the external sculpture which is visible through the substance of the shell; inner lip decidedly sinuous, reflected over and appressed to the columella; parietal wall provided with a thin callus.

The type, Cat. No. 340,858, U. S. N. M., was collected by Mrs. Oldroyd at Clayoquot, British Columbia. It has nine and a half postnuclear whorls and measures: length, 6.5 mm.; diameter, 2.3 mm.

I take pleasure in naming this species for Dr. C. M. Fraser, Director of the Biological Station, Nanaimo, British Columbia.

Cat. No. 340,856, U. S. N. M., was collected by Mrs. Oldroyd. It comes from Victoria, British Columbia, and Cat. No. 340,857, U. S. N. M., two specimens, were likewise collected by Mrs. Oldroyd at Nanaimo, British Columbia. Additional specimens of this species are in Mrs. Oldroyd's collection.

Cerithiopsis onealensis, new species.

Shell elongate conic, pale chestnut brown. Nuclear whorls decollated. Postnuclear whorls moderately rounded, slightly overhanging, crossed by very strong, broad, rounded, slightly protractively slanting axial ribs, of which sixteen occur upon the first four turns, eighteen upon the fifth and twenty-six upon the last. Intercostal spaces about half as wide as the ribs. In addition to the axial ribs the whorls are crossed by three strong spiral cords, of which the one at the summit is a little less strong than the other two. The junction of the axial ribs and spiral cords forms very prominent tubercles. Those on the cord near the summit are well rounded. Those on the median cord are truncated posteriorly, and almost truncated anteriorly, while those on the cord above the suture are abruptly truncated posteriorly and slope moderately, gently anteriorly. On the last whorl, where the ribs are much more crowded, the tubercles have an oblong outline, and are about equal on all three cords, their long axis coinciding with the axis

of the shell. The pits enclosed by the spiral cords and axial ribs are well rounded on all the whorls. Suture strongly impressed. Periphery of the last whorl marked by a sulcus about as broad as that separating the median from the supersutural cord on the spire. Base short, well rounded, marked by feeble continuation of the axial ribs, which lend it a roughened aspect, and a single slender spiral thread, which encircles the base at the insertion of the columella. Aperture decidedly channeled anteriorly; posterior angle obtuse; outer lip thin, showing the external sculpture within, sinuous at the edge; inner lip sigmoid, reflected over and appressed to the columella.

The type, Cat. No. 340,827, U. S. N. M., was collected by Mrs. Oldroyd in 20 fathoms, off O'Neal Island, Puget Sound. It has almost seven postnuclear whorls and measures: length, 5.1 mm.; diameter, 1.9 mm.

Cerithiopsis (Cerithiopsina) signa, new species.

Shell elongate conic, pale brown. First half postnuclear whorl smooth, the next one and a half well rounded and marked by rather distantly spaced, almost vertical axial ribs. Postnuclear whorls appressed at the summit, marked by strong, rounded almost vertical axial ribs, of which eighteen occur upon the first, fourteen upon the second to sixth, sixteen upon the seventh, and eighteen upon the last turn. The spiral sculpture consists of three strong, equally spaced cords, which are crossed by strong axial ribs. The intersection of the axial ribs and the spiral cords form strong tubercles, which are truncated on their posterior margin, and slope gently anteriorly in all three groups. The spaces enclosed between the cords and the ribs are elongated pits which have their long axis coinciding with the spiral sculpture. In addition to this, the entire surface of the spire is marked by fine axial lines of growth and closely spaced spiral striations. Suture strongly impressed. Periphery of the last whorl rendered angulated by a keel. Base short, slightly concave at the insertion of the columella, marked by fine lines of growth and very fine spiral striations, and a slender spiral thread at the insertion of the columella. Aperture subquadrate; decidedly channeled anteriorly; posterior angle obtuse; outer lip rendered sinuous by the spiral cords; inner lip sigmoid, reflected over and appressed to the columella.

The type, Cat. No. 340,826, U. S. N. M., was collected off O'Neal Island, Puget Sound. It has 10.5 whorls and measures: length, 5.5 mm.; diameter, 2.7 mm.

The following additional specimens have been examined: 3 specimens, Nanaimo, British Columbia, Cat. No. 340,841, U. S. N. M. 4 specimens, Port Orchard, Puget Sound, Cat. No. 133,233, U. S. N. M. 7 specimens, San Juan Island, Puget Sound, Cat. No. 340,934, U. S. N. M.

Cerithiopsis (Cerithiopsina) willetti, new species.

Shell large, robust, elongate conic, pale brown. All but the last nuclear whorl decollated. This shows, however, that the species belongs to the subgenus *Cerithiopsina*. Postnuclear whorls crossed by very strong, almost sublamellar, rather coarse, rounded, protractively slanting axial ribs, of which sixteen occur upon the first to fifth, eighteen upon the sixth, twenty

upon the seventh, and twenty-four upon the last turn. Intercostal spaces about two thirds as wide as the ribs. In addition to the axial ribs there are three strong spiral cords, of which the first is about as far anterior to the summit of the whorls as it is distant from its median neighbor. The first of these spiral cords is a little less strongly developed on the earlier whorls than on the succeeding turns, where it almost equals the other two. The junction of the axial ribs and the spiral cords forms strong tubercles, of which those on the cord at the summit are well rounded, while those on the median cord are truncated posteriorly and slope gently anteriorly. The same is true of the supra-sutural cord. On the last whorl, however, the tubercles are more elongated and the truncation at the anterior margin is less pronounced, the long axis of the tubercles coinciding with the axis of the shell. The spaces enclosed between the axial ribs and spiral cords are well rounded pits. The summit of the whorls falls a little anterior to the peripheral cord, and lets this appear as a narrow, smooth, sinuous thread in the somewhat constricted suture. Periphery of the last whorl marked by a strong cord, which constitutes the termination of the axial ribs. Base short and rounded, but concave at the junction with the columella. The junction of the columella and the base is marked by a slender spiral cord. Aperture broadly oval, decidedly channeled anteriorly; posterior angle obtuse; outer lip thin, rendered sinuous by the external sculpture, which is also seen within the aperture by transmitted light; inner lip reflected over and appressed to the columella.

The type and two specimens of this species, Cat. No. 268,746, U. S. N. M., were collected by Mr. George Willett at Forrester Island, Alaska. The type has nine postnuclear whorls and measures: length, 7.5 mm.; diameter, 2.5 mm. Four additional specimens from the same station are in Mr. Willett's collection. Another specimen, Cat. No. 340,936, U. S. N. M., was collected by Mrs. Oldroyd at San Juan Islands.

This species suggests *Cerithiopsis* (*Cerithiopsina*) *signa*, but has much larger nuclear whorls and is in every way more robust than that species.

Alvania sanjuanensis, new species.

Shell moderately large, chestnut brown excepting the tip which is a little paler and the extreme base which is also lighter. Nuclear whorls one and a half, well rounded (the sculpture of the nuclear whorls erroded in all the shells seen except in a very small fraction of the last turn in the type, which presents a finely, somewhat wavy, spirally lirate surface. I am not quite certain whether axial threads are present or not). Nuclear whorls strongly shouldered at the summit, strongly rounded, marked on the first turn by three strong spiral cords, which occupy the anterior half of the turn; on the second turn a fourth cord occurs a little anterior to the median line between the summit and the first strong cord, while on the next turn a fifth slender thread makes its appearance between the summit and this cord. This last cord at the summit never attains a strength as great as the third anterior to it, while the second one is fully as strong on the penultimate turn. In addition to these spiral cords the shell is marked by rather weak axial ribs,

of which twenty-four occur upon the second, twenty-six upon the third, and about thirty-two upon the last turn; on this they are decidedly enfeebled. The junction of the axial ribs and spiral cords forms feeble nodules. The entire surface of the spire between ribs and interspaces is crossed by fine spiral and axial threads, which lend it a fine clothlike texture. Suture strongly constricted. Periphery of the last whorl well rounded. Base moderately long, well rounded, marked by seven equally spaced spiral threads, of which the seventh immediately behind the inner lip is very feeble. The rest are almost as wide as the spaces that separate them. The axial ribs do not extend over the base, but the fine sculpture described for the spire is also present here. Aperture ovate; posterior angle obtuse; outer lip thin at the edge, strongly curved; inner lip strongly curved, reflected and appressed to the base except at the extreme tip; parietal wall covered by a thick callus, which renders the peritreme complete.

The type and three additional specimens, Cat. No. 334,487, U. S. N. M., were collected by Dr. C. C. Engberg at San Juan Island, Gulf of Georgia. The type has 5 whorls and measures: altitude, 3 mm.; diameter, 1.5 mm. Eight additional specimens from the same station are in Dr. Engberg's collections.

This species is nearest related to *Alvania montereyensis* Bartsch, but can at once be distinguished from it by its much larger size, as well as other detail characters.

Alvania burrardensis, new species.

Shell very broadly ovate, pale yellow. Nuclear whorls decollated in all our specimens. Postnuclear whorls strongly inflated, marked by strong, rather distantly spaced curved and slightly protractively slanting axial ribs, of which twenty-four occur upon the next to the last and twenty-two upon the last turn. In addition to the axial ribs the whorls are crossed by six equal and equally spaced, broad spiral cords, which render the axial ribs obscurely nodulose at their junction. The spaces separating the spiral cords are a little less wide than the cords. Periphery of the last whorl marked by a sulcus, which is crossed by the continuation of the axial ribs, which extend partly over the base, but evanesce soon after passing the periphery. Base short, strongly rounded, marked by nine equal and equally spaced prominent spiral cords, which are a little wider than the spaces that separate them. Aperture subcircular; posterior angle obtuse; outer lip reinforced by a callus at the edge; inner lip curved and appressed to the base; parietal wall covered by a moderately thick callus.

The type and two specimens, Cat. No. 340,938, U. S. N. M., were collected by Mrs. Oldroyd at Burrard Inlet, British Columbia. The type has four whorls remaining and measures: length, 2.2 mm.; diameter, 2 mm. Five additional specimens from the same station are in the Oldroyd collection.

This species is nearest related to *Alvania rosana* from off Santa Rosa Island. It differs from this by its less acute outline, by having the whorls more rounded, and also in other details of sculpture.

Vitrinella (Docomphala) columbiana, new species.

Shell moderately large, depressed helicoid, semitranslucent, bluish-white. Nuclear whorls decollated. Postnuclear whorls gently rounded, almost appressed at the summit, marked by rather strong incremental lines which extend over both the upper and lower surface; the lower surface is a little more convex than the upper; the umbilical wall is marked by strong notches. Aperture decidedly oblique, almost circular; parietal wall marked by a thin callus, which renders the peristome almost complete.

The type, Cat. No. 340,848, U. S. N. M., was collected by Mrs. Oldroyd at Departure Bay. It has two and a half whorls remaining and measures: altitude, 1.5 mm.; greater diameter, 3.1 mm.

The present species is nearest related to *Vitrinella* (*Docomphala*) *stearnsi* Bartsch, but differs from it in being a little more depressed, almost lacking the sculpture of the upper surface of that species, and in having the umbilicus decidedly narrower and the notchings of the umbilical wall in the umbilicus much less pronounced.

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TWO NEW LEGUMES FROM MEXICO AND COSTA RICA.

BY C. V. PIPER.

In the course of a critical study of the genus Canavalia it was found necessary to examine also the related genera. The two following plants seem to be undescribed species.

Phaseolus chiapasanus, sp. nov.

Herbaceous, climbing, slender-stemmed, the whole plant turning black in drying; stems terete, sparsely pilose with rusty hairs; petioles terete, rusty pilose, longer than the leaflets; stipules oblong-quadrangular, striate, acuminate, glabrous above, pubescent beneath, 1 cm. long; stipels narrowly oblong-lanceolate, striate, curved, pubescent beneath, 3–4 mm. long; petiolules 5–6 mm. long, rusty pubescent; leaflets thin membranaceous, broadly ovate to orbicular, conspicuously acuminate with the tip apiculate, three-nerved from the rounded base, sparsely strigillose above, more so beneath especially on the nerves, 7–10 cm. long; flowers in loose slender bracteate racemes; bracts ovate-lanceolate, acuminate, glabrous above, rusty pubescent beneath, 4–5 mm. long, the lower ones entire, the upper divided to the base into 2 or 3 segments; pedicels slender, pubescent, 5–10 mm. long, each bearing a single bracteole at the base of the calyx; gland at base of pedicel expanded, 2-lobed; calyx campanulate, 8–9 mm. long, rusty pubescent with appressed coarse hairs, the lobes much shorter than the tube, the upper lip notched, shorter than the lower, the lobes obtuse, the lower lip 3-lobed, the lateral ones obtuse, the median longer and acute; corolla about 3 cm. long; standard orbicular, emarginate at apex, reniform at base, short-unguiculate, 2.5 cm. long, 2 cm. broad, rather firm in texture, a linear gland in the middle toward the base; wings as long as the body of the keel, unguiculate, the stalk and middle portion thickish, the terminal third thin and expanded, a short lobe near the middle; keel thickish, semicircularly curved, the narrow beak in two complete coils about 5 mm. broad; stamens diadelphous; ovary linear, rusty pubescent; style bearded on the under side toward the tip; stigma scarcely enlarged, lateral, covered with retrorse papillae.

Finca Mexiquito, Chiapas, Mexico, *C. A. Purpus* 6881, Sept., 1913 (type in the U. S. National Herbarium, sheet No. 567,182).

Calopogonium ferrugineum, n. sp.

Herbaceous?; whole plant more or less densely covered with short appressed ferruginous hairs; stems terete, densely hairy; petioles channelled above, shorter than the leaflets; stipules oblong, acutish and somewhat lacerate, pubescent on both sides, 3 mm. long; stipels narrowly lanceolate; petiolules densely pubescent, 3–4 mm. long; leaflets broadly ovate, the median as broad as long, entire or obscurely 2- or 3-lobed, 3-nerved from the rounded base, acuminate and apiculate, sparsely strigillose above more so on the nerves, densely appressed pubescent beneath, 7–8 cm. long; inflorescence a narrow erect panicle 20–30 cm. long on a stout peduncle nearly as long; branches of the panicle very short, thickened, each bearing 3–5 flowers; flowers deflexed, on slender pedicels about 5 mm. long; calyx campanulate, densely ferruginous, 6 mm. long, the upper lip shorter than the lower and with 2 short acutish teeth, the lower lip with 3 acute teeth, the median longest and nearly as long as the calyx tube; bracteole at base of calyx minute, oblong-lanceolate; corolla purple, 7–8 mm. long; standard orbicular, obliquely nerved, not notched at apex, auricle at base, the auricles inflexed, unguiculate, the claw one-fourth as long as the blade, a linear thickening on each side of a median depression at the base of the blade; wings as long as the keel, spatulate, obtuse, unguiculate, each with a horn-like reflexed auricle at base; keel curved, blunt, the petals slightly united, somewhat gibbous, unguiculate, each blade with a hood-shaped or rarely horn shaped sac at base; ovary linear, densely hairy; style sparsely hairy beneath, coiled once at tip; pods (immature) linear, compressed, recurved at tip, densely ferruginous, not constricted between the seeds, 9 cm. long, 1.5 cm. wide, the stout pedicel 1 cm. long.

Buissons a Las Vueltas, Tucurrique, Costa Rica, *A. Tonduz* 12889, Dec., 1898, sheet 577,657 in U. S. National Herbarium. Allied to *C. coeruleum* (Benth.) Desv. but readily distinguished by the form of the leaflets, the ferruginous appressed pubescence, the orbicular entire standard, and the much larger not constricted pods. The style in *C. coeruleum* is less hairy and straight.

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NEW TREES AND SHRUBS FROM YUCATAN.

BY S. F. BLAKE.

The descriptions of the following new species of woody plants from Yucatan, made by the writer several years ago, are published here in order that the names may be available for use in the work on "Trees and Shrubs of Mexico," by Mr. Paul C. Standley of the U. S. National Herbarium, now in course of publication.

Acacia dolichostachya Blake, sp. nov.

Shrub 5 meters high; stem unarmed, glabrous, the older branchlets weakly armed with tiny indurate stipules, the younger minutely appressed-puberulous; upper leaves (immature) bipinnate, 3 to 3.5 cm. long including petiole; stipules 0.7 to 1 mm. long, subulate, straight, at length indurated or deciduous; petiole 1.5 to 2.2 cm. long, sparsely puberulous, bearing below the middle a conspicuous oval or roundish gland 1 mm. long; rachis 1.3 to 1.5 cm. long, bearing an apical gland; pinnae 5 pairs, 2 to 2.5 cm. long, puberulous especially at the base of the leaflets; leaflets 24 to 29 pairs, linear-oblong, 3.5 mm. long, 0.5 mm. wide, or smaller, obtuse, truncate-rounded at base, inequilateral, ciliolate, otherwise glabrous; spikes cylindric, numerous, axillary, erect, 3 to 3.5 cm. long, about 6 mm. thick, the rachis strigillose; peduncle 3 mm. long; flowers rather loosely spicate, 3 mm. long (including the stamens); bracteoles curved, yellowish, 0.5 mm. long, persistent; calyx turbinate, broadly truncate at base, strigillose, 0.6 mm. long, 5-lobed for ⅓ its length, the lobes deltoid, obtusish; corolla (in dried specimen) pale yellowish, 1.5 mm. long, strigillose, 5-lobed nearly to the middle, the lobes ovate, acutish; stamens 30, with free filaments, surpassing the corolla, the anther cells elliptic; ovary short-stiped, glabrous, 11-ovulate; style curved.

Type in the herbarium of the Field Columbian Museum, No. 446,819, collected at Las Bocas, Silam, Yucatan, May, 1916, by G. F. Gaumer & Sons (No. 23,329).

This species belongs to the group *Nudiflorae* of the second subseries of the *Vulgares*, as treated by Bentham. Its nearest ally is *A. coulteri* Benth., from which it differs in the shorter spikes, smaller flowers with about half

the number of stamens of *A. coulteri*, and particularly in the persistence of the bracteoles on the rachis of the spikes after the fall of the flowers.

Acacia gaumeri Blake, sp. nov.

Tree 8 meters high; stem glabrous, below the stipules armed with firm, retrorse, broad-based, blackish prickles about 4 mm. long, as well as a few very small straight prickles; young branchlets spreading-pilosulous; leaves bipinnate, 4 to 4.5 cm. long including petiole; stipules subulate, deciduous, 1 mm. long; petiole 1.5 to 2 cm. long, canaliculate, subglabrous, bearing below the middle an oval gland 1 mm. long; rachis 2.5 cm. long, 3-canaliculate, pilosulous in the grooves, unarmed, sometimes with a single apical gland; pinnae 4 pairs, 4 to 5 cm. long, narrowly oblong in outline, the axes pilosulous; leaflets 9 to 16 pairs, oblong, 8 to 11 mm. long, 2.5 to 4 mm. wide, inequilateral, rounded or truncate-rounded at apex, at base truncate-rounded and oblique, beneath slightly paler, sparsely appressed-pubescent on both sides; spikes very numerous, fascicled, axillary and terminal, forming an ovoid naked panicle 9 to 16 cm. wide, the axes spreading-pilosulous; ultimate peduncles 8 to 15 mm. long, pilosulous, usually bearing two linear-lanceolate, alternate bracteoles about 1.3 mm. long; spikes rather dense, oblong-cylindric, 1 to 1.4 cm. long, 6.5 mm. in diameter (including the stamens), the bracteoles deciduous; calyx turbinate, rounded at base, 1.5 mm. long, spreading-pilosulous below the teeth, 5-lobed for $\frac{2}{5}$ its length, the lobes deltoid, acutish; corolla when dry pale yellowish, 2 mm. long, 5-lobed to middle, pubescent below the tip of the lobes with subappressed hairs, the lobes ovate, acutish, densely ciliate with subglandular hairs; stamens about 180, some free, some irregularly fasciculate-connate at base or to the middle, 2.8 mm. long; ovary with slender glabrous stipe, about 11-ovulate, rather densely long-pilose.

Type in the herbarium of the Field Columbian Museum, No. 446,825, collected three miles inland from Silam, Yucatan, May, 1916, by G. F. Gaumer & Sons (No. 23,332).

A member of the *Americanae Spiciflorae*, as the genus is arranged by Bentham.

Diospyros anisandra Blake, sp. nov.

Dioecious shrub, 3 meters high; stem glabrous; leaves alternate, crowded at the tips of the branches; petioles 1 to 2 mm. long, sparsely puberulous; blades obovate, 2.5 to 4.3 cm. long, 1.2 to 2.3 cm. wide, retuse at apex, cuneate at base, shining above, beneath slightly paler, glabrous except for a few hairs at base of blade on upper side, chartaceous-membranaceous, slightly veiny, the lateral veins 4 to 6 pairs; staminate flowers 1 or 2, axillary on the young branchlets, pendulous on pedicels 1 to 1.5 mm. long; calyx funnelform, 4 mm. long, glabrous outside, the 4 lobes lanceolate, 1.5 mm. long, acuminate, recurved, 3-nerved, within spreading-puberulous below the apex; corolla urceolate, "yellow," glabrous, 14 mm. long, the tube 7 mm. long, the 4 lobes lanceolate, 7 mm. long, spreading, acuminate; stamens glabrous, connate at extreme base, alternately longer and shorter, the longer 4 mm. long (filaments 2 mm., anthers 2 mm.), the anthers obliquely cordate

at base, acute at apex, the shorter stamens 2.7 mm. long (filaments 1 mm., anthers 1.7 mm.); pistillate flowers 1 or 2, axillary on the young branchlets, erect on glabrous pedicels 6 to 8 mm. long; calyx tube turbinate, 1.7 mm. long, glabrous outside, appressed-pubescent within, the 4 lobes ovate, acute or obtuse, spreading, at apex ciliate, at base within pilosulous, otherwise glabrous; bud subulate, very acute; corolla urceolate, glabrous, maroon color, the tube 4 mm. long, the 4 lanceolate acuminate lobes about 6.8 mm. long; pistil 4 mm. long; ovary 4-celled, with a pilose ring at base, the cells 1-ovuled; style 1 mm. long; stigma bifid, excavated.

Type in the herbarium of the Field Columbian Museum, No. 446,760, collected in the forests of Suitun, Yucatan, May, 1916, by G. F. Gaumer & Sons (No. 23,307). The pistillate plant (No. 23,308) was collected with the type.

A member of the Section *Danzleria*, not closely related to any described species.

Citharexylum trinerve Blake, sp. nov.

Shrub 1.5 meters high, the stem minutely hispidulous toward the apex, glabrate; leaves opposite, on ciliolate petioles 5 to 12 mm. long, the blades oval or elliptic, 3.2 to 5.2 cm. long, 1.7 to 3.2 cm. wide, obtuse or emarginulate, not mucronate, at base short-cuneate, entire, chartaceous-coriaceous, above glabrous, prominulous-reticulate, beneath equally green, strongly 3-nerved slightly above the base, prominulous-reticulate, barbellate in the axils of the two lateral veins, otherwise glabrous; spikes terminal, solitary or in threes, usually simple, densely flowered, about 2.5 cm. long, about 1.6 cm. wide, the peduncle densely puberulous, 8 to 12 mm. long; bracts triangular, acute, 1.2 mm. long; flowers subsessile; calyx subtubular, 4 mm. long, villous-tomentose at apex in the sinus, otherwise subglabrous, 5-sulcate, with 5 short obtusish deltoid teeth; petals united for $\frac{2}{3}$ their length, outside essentially glabrous, the tube 4 mm. long, short-pilose within above the base, the lobes 5, oblong, 5 to 5.5 mm. long, obtuse, inside densely barbate-villous; perfect stamens 4, reaching the apex of the tube, the fifth sterile; ovary glabrous.

Type in the herbarium of the Field Columbian Museum, No. 460,289, collected at Xnocac, Yucatan, December, 1916, by G. F. Gaumer & Sons (No. 23,502).

This species is very distinct in its small roundish strongly 3-nerved leaves.

Randia millspaughiana Blake, sp. nov.

Glabrous shrub 6 meters high, 1 dm. thick, the branches armed with stout spines 4 to 9 mm. long; leaves crowded at tips of branchlets, opposite; petioles 1 to 1.5 mm. long, glabrous; blades oval, 1.5 to 2.7 cm. long, 0.9 to 1.7 cm. wide, short-pointed at base and apex, mucronulate, glabrous or sparsely puberulous beneath along the costa, above deep green and somewhat shining, scarcely paler beneath, with 5 to 7 pairs of nerves; flowers solitary, sessile; calyx 5 to 6 mm. long, glabrous outside, the campanulate tube 4 mm. long (measured to apex of inner membrane), with a pilose ring

inside at base of throat, the 5 subulate teeth 3 mm. long from base; corolla salver-shaped, blackening on drying, the tube 13 to 15 mm. long, 2.5 mm. thick, slightly widened at apex, with a pilose ring inside between the base and the stamens, the 5 lobes lanceolate, acuminate, slightly oblique, 9 to 15 mm. long, 5 mm. wide; stamens 5, included, glabrous, the cells 5 mm. long; ovary 2-celled; style 10.5 mm. long; stigma slightly clavate, undivided, 4 mm. long.

Type in the herbarium of the Field Columbian Museum, No. 446,691, collected at Maxcanú, Yucatan, March, 1916, by G. F. Gaumer & Sons (No. 23,260). Additional specimens collected in May are numbered *Gaumer* 23,227.

This species is related to *Randia xalapensis* Mart. & Gal., but has a much larger calyx and corolla. In size of flower it is intermediate between *R. xalapensis* and *R. longiloba* Hemsl.

Notoptera leptocephala Blake, sp. nov.

Shrub 1.5 meters high; stem terete, striate, gray, tuberculate-hispid-pilose with incurved hairs and puberulous; leaves opposite; petioles densely tuberculate-hispid-pilose, 5 mm. long; blades ovate or elliptic-ovate, 5.5 to 8.5 cm. long, 2 to 3.5 cm. wide, acuminate, at base rounded or cuneate, mucronulate-denticulate (teeth 9 to 12 pairs), above very harshly tuberculate-hispidulous, beneath paler, rather softly and densely hispidulous-pilosulous and gland-dotted, reticulate-venose with about 10 pairs of lateral veins; uppermost leaves bracteiform, 1.8 to 3.8 cm. long; panicles terminating stem and branches, 8 cm. wide, 4 to 8 cm. long, convex; bracts 3 to 6 mm. long; peduncles 5 to 14 mm. long; pedicels 1 to 4 mm. long; heads discoid, about 26-flowered, when young subcylindric, 7.5 mm. high, 3.5 mm. thick, in age 9 to 10 mm. high, 6 to 6.5 mm. thick; involucre about 4-seriate, 3.5 to 4.5 mm. high, the phyllaries subcoriaceous, strigose, the outer ovate, obtuse, glabrate, the inner lanceolate, acute; corollas whitish, curved or reflexed, 4.5 mm. long (tube 2 mm. long, ampliate at base, teeth 1.2 mm. long); pales narrow, carinate and winged, obtuse, glabrous, erose-denticulate above; achenes ovate or oblanceolate, 3.5 to 4.5 mm. long (excluding wings), blackish, glabrous, narrowly winged on each side; pappus awns 2, the inner 2.2 mm. long, winged to apex, the wing spinose-ciliolate, the outer 1.5 mm. long, ciliolate, winged to the middle (the wing subglabrous), sometimes trifid at base.

Type in the herbarium of the Field Columbian Museum, No. 460,238, collected at Xnocac, Yucatan, December, 1916, by G. F. Gaumer & Sons (No. 23,473).

This species belongs to the Section *Loxosiphon*, and is readily distinguished from any other species of that group by its subcylindric heads. The sectional character[1] requires a slight modification to cover the ciliate wings of the achene in this species, a feature not previously known in this section. According to the collectors' note, *Notoptera leptocephala* is reported to be used medicinally.

[1] See Blake, Journ. Bot. 53: 225. 1915.

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NOTES ON THREE CLUPEOID FISHES COLLECTED BY EDMUND HELLER IN SAN FILIPE BAY, GULF OF CALIFORNIA.

BY CARL L. HUBBS.

Several specimens of clupeoid fishes (herrings and anchovies), collected by Edmund Heller in San Filipe Bay on the gulf coast of Lower California, are now deposited in the Field Museum of Natural History. These include the types of a new species of *Anchoviella*, named for the collector, and topotypes of a nominal species, which this added material shows to be a synonym of *Cetengraulis mysticetus*.

1. **Opisthonema libertate** Günther.

Three specimens, each with 20 anal rays.

2. **Anchoviella helleri,** new species.

Relationships.—*Anchoviella helleri* closely resembles *naso, starksi, cultrata* and *delicatissima*, differing from each in details of form and proportions, and in the number of fin-rays, gill-rakers, etc.

Holotype.—A specimen 78 mm. long to caudal base, taken by Edmund Heller (for whom the species is named), with two slightly smaller paratypes, in San Filipe Bay, Gulf of California; Cat. No. 3332, Field Museum of Natural History.

Description.—Body slender, the contours weakly arched; greatest depth, 4.9 (to 5.2) in length to caudal base; least depth of caudal peduncle, 2.8 (2.8 to 3.2) in length of head; belly rounded both before and behind pelvic fins, but scarcely carinate. Head slender and rather long, its length to end of opercle being contained 3.65 times in length to caudal; its greatest depth, below occiput, 1.8 (1.65 to 1.75) in its length. Snout long, abruptly produced beyond upper jaw and nostrils, rounded terminally; its length slightly less than diameter of eye, 5.5 (to 4.5) in head; length of eye, 4.5 (4.2 to 4.3). Maxillary long, tapering behind its subterminal dilation to its extreme rounded tip; nearly extended to gill opening. Teeth developed in both jaws, all directed vertically. Cheek an acute triangle, its base half the distance from its apex to middle of pupil; opercle oblique, oblong, about one-third as wide as deep. Gill-rakers dentate, bluntly pointed, comparatively short and widely spaced, the longest not quite so long as eye; their number, 18+18 (to 18+20).

Scales deciduous anteriorly; in 40 rows from gill opening to caudal base. Dorsal rays, excluding anterior rudiments, 13 (13 or 14); anal, 19 (19 or 20). Origin of dorsal midway between end of hypural and middle of snout (or front of orbit); height of dorsal 1.6 (to 1.7) in head, about one-fifth longer than base of fin. Height of anal about equal to length of dorsal base; base of anal as long as distance from middle of eye to insertion of pectoral fin. Pectorals 1.7 (to 1.8) in head, not reaching to pelvic fin; the latter a little longer than half the interspace between pelvic insertion and anal origin, or a little longer than distance from tip of snout to posterior border of pupil.

Lateral band brilliant and sharply distinct, bordered above with black, narrowed in both directions from the middle of its length; its greatest width equal to length of snout. Sides and lower surfaces of head, and iris, also bright silvery; upper surface of head punctulate, the occiput and nape blackish; vertebral streak consisting of irregular rows of dots before dorsal, and of two blackish streaks behind dorsal, becoming most conspicuous along the upper procurrent caudal rays; no conspicuous punctulations along base of anal fin; caudal dark-edged, the other fins pale.

3. **Cetengraulis mysticetus** Günther.

Stolephorus opercularis Jordan & Gilbert, Proc. U. S. Nat. Mus., 4, 1881 (1882), p. 275 (San Filipe Bay, Lower California; description); Jordan & Evermann, Bull. U. S. Nat. Mus., 47, pt. 1. 1896, p. 445 (after Jordan & Gilbert); Gilbert, Proc. U. S. Nat. Mus., 13, 1890, p. 449 (Panama record).

Anchovia opercularis Gilbert & Starks, Mem. Calif. Acad. Sci., 4, 1904, p. 42 (after Gilbert).

Three anchovies, topotypes of *Stolephorus opercularis*, described from injured specimens, were collected by Edmund Heller at San Filipe Bay, Lower California. Having the branchiostegal membranes broadly united, they are referable to the genus *Cetengraulis*, and to the species *mysticetus* of the Panama region.

These specimens from the Gulf of California confirm the differences which Gilbert & Starks (*l. c.*, p. 47) observed in comparing *mysticetus* with its Atlantic representative *edentulus*. The following figures are given for comparison with those published by Gilbert and Starks.

Measurements in hundredths of length without caudal.

Length to end of hypural, mm.	102	101	93
Head (to end of subopercle)	34	33.5	33.5
Depth of body	27	26.5	24.5
Diameter of orbit	7.5	7.5	7.5
Length of maxillary	20	20	19.5
Length of snout	4.5	4	4
Greatest length from preopercular ridge to gill opening	15	15	16
Number of dorsal rays	14	14	14
Number of anal rays	20	.....	20
Number of scales	43	43	40

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MUTANDA ORNITHOLOGICA.

X.

BY HARRY C. OBERHOLSER.

In the following paragraphs[1] attention is called to the preoccupied names of five species of birds. These belong to the families Turdidae, Pycnonotidae, and Ploceidae.

Family TURDIDAE.

Petrophila erythrogastra (Vigors).

The name *Petrophila erythrogastra*, long in use for a Himalayan thrush, is untenable, since its original combination, *Turdus erythrogaster* Vigors (Proc. Zool. Soc. Lond., 1831 [March 2, 1832] p. 171; Himalaya Mountains), is a homonym of the prior *Turdus erythrogaster* Boddaert (Tabl. Planch. Enlum. d'Hist. Nat., 1783, p. 22; Senegal), which latter is a synonym of *Spreo pulcher* (Müller). For *Petrophila erythrogastra* the *Petrocincla rufiventris* Jardine and Selby (Illustr. Ornith., 1835, pl. CXXIX; Himalayan District, India) will therefore come into use, and the name of this species now will become *Petrophila rufiventris* (Jardine and Selby).

Family PYCNONOTIDAE.

Iole philippensis (Gmelin).

The name *Iole philippensis* (Gmelin), at present in use for a Philippine bulbul, must be discarded, since its original combination, *Turdus philippensis* Gmelin (Syst. Nat., I, ii, 1789, p. 814; Philippine Islands), is invalidated by *Turdus philippensis* Müller (Vollständ. Natursyst. Suppl., 1776, p. 145; Philippine Islands), a synonym of *Petrophila cyanus solitaria* (Müller). Its only other name is *Philedon gularis* Pucheran (Arch. Mus. d'Hist. Nat., VII, 1854, p. 344, pl. XVIII; "China"), the type locality of which, originally and erroneously given as China, we hereby designate as Manila, Luzon Island, Philippine Islands. The species will, therefore, now stand as *Iole gularis* (Pucheran).

[1] For the nine previous articles in this series, *cf.* Proc. Biol. Soc. Wash., XXX, March 31, 1917, pp. 75–76; July 27, 1917, pp. 125–126; *ibid.*, XXXI, May 16, 1918, pp. 47–49; November 29, 1918, pp. 125–126; *ibid.*, XXXII, February 14, 1919, pp. 7–8; April 11, 1919, pp. 21–22; June 27, 1919, pp. 127–128; December 31, 1919, pp. 239–240; *ibid.*, XXXIII, December 30, 1920, pp. 83–84.

FAMILY PLOCEIDAE.

Erythrura tricolor (Vieillot).

The name *Erythrura tricolor* can no longer be employed for the species of weaver bird to which it has been applied, since its original combination, *Fringilla tricolor* Vieillot (Nouv. Dict. d'Hist. Nat., XII, 1817, p. 233; Timor), is debarred by *Fringilla tricolor* Linnaeus (Syst. Nat., ed. 12, I, 1766, p. 323; Surinam, Dutch Guiana), applied to some other and undetermined species. The proper name for the Timor bird seems to be *Erythrura forbesi* Sharpe (Cat. Birds Brit. Mus., XIII, 1890, p. 387; Loetoer, Timorlaut Island, East Indies), from Timorlaut Island, since the latter is, according to both E. Hartert (Novit. Zool., XI, 1904, p. 217) and C. E. Hellmayr (Zool. Timor, I, 1914, p. 62), inseparable from the bird from Timor.

Since the generic name *Erythrura* was originally spelled *Erythura* (Swainson, Nat. Hist. and Classif. Birds, II, 1837, p. 280), the species at present under consideration should now stand as *Erythura forbesi* (Sharpe).

Spermospiza guttata (Vieillot).

The *Loxia guttata* of Vieillot (Hist. Nat. Ois. Chant., 1805, p. 103, pl. LXVIII; Malimba, French Congo, West Africa), which is now known as *Spermospiza guttata*, must give way on account of *Loxia guttata* Shaw (Mus. Lever., II, No. 6, 1796, p. 47, upper fig. [2] of plate; Australia), which is now called *Stagonopleura guttata* (Shaw). The next available name for this weaver bird seems to be *Fringilla pustulata* Voigt (Cuv. Thierr., I, 1831, p. 581), which is a renaming of *Loxia guttata* Vieillot. This appears not to be preoccupied, because *Fringilla pustulata* Lichtenstein (Verz. Säug. und Vögeln Zool. Mus. K. Univ. Berlin, 1818, p. 24), which refers to a form of *Leucosticte* from the Kuril Islands, is a nomen nudum. The weaver bird, *Spermospiza guttata*, we must, therefore, hereafter call *Spermospiza pustulata* (Voigt).

Estrilda cinerea (Vieillot).

The name *Estrilda cinerea* must be changed, since its basis, *Fringilla cinerea* Vieillot (Nouv. Dict. d'Hist. Nat., XII, 1817, p. 176; Africa), is rendered untenable by *Fringilla cinerea* Gmelin (Syst. Nat., I, ii, 1789, p. 922; Unalaska, Alaska), which is now considered a synonym of *Melospiza melodia sanaka* McGregor. A name for *Estrilda cinerea* is to be found in *Fringilla troglodytes* Lichtenstein (Verz. Doubl., 1823, p. 26; Senegambia), and it should be known hereafter as *Estrilda troglodytes* (Lichtenstein).

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PROCEEDINGS

OF THE

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FIVE NEW GENERA OF BIRDS.

BY J. H. RILEY.[1]

In working upon a collection of birds from Celebes, I have found trouble in placing a number of species in currently accepted genera, as others have in the past. It seems to me that such species had better be removed and accordingly I propose the following genera for their reception:

Compsoenas, gen. nov.

Type, *Columba radiata* Quoy and Gaimard.

Similar to *Zonophaps* Salvadori (type, *Hemiphaga forsteni* Bonaparte), but the inner web of the three outer primaries widened about the middle, then sinuated to the tips, instead of having the two outer primaries scooped out about the middle; tail proportionally shorter, the feathers not so broad.

The two species will stand as: *Compsoenas radiata* (Quoy and Gaimard) and *Compsoenas mindorensis* (Whitehead).

Lamprura, gen. nov.

Type, *Columba rufigaster* Quoy and Gaimard.

Similar to *Zonophaps* Salvadori, but the inner web of the outer primary slightly tapering towards the tip with a small elongated nick near the end, instead of having the two outer primaries scooped out on the inner web near the middle; tail proportionally shorter, the under tail-coverts reaching more than half way to the tip of the tail, instead of not more than half way; coloration quite different, rump and tail purple, the tail band apical.

Remarks.—Whether the remaining species put in *Zonophaps* by Sharpe[2] are congeneric with the above, I am unable to say, as they are autopically unknown to me, but judging from descriptions alone, *Carpophaga finschi* Ramsay is not.

Meyer and Wiglesworth[3] have already called attention to the fact that *Zonophaps* Salvadori is a composite genus, the only species congeneric with

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

[2] Hand-list, I, 1899, 66.

[3] Birds Celebes, 2, 1898, 623, 625, 626.

the type (*Hemiphaga forsteni* Bonaparte) being *Carpophaga poliocephala* Gray. They indicated the sections into which the genus can be divided, but unfortunately provided no names for these sections, probably because following Salvadori they only recognized *Zonophaps* as a subgenus of *Carpophaga*.

Diopezus, gen. nov.

Type, *Phlegaenas tristigmata* Bonaparte.

Similar to *Gallicolumba* Heck (type *Columba luzonica* Scopoli), but the tarsus about a fifth longer than the middle toe with claw, instead of nearly equal; the breast spot of decomposed feathers more diffused and of a different texture; bill heavier, the covering of the nostril proportionally less swollen; type of coloration different.

Remarks.—Dr. Chas. W. Richmond[1] has shown that *Plegoenas* Reichenbach, 1851, is antedated by *Gallicolumba* Heck, 1849, both names having the same type. The group of pigeons placed by authors in *Plegoenas* (usually written *Phlogoenas*, but there are many variations) is a composite one and needs revision, but which I have neither the material or inclination to undertake at present. *Phlegaenas tristigmata* Bonaparte is so aberrant that it should be removed, however.

Cranobrontes, gen. nov.

Type, *Buceros leucocephalus* Vieillot.

Similar to *Cranorrhinus* Cabanis and Heine (type *Buceros cassidix* Temminck), but maxilla without a grooved plate at the base; casque smaller, not so arched, and corrugations more pronounced; the two outer primaries more attenuate at the tip.

The three species of the genus will stand as:
Cranobrontes leucocephalus (Vieillot).
Cranobrontes corrugatus (Temminck).
Cranobrontes waldeni (Sharpe).

Remarks.—Meyer and Wiglesworth[2] have suggested that *Cranorrhinus* be restricted to the Celebes species and as it is clear that the other three species usually placed in the same genus are not congeneric I have acted upon their suggestion.

Orodytes, gen. nov.

Type, *Arachnothera? celebensis* Meyer and Wiglesworth.

Similar to *Stigmatops* Gould (type, *Glyciphila ocularis* Gould) but the bare skin around the eye more extensive, extending above as well as below the orbit; the eyelid above and below surrounded by small feathers, these feathers meeting behind on the naked area; ear-coverts not composed of small specialized silky feathers; bill proportionally longer and heavier (culmen much longer than the tarsus instead of only slightly); tail rounded instead of truncate; body feathers coarser and harsher, not so blended and silky.

[1] Proc. U. S. Nat. Mus., 53, 1917, 591.
[2] Birds Celebes, I, 1898, 239.

The two forms will stand as:

Orodytes celebensis celebensis (Meyer and Wiglesworth), and
Orodytes celebensis meridionalis (Meyer and Wiglesworth).

Remarks:—Meyer and Wiglesworth place their *Arachnothera? celebensis* in *Melilestes* Salvadori (type, *Ptilotis megarhynchus* Gray) but say "the foot and tarsus is * * * smaller and more delicate in the Celebes form, the tarsus is indeed about ¼ the length of the wing and longer than the middle toe, while in *Melilestes megarhynchus* the tarsus is about $\frac{1}{10}$ longer and equal to the middle toe; the space of bare skin behind and above the eye is also peculiar to the Celebes form. Still it appears to us to stand as near (or nearer) to the typical *Melilestes* as does *M. iliolophus* and its allies, and it would be disadvantageous to bury its affinities under a new generic name."[1]

As the above shows *Melilestes celebensis* clearly did not belong in the genus *Melilestes*, Stresemann[2] removed and placed it in *Stigmatops* Gould, but in my opinion this was not a happy disposition and it seems to me the only solution of the difficulty is to erect a genus for its reception.

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[1] Birds Celebes, 2, 1898, 482.
[2] Nov. Zool., 21, 1914, 393.

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FOUR NEW BIRDS FROM CELEBES.

BY J. H. RILEY.[1]

This is the fourth paper[2] dealing with the birds collected in North and Middle Celebes by Mr. H. C. Raven.

For the loan of material used in working out two of the forms, I am indebted to the authorities of the American Museum of Natural History, New York, and to Mr. J. H. Fleming, Toronto, Ontario.

Scolopax celebensis, sp. nov.

Type, adult male, U. S. National Museum, No. 226,174, Rano Rano, Celebes, Dec. 22, 1917. Collected by H. C. Raven (orig. No. 4838).

Similar to *Scolopax saturata* but russet notches on primaries much larger and deeper in color; wing and culmen longer. Wing, 188; culmen, 86.5. mm.

Remarks.—Mr. Raven found this woodcock inhabiting bamboo thickets in the mountains at the type locality, where they only came out at night to feed. The only specimen he succeeded in recovering had been badly eaten by ants, as it had been shot the evening before, and made into a rough skeleton. The flight feathers had been left on the wing and some feathers around the base of the bill and the end of the tibia. The flight feathers alone show this to be a very distinct species of woodcock, quite different from *Scolopax saturata* and more like *rusticola*, having the russet notches on both webs of the primaries, but of a much deeper color; the wing-coverts are of a different pattern, the russet darker and confined to notches along the border not bars, the rest of the feather brownish-black, like the primaries.

Judging from the plate[3] and remarks, *Scolopax rusticola mira* Hartert approaches the Celebes species, but the latter has a much darker wing, and as the former is supposed to be a resident on the Island of Amami in the northern Riu Kiu group, it is not likely to occur in Celebes.

This genus has not been reported from Celebes before.

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

[2] Cf. Proc. Biol. Soc. Wash., 31, 1918, pp. 155–160; 32, 1919, pp. 93–96; 33, 1920, pp. 55–58.

[3] Nov. Zool. 24, 1917, 437, pl. 2.

Dendrobiastes hyperythra jugosae, subsp. nov.

Type, adult male, U. S. National Museum, No. 251,100, Goenoeng Lehio, Celebes, January 17, 1917. Collected by H. C. Raven (original No. 3412).

Similar to *Dendrobiastes hyperythra vulcani* Robinson[1] from Java but averaging lighter above; the belly with more white; wing longer. Wing, 62; tail, 43; culmen, 10 mm.

The female is more different than the male. The back is more brownish olive; the superciliary and lower parts more of a clay color, not light buff; edgings of the remiges darker than in the Javan form.

Remarks.—The above race is founded upon a good series from the mountains of north and north central Celebes. For comparison I have had a small series of topotypes of *D. h. vulcani*, two male paratypes of *D. h. annamensis*, and one male from Kina Balu, north Borneo. While the males of the Celebes and Java forms are quite similar, the females are quite different. The female of the Javan form has the pectoral band very pronounced with the throat much lighter, while in that from Celebes the throat is little lighter than the chest. The two males of *D. h. annamensis* are quite similar to same sex from Celebes but they appear to be larger and the brown edging on the remiges more pronounced. The single male from Kina Balu is lighter above and much lighter below than any specimen before me and probably represents a distinct form.

Myzomela chloroptera juga, subsp. nov.

Type, adult male, U. S. National Museum, No. 256,965, Indrulaman, south Celebes, October, 1895. Collected by Alfred Everett.

Similar to *Myzomela chloroptera chloroptera* but much grayer on the breast and belly; the back, wings and tail distinctly brownish; the red duller; size slightly smaller. Wing, 57; tail, 37; culmen, 15.5 mm.

Remarks.—In a large series fron north Celebes, the type locality of *Myzomela chloroptera* Walden, the breast and belly is rather strongly washed with sulphur yellow and the scapulars, wings, and tail are distinctly black. In a series of four males from South Celebes (three from the type locality and one from Bonthain Peak) the breast and belly almost lack the sulphur wash, making them more grayish; the scapulars, wings, and tail are distinctly brownish; and the reds are duller. The slight difference in size between the two series might disappear upon the measurement of a larger series but the color differences are very great upon comparison. Meyer and Wiglesworth[2] had noticed these differences but their series was very small.

A male from Saleyer Island has the red of the plumage much lighter than *Myzomela chloroptera juga;* otherwise it does not differ materially, but whether this difference is due to age or not it is impossible to say until a larger series has been examined.

[1]Journ. Fed. Malay States Mus., 7, 1918, 235.

[2]Bds. Celebes, II, 1898, 478.

Lamprocorax montosa, sp. nov.

Type, adult male, U. S. National Museum, No. 250,903, Rano Lindoe, Celebes, March 6, 1917. Collected by H. C. Raven (original No. 3721).

Similar to *Lamprocorax minor,* but feathers of the throat, jugulum, and sides of neck almost plain shining green, only a slight purplish sheen seen in certain lights; averaging slightly smaller. Wing, 99; tail, 59.5; culmen, 16; tarsus, 21; middle-toe, 17.5 mm.

Remarks.—The above species is founded upon eleven males, eight females, and three immatures, all taken at the type locality, March 4–16, 1917. For comparison I only have three females of *Lamprocorax minor* from Pendek and Tobea Islands, Buton Strait. There appears to be little difference in the sexes, the female only being smaller and duller than the males. The series of *Lamprocorax montosa* is quite uniform, the purplish sheen on the throat and jugulum being faint and only seen in a favorable light and absent or nearly so from the sides of the neck.

In *Lamprocorax minor* the purplish sheen is much more pronounced on the throat and jugulum and even extends to the side of the neck; it is also apparently larger. The type of *Lamprocorax todayensis* (a female) from Mt. Apo, Mindanao, resembles *Lamprocorax montosa* very much, but the feathers of the throat and jugulum are more lanceolate and the purple sheen is still fainter, almost lacking; the wings are duller. I attach no importance to the latter, as the series of *L. montosa,* shows that as the plumage fades the iridescent green of the wings disappears and they become brownish and the backs steely. *Lamprocorax todayensis* and *montosa* are both mountain forms derived from the same stock, probably *Lamprocorax minor,* but as the latter appears to be even a later immigrant from the south into Celebes, it is better to treat them all as species for the present until more is known of their distribution and relationship.

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PROCEEDINGS

OF THE

BIOLOGICAL SOCIETY OF WASHINGTON

ADDITIONAL FUNGOUS INSECTS AND THEIR HOSTS.

BY HARRY B. WEISS AND ERDMAN WEST.

Since the publication of our former list (Proc. Biol. Soc. Wash. vol. 33, pp. 1–20, 1920), the following records have accumulated. Our thanks are due to Mr. Chas. Dury for identifications in the *Cisidae*, to Mr. H. Notman for his help with the *Staphylinidae* and to Mr. C. W. Leng and Mr. C. A. Frost for miscellaneous determinations in the Coleoptera. Records not specifically credited were obtained by the writers. Of special interest is the record by Mr. W. A. Hoffman of *Plesiocis cribrum* from *Polyporus volvatus* at Albany, N. Y., this species having been previously described and recorded from California.

COLEOPTERA.

Family Carabidae.

Tachys flavicauda Say. South River, N. J., April 14, on *Polyporus versicolor*.

Family Silphidae.

Silpha americana Linn. New Brunswick, N. J., Aug. 8, feeding on decayed *Russula* sp. and *Lactarius* sp. (G. W. Martin).

Family Staphylinidae.

Gyrophaena flavicornis Melsh. Sherborn, Mass., on *Collybia platyphylla*, (C. A. Frost). Monmouth Jc., N. J., June 10, on *Tricholoma terrifera*.

Gyrophaena corruscula Er. Monmouth Jc., N. J., on *Pleurotus sapidus*.

Atheta frosti Brnk. Attleboro, Mass., on *Clavaria* sp., (C. A. Frost).

Atheta pennsylvanica Brnk. Attleboro, Mass., on *Clavaria* sp., (C. A. Frost).

Atheta polita Melsh. Attleboro, Mass., on *Amanita caesarea*, (C. A. Frost).

Atheta virginica Brnk. Nantick, Mass., on *Clytocybe maxima*, (C. A. Frost).

Omalium humerosum Fa. Springfield, N. J., February 14, in *Polyporus fumosus.*

Oxyporus 5-maculatus Lec. Monmouth Junction, N. J., feeding on *Hypholoma sublateritium.*

Family Scaphidiidae.

Scaphisoma reparida Csy. Blue Anchor, N. J., Sept. 1, on *Polyporus spraguei.*

Family Erotylidae.

Megalodacne fasciata Fab. Union, N. J., August 4, feeding on and breeding in *Fomes fraxineus.*

Tritoma thoracica Say. Whitesbog, N. J., August 28, on *Amanita rubescens,* (G. W. Martin).

Tritoma biguttata Say. Cedar Bridge, N. J., August 22, on *Amanita rubescens,* (G. W. Martin). New Brunswick, N. J., July 11, on *Amanita muscaria,* New Brunswick, N. J., Sept. 10, on *Polyporus lacteus,* (G. W. Martin).

Family Colyiidae.

Philothermus glabriculus Lec. Monmouth Jc., June 10, in slime mould.

Family Mycetophagidae.

Litargus balteatus Lec. New Brunswick, N. J., May 30, feeding on *Polyporus tsugae.*

Family Nitidulidae.

Stelidota geminata Sat. Monmouth Jc., N. J., May 30, on *Pleurotus cervinus,* Springfield, N. J., Sept. 12, in *Polyporus chioneus.* New Brunswick, N. J., August 1, on *Collybia radicata,* (G. W. Martin).

Phenolia grossa Fab. Monmouth Jc., N. J., May 5, in *Fomes igniarius.*

Cyllodes biplagiatus Lec. West Point, N. Y., in *Fomes rimosus,* (C. W. Leng); on *Pleurotus ostreatus,* Monmouth Jc., N. J., May 30.

Rhizophagus bipunctatus Say. Princeton Jc., N. J., April 24, in *Polyporus versicolor.*

Family Latridiidae.

Melanopthalma longipennis Lec. Middlesex County, N. J., May 6, in *Lenzites betulina.*

Family Trogositidae.

Peltis pippingskoeldi Mann. Alma, Calif., January, in *Fomes pinicola,* (Hartman).

Family Dascyllidae.

Eucinetus morio Lec. Monmouth Jc., N. J., June 7, in *Trichia* sp. (slime mould).

Family Cisidae.

Cis cylindricus Dury. Linn Co., Oregon, October 6, breeds in *Polyporus hirsutus*, (W. J. Chamberlin). San Franciso, Cal., in *Polyporus versicolor*, (received from Mr. Chas. Dury). Corvallis, Oregon, March, breeds in *Polyporus versicolor*, (Chamberlin).

Cis impressa Csy. Linn Co., Oregon, October 6, breeds in *Polyporus versicolor*, (W. J. Chamberlin). Corvallis, Oregon, March, in *P. versicolor* (Chamberlin).

Cis hystricula Csy. Alma, Calif., Jan. in *Polyporus versicolor*, (Hartman).

Cis vitula Mann. Alma, Calif., Jan., in *Polyporus versicolor*, (Hartman).

Cis serricollis Dury. Alma, Calif., Jan., in *Trametes sepium*, (Hartman).

Plesiocis cribrum Csy. Albany, N. Y., August 11, breeding in *Polyporus volvatus*, (W. A. Hoffman).

Dolichocis manitoba Dury. Alma, Calif., Jan., in *Fomes pinicola*, (Hartman).

Rhipandrus paradoxus Beauv. Springfield, N. J., October, in *Irpex lacteus*.

Family Scarabaeidae.

Onthophagus hecate Panz. New Brunswick, N. J., July, on *Russula alutacea*, (G. W. Martin).

Family Tenebrionidae.

Diaperis maculata Oliv. New Brunswick, N. J., August 8, (G. W. Martin), Blue Anchor, N. J., Sept. 1, on *Polyporus spraguei*.

Platydema ellipticum Fab. Union, N. J., August 4, on *Polyporus albellus*.

Nyctobates pennsylvanica DeGeer. Springfield, N. J., May 30, on *Polyporus gilvus*.

Eleates occidentalis Csy. Alma, Calif., Jan., in *Fomes pinicola*, (Hartman).

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FOOD HABITS OF SCELOPORUS GRACIOSUS GRACIOSUS (BAIRD AND GIRARD).

BY HERBERT J. PACK.

A few years ago the writer collected about seventy specimens of the common sagebrush swift, *Sceloporus graciosus graciosus* (Baird and Girard) for a study of its food habits. The stomach contents of these lizardsh ave been examined and the results are tabulated below. Most of the lizards were taken on the foothills northeast of Salt Lake City, while a few were secured in the western part of the city and ten miles to the north in Bountiful. All were taken in the month of August, except as noted in the following table. This is a numerical, not a percentage, table.

The examination of the stomach contents thoroughly substantiated the common belief that this lizard is insectivorous and beneficial. The chief item of food was found to be the red-legged locust, *Melanoplus femur-rubrum*. This was the smallest and most abundant grasshopper in the localities from which lizards were collected. It is surprising to note the great number of lizards, 69 per cent, that had eaten one or more of these locusts. The next insects in importance were ants. In quantity these are relatively unimportant in comparison with grasshoppers. Among the few beneficial insects eaten must be mentioned lady beetles which were taken to a limited extent by 11 per cent of the lizards. The occurrence within a stomach of vegetable matter or grains of sand was only occasional, and undoubtedly was taken in accidentally with food.

These brief observations remind one of the fact that in the scheme of nature this lizard occupies a place of no little importance.

STOMACH CONTENTS OF SCELOPORUS GRACIOSUS GRACIOSUS (B. AND G.).

Sex.	No.	Orthoptera.	Coleoptera.	Hymenoptera.	Miscellaneous Insects.	Spiders.	Unidentified Animal matter.	Vegetable matter.	Sand.	Notes.
♀	1						x			juvenile
♂	2				1 unid. larva					juvenile
♀	3	2 Melanoplus femur-rubrum	2 ground beetles			1				
♂	4			1 ant	2 (unid.)					juvenile
♀	5	1 "	1 (unid.)							
♀	6	1 "		1 bee		1				
♂	7	1 "								
♀	8	1 "			1 (unid.)					
♀	9		1 lady beetle						1 grain	
♂	10						x		1 grain	
♀	11	2 "		15 ants						
♂	12		1 (unid.)	4 ants						
♀	13	1 "					x			
♀	14	1 "							3 grains	
♂	15	1 "								
♂	16	1 "		1 ant			x		1 grain	
♂	17			1 bee, 3 ants						
♀	18	1 "		1 bee					1 grain	
♂	19	1 "								
?	20	1 "								
♂	21	1 "								
♂	22		3 lady beetles							
♀	23	1 "	2 (unid.)							

♂	24	1 Melanoplus femur-rubrum								
♀	25	1 "								
♀	26			1 bee, 1 ant	2 larvae (unid.)			x		
♂	27	1 "		2 ants	1 (unid.)				1 grain	
♂♀♀	28		2 flea beetles	1 ant						
♀	29				1 (unid.)					
♀	30	1 "								
♂♂♀	31			40 ants	1 Hemiptera					
♂♀	32		1 (unid.)	1 ant						
♂♂	33			2 ants			x			
♂♂♀	34	1 "		5 ants				x		
♀	35				4 (unid.) 32 aphids					juvenile
♀	36		1 lady beetle	1 bee, 6 ants	6 (unid.)					
♂♂	37			3 bees, 8 ants	2 (unid.)					
♂♂♀	38	2 "	1 snout beetle	3 ants						
♀	39	1 *Cammula pellucida*				1				
♀	40									Not killed until hours after collecting.
♂♂	41									"
♀♀	42									"
♀	43	1 Melanoplus femur-rubrum							1 grain	
♂	44	1 "			2 (unid.)					
♀	45	2 "								
♂♂	46	1 "	1 (unid.)	3 ants						
♂♂	47			3 ants	2 unid. larvae					juvenile
♂♂	48	2 "								
♂♂♂	49	2 "			1 (unid.)				1 grain	
♀	50	1 "			8 aphids				2 grains	
♂	51	2 "		1 ant			x			

Sex.	No.	Orthoptera.	Coleoptera.	Hymenoptera.	Miscellaneous Insects.	Spiders.	Unidentified Animal matter.	Vegetable matter.	Sand.	Notes.
♀	52	1 Melanoplus femur-rubrum	1 unid. larva 1 lady beetle	5 ants			x			
♂	53	2 "		15 ants						
♂♂♂	54	1 "	1 unid. larva	33 ants	1 aphid					
♂♂	55	2 "		1 bee, 17 ants	1 (unid.)					
♀♂♂	56							x		
♀	57	1 "		1 ant				x	3 grains	Contained 5 eggs, avg. size 13 x 7.5 mm. June 15.
♀	58	1 "	1 lady beetle		1 (unid.)			x		Contained 3 eggs, slightly smaller than above. June 15.
♀	59	3 "		1 bee, 1 ant	2 Hemiptera 1 Diptera					2 of the 3 M. f. r. were nymphs
♂	60	1 "								
♀♀♂	61	1 "			1 leaf hopper				2 grains	
♀♀♂	62	1 "	2 lady beetles		1 unid. larva					
♂♂	63	2 "							1 grain	
♀♂♂	64	3 "			1 Hemiptera					
♀	65	1 "	1(unid.) 1 lady beetle	8 ants	1 Hemiptera 2 leaf hoppers					
♀	66	1 "	2 lady beetles							
♀♀	67	1 "		1 ant						Head of foxtail 1 in. long in intestine
♂	68	1 "	1 ground beetle	5 ants						
♂	69	1 "		1 bee, 3 ants	1 (unid.)	1				
♀♀	70	3 "				1				1 of the 3 M. f. r. was nymph
♀	71	1 "								

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DESCRIPTIONS OF SIXTEEN NEW MURINE RODENTS FROM CELEBES.

BY GERRIT S. MILLER JR. AND N. HOLLISTER.

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Among the mammals which the generosity of Dr. W. L. Abbott enabled Mr. H. C. Raven to collect in Celebes for the United States National Museum we have found the following sixteen forms which appear to have been not previously described.

Echiothrix centrosa, sp. nov.

Type from Winatoe (between Koelawi and Gimpoe), Middle Celebes. No. 218,706, U. S. National Museum; skin and skull of adult ♂ (teeth moderately worn); collected January 9, 1917, by H. C. Raven; original number 3077.

Diagnosis.—Like *Echiothrix leucura* Gray, of North Celebes; but more grayish, less buffy, in color; with more cream-buff, less yellowish, underparts and inner surfaces of limbs. Ears smaller; teeth smaller, the length of entire upper tooth row about equal to that of first and second molars of *leucura*.

Measurements.—Type: Head and body, 215 mm.; tail, 265; hind foot, 53; ear from notch, dry, 29.4. Skull of type: Condylobasal length, 52.0; zygomatic breadth, 23.6; palatal length, 29.5; breadth of braincase, 19.6; interorbital breadth, 7.7; orbit to end of nasals, 25.2; mandible, 30.8; upper tooth row, 6.4; lower tooth row, 6.7.

Specimens examined.—Five, all from the interior of Middle Celebes; Besoa, 1; Gimpoe, 2; Toware, Bada, 1; Winatoe, 1, the type.

Remarks.—This form is like *Echiothrix leucura* of North Celebes in size and proportions of the skin and skull; except that it has smaller ears and smaller teeth. In color it is conspicuously different from a series of *leucura* from Temboan, North Celebes; the yellowish-buff tints of *leucura* are replaced by vinaceous-gray, especially noticeable on the flanks; and the belly is a whitish cream-buff rather than deep yellowish-buff.

Echiothrix brevicula, sp. nov.

Type from Pinedapa (about 5 miles inland from the Gulf of Tomini, near Mapane), Middle Celebes. No. 219,744, U. S. National Museum; skin and skull of adult ♂ (teeth much worn); collected January 29, 1918, by H. C. Raven; original number 3467.

Diagnosis.—Differs from *Echiothrix leucura* and *E. centrosa* in smaller size; smaller hind feet; much more vinaceous, less buffy or yellowish, coloration; darker underparts, buff or reddish-buff rather than yellowish or whitish; and smaller, less narrowed skull. Ears and teeth small, as in *centrosa.*

Measurements.—Type: Head and body, 198 mm.; tail, 240; hind foot, 48; ear from notch, dry, 28.1. Skull of type: Condylobasal length, 48.7; zygomatic breadth, 23.7; palatal length, 27.8; breadth of braincase, 19.0; interorbital breadth, 6.9; orbit to end of nasals, 23.1; mandible, 28.2; upper tooth row, 6.5; lower tooth row, 6.5.

Specimens examined.—Thirteen from the type locality.

Remarks.—This species is easily separated from *E. leucura* and *E. centrosa* by its small size, peculiar coloration, and the less narrowed skull. It has small ears and small teeth as in *E. centrosa.*

Rattus musschenbroekii tetricus, subsp. nov.

Type from Gimpoe (southwest from Lake Lindoe), Middle Celebes. No. 219,613, U. S. National Museum; skin and skull of adult ♂ (teeth moderately worn); collected August 27, 1917, by H. C. Raven; original number 3184.

Diagnosis.—Like *Rattus musschenbroekii musschenbroekii* Jentink from North Celebes (Menado); but larger, with longer tail and hind foot; general color of upperparts much more reddish, less buffy; skull larger, with more robust teeth.

Measurements.—Type: Head and body, 160 mm.; tail, 145; hind foot, 34. Skull of type: Condylobasal length, 35.0; zygomatic breadth, 16.7; breadth of braincase, 15.1; interorbital breadth, 5.9; mandible, 20.8; maxillary tooth row, 6.1; mandibular tooth row, 6.1.

Specimens examined.—Ten, all from Middle Celebes; Gimpoe, 1; Pinedapa, 7; Rano Lindoe, 1, Rano Rano, 1.

Remarks.—Two well marked forms of *Rattus musschenbroekii* are included in the collection. The typical form is represented by more than 70 specimens from localities in North Celebes. Compared with these, the small series of skins and skulls from Middle Celebes is conspicuously different, the specimens averaging larger and much more reddish, with larger, especially longer, skulls and with larger teeth.

Rattus raveni, sp. nov.

Type from Toli Toli, North Celebes. No. 199,976, U. S. National Museum; skin and skull of adult ♂ (teeth moderately worn); collected December 16, 1914, by H. C. Raven; original number 1963.

Diagnosis.—A large, light colored member of the *Rattus concolor* group. Upperparts grizzled ochraceous tawny; the longer, soft hairs tipped with buckthorn brown; the spiny hairs grayish buff, with blackish tips; hind foot creamy buff, sometimes with a faint line of dark extending down from ankle. Differs further from specimens of the *concolor* group from Sempang

River, Borneo (referred to *R. ephippium*[1]), in having a longer tail and wider skull; the brain case, especially, less narrowed.

Measurements.—Type: Head and body, 123 mm.; tail, 150; hind foot, 27. Average measurements of ten adult males from type locality: Head and body, 121.7; tail, 146.7; hind foot, 26. Skull of type: Condylobasal length, 29.0; zygomatic breadth, 14.4; palatal length, 16.5; breadth of braincase, 13.2; interorbital breadth, 4.9; mandible, 16.8; maxillary tooth row, 5.6; mandibular tooth row, 5.5.

Specimens examined.—Eighty-nine, including 79 from the type locality, and ten from the following localities in Middle Celebes: Besoa, 2; Gimpoe, 4; Pinedapa, 1; Toware, Bada, 2; Watoetaoe, Napoe, 1.

Remarks.—This is the species usually listed as *ephippium* in the literature of the mammals of Celebes. It clearly needs separation from both *Rattus ephippium* and *R. concolor*. Specimens from Middle Celebes seem inseparable from those from Toli Toli; but a well marked local form of the species, described below, occurs in northeastern Celebes.

Rattus raveni eurous, subsp. nov.

Type from Molengkapoti, Kwandang, North Celebes. No. 199,927, U.S. National Museum; skin and skull of adult ♂ (teeth moderately worn); collected October 15, 1914, by H. C. Raven; original number 1724.

Diagnosis.—Differs from *Rattus raveni raveni* in smaller size and darker coloration. Upperparts grizzled Sudan brown; the color decidedly reddish brown rather than ochraceous, buffy, or tawny as in true *raveni*. Tail and hind foot shorter.

Measurements.—Type: Head and body, 110 mm.; tail, 135; hind foot, 24. Average measurements of ten adult males from type locality: Head and body, 114.8; tail, 131.0; hind foot, 24.2. Skull of type: Condylobasal length, 28.3; zygomatic breadth, 13.9; palatal length, 15.2; breadth of braincase, 13.2; interorbital breadth, 4.6; mandible, 16.7; maxillary tooth row, 5.3; mandibular tooth row, 4.9.

Specimens examined.—Thirty-five, all from North Celebes: Koeala Prang, 1; Molengkapoti, 26; Pulo Paleleh, 1; Temboan, 5; Teteamoet, 2.

Remarks.—All specimens of *Rattus raveni* from localities between the Paleleh River and the eastern extremity of the northern peninsula are referable to the subspecies *eurous*. They are decidely smaller and more reddish in color than specimens from the western end of the northern peninsula, at Toli Toli, and from Middle Celebes. This form approaches in appearance *Rattus buruensis* (Allen) from Bouru Island, but is somewhat lighter colored, more reddish, than that species, and has a decidedly weaker skull, with smaller teeth.

Rattus palelae, sp. nov.

Type from Pulo Paleleh, north coast of Celebes. No. 200,063, U. S. National Museum; skin and skull of adult ♀ (teeth moderately worn); collected August 2, 1914, by H. C. Raven; original number 1619.

[1]Lyon, Proc. U. S. Nat. Mus., Vol. 40; p. 98, 1911.

Diagnosis.—A member of the *Rattus rattus* group differing from *Rattus hoffmanni* (Matschie), the common member of the group throughout northern Celebes, in paler coloration; longer tail; less angular, more rounded antorbital plate; and much smaller teeth.

Measurements.—Type: Head and body, 178 mm.; tail, 220; hind foot, 36. Skull of type: Condylobasal length, 40.6; zygomatic breadth, 19.2; palatal length, 23.3; mastoid breadth, 16.0; mandible, 23.7; maxillary tooth row, crowns, 6.2; mandibular tooth row, crowns, 6.1. (Average measurements of ten adults of *hoffmanni:* Tail, 195; maxillary tooth row, crowns 7.0.)

Specimens examined.—Seven; two from Pulo Paleleh; four from Toli Toli, and one from Molengkapoti, on the mainland of northern Celebes.

Remarks.—There is in the collection a very extensive series of specimens of *Rattus hoffmanni* from mainland localities on the northern peninsula of Celebes, from Menado west and south to Laboea Sore, just north of Parigi. The seven specimens of *Rattus palelae* are instantly separable from any specimen of *hoffmanni* by the much smaller, especially narrower, teeth. In addition to this diagnostic character, the specimens of *palelae* average distinctly lighter, less richly colored, and have longer tails. *Rattus hoffmanni* was not taken on Pulo Paleleh, but specimens with small teeth, and in no way distinguishable from the new species, were collected at two mainland localities on the northern coast where good series of *hoffmanni* were also obtained.

Rattus hoffmanni linduensis, subsp. nov.

Type from Tomado, Lake Lindoe, Middle Celebes. No. 218,700, U. S. National Museum; skin and skull of adult ♀ (teeth moderately worn); collected March 28, 1917, by H. C. Raven; original number 3141.

Diagnosis.—Like *Rattus hoffmanni hoffmanni* (Matschie) of northern Celebes, but averaging smaller and darker; with longer, softer pelage; and smaller skull.

Measurements.—Type: Head and body, 170 mm.; tail, 170; hind foot, 37. Skull of type: Condylobasal length, 38.9; palatal length, 21.9; zygomatic breadth, 20.5; mastoid breadth, 16.7; interorbital breadth, 5.8; mandible, 25.2; maxillary tooth row, crowns, 7.4; mandibular tooth row, crowns, 7.5.

Specimens examined.—Forty-nine, from the following localities in Middle Celebes: Bumbaroedjaba; Koelawi; Lehio; Pinedapa; Rano Rano; Tomado, Lake Lindoe.

Remarks.—All of these specimens of *Rattus hoffmanni* from the highlands of Middle Celebes are readily separable from specimens of the typical form from North Celebes by the long, soft, richly colored pelage. The underparts average darker also, more grayish buff; the skulls average distinctly smaller, but the teeth are large, as in the typical form. The specimens from Bumbaroedjaba are clearly referable to *linduensis* rather than to true *hoffmanni* which occurs near the coast, north of Toboli, at Laboea Sore.

Rattus hoffmanni subditivus, subsp. nov.

Type from Towaro, Bada, Middle Celebes. No. 219,691, U. S. National Museum; skin and skull of adult ♀ (teeth moderately worn); collected September 18, 1917, by H. C. Raven; original number 3270.

Diagnosis.—Larger and lighter colored than *Rattus hoffmanni hoffmanni* or *R. h. linduensis;* grayer, less rufous or rich dark brown; underparts lighter, with strong suffusion of pale yellowish rather than grayish drab. Skull larger than in *linduensis*, as large as in typical *hoffmanni.*

Measurements.—Type: Head and body, 195 mm; tail, 165; hind foot, 45. Skull of type: Condylobasal length, 44.9; palatal length, 26.0; zygomatic breadth, 20.9; mastoid breadth, 17.5; interorbital breadth, 7.4; mandible, 26.3; maxillary tooth row, crowns, 7.0; mandibular tooth row, crowns, 6.8.

Specimens examined.—Six, all from southern localities in Middle Celebes: Gimpoe, 3; Toware, Bada, 1; Watoetaoe, Napoe, 2.

Remarks.—South of the region in Middle Celebes occupied by the small skulled, rich colored, and long furred *R. h. linduensis*, is this form of *hoffmanni* with shorter, harsher pelage; more like the typical form but with much lighter, more grayish brown, coloration. It is a large animal, with large hind feet.

Rattus mollicomus, sp. nov.

Type from Goenoeng Kalabat; altitude 6,500 feet, northeastern Celebes. No. 217,752, U. S. National Museum; skin and skull of adult ♂ (teeth considerably worn); collected April 10, 1916, by H. C. Raven; Original number 2433.

Diagnosis.—A member of the *Rattus rattus* group related to *R. hoffmanni*, but with much longer, softer pelage; skull shorter and broader, with spreading zygomata; the antorbital plates less extended forward.

Measurements.—Type: Head and body, 187 mm.; tail, 195; hind foot, 40. Skull of type: Condylobasal length, 42.0; zygomatic breadth, 21.7; palatal length, 23.9; interorbital breadth, 6.0; mastoid breadth, 17.5; mandible, 26.7; maxillary tooth row, crowns, 8.0; mandibular tooth row, crowns, 7.8.

Specimens examined.—Twelve, all from 5,600 to 6,500 feet altitude on Goenoeng Kalabat.

Remarks.—This high mountain species is very different from *Rattus hoffmanni* of the surrounding lowlands. There is no reason to suspect intergradation with *hoffmanni;* and the long, soft pelage and short, broad skull make *R. mollicomus* an easily recognized form.

Rattus adspersus, sp. nov.

Type from Pinedapa, Middle Celebes. No. 219,602, U. S. National Museum; skin and skull of adult ♂ (teeth considerably worn); collected January 22, 1918, by H. C. Raven; original number 3427.

Diagnosis.—Related to *Rattus chrysocomus* (Hoffmann) of North Celebes, but general coloration darker; the characteristic agouti-like flecking more brownish, less yellowish; sides and underparts especially less yellowish. Tail shorter, almost unicolor, only very slightly lighter colored on underside near base, and without light colored tip. Skull smaller.

Measurements.—Type: Head and body, 163; tail, 147; hind foot, 38. Skull of type: Condylobasal length, 38.8; zygomatic breadth, 19.8; inter-

orbital breadth, 6.7; mastoid breadth, 16.8; mandible, 24.0; maxillary tooth row (alveoli), 7.7; mandibular tooth row (alveoli), 7.2.

Specimens examined.—Twenty-three from the type locality and 2 from Toware, Bada.

Remarks.—These specimens have been compared with about 150 skins and skulls of *Rattus chrysocomus* (including for the present *Mus fratrorum* Thomas) from numerous localities in North Celebes. The specimens of *chrysocomus* vary considerably in size but average larger than examples of the new form from Middle Celebes, with much more distinctly yellowish flecking. The northern species always has the terminal portion and the whole underside of the tail whitish. The color of the upperparts in some specimens of *adspersus* approaches very closely to that of the type specimen of *Rattus andrewsi* (Allen) from Pulo Boeton, off the coast of southeastern Celebes, which proves to be a member of the *chrysocomus* group.

Rattus nigellus, sp. nov.

Type from Bumbaroedjaba (near Toboli), northern Middle Celebes. No. 218,140, U. S. National Museum; skin and skull of adult ♂ (teeth moderately worn); collected November 8, 1916, by H. C. Raven; original number 2936.

Diagnosis.—A small, dark member of the *chrysocomus* group with long, soft pelage. Flanks as dark as back, median area of underparts cinnamon drab. Flecking of upperparts brown, not yellowish; wrist and heel blackish; toes whitish. Tail short, almost entirely blackish, with only a slight indication in a few specimens of light color on underside. Skull smaller than that of *Rattus adspersus.*

Measurements.—Type: Head and body, 160; tail, 131; hind foot, 34. Skull of type: Condylobasal length, 35.8; zygomatic breadth, 17.5; interorbital breadth, 6.3; mastoid breadth, 15.5; mandible, 21.6; maxillary tooth row (alveoli), 6.5; mandibular tooth row (alveoli), 6.6.

Specimens examined.—Twelve, all from northern Middle Celebes, on east side of neck of land connecting Middle Celebes with North Celebes: Bumbaroedjaba, 11; Laboea Sore, 1.

Remarks.—This small species is related to *R. adspersus* rather than to *R. chrysocomus* of North Celebes. It is easily distinguished from *adspersus* by its lesser external measurements; longer, softer pelage; and small skull.

Rattus penitus, sp. nov.

Type from Goenoeng Lehio (southwest from Lake Lindoe), Middle Celebes; above 6,000 feet altitude. No. 218,686, U. S. National Museum; skin and skull of adult ♂ (teeth moderately worn); collected January 21, 1917, by H. C. Raven; original number 3109.

Diagnosis.—A mountain member of the *chrysocomus* group with long, soft, cinnamon-flecked fur; sides dark like upperparts; belly grayish buff; feet scantily haired with grayish or whitish, toes whiter. Entire underside and terminal third of tail above, whitish. Skull with extraordinarily enlarged rostrum, which is thickened throughout, and only very slightly

tapering toward end; antorbital plate weak and sloping, without squarish angle.

Measurements.—Type: Head and body, 172; tail, 190; hind foot, 41. Skull of type: Condylobasal length, 40.2; palatal length, 22.5; zygomatic breadth, 18.9; mastoid breadth, 15.8; interorbital breadth, 6.8; nasals, 18.1 x 5.8; width of rostrum in front of antorbital plate, 8.1; mandible, 24.0; maxillary tooth row (alveoli), 7.8; mandibular tooth row (alveoli), 8.0.

Specimens examined.—Five from the type locality, all collected above 6,000 feet.

Remarks.—This large-snouted member of the *chrysocomus* group is very different from all the related forms, with the exception of the species described next below, also a highland form, which it resembles in many features.

Rattus sericatus, sp. nov.

Type from Rano Rano (east of Lake Lindoe and north of Lake Poso), Middle Celebes; about 6,000 feet altitude. No. 219,627, U. S. National Museum; skin and skull of adult male (teeth considerably worn); collected December 19, 1917, by H. C. Raven; original number 3340.

Diagnosis.—Like *Rattus penitus*, but darker, and with still longer, softer pelage; feet more fully clothed with whitish hairs, sharply contrasted with dark brown of ankle. Skull with rostrum enlarged, but less thickened at end, more tapering, than in *penitus*.

Measurements.—Type: Head and body, 175; tail, 170; hind foot, 40. Skull of type; Condylobasal length, 41.4; palatal length, 23.7; zygomatic breadth, 19.5; mastoid breadth, 17.4; interorbital breadth, 6.9; nasals, 18.7 x 5.3; width of rostrum in front of antorbital plate, 8.5; mandible, 24.5; maxillary tooth row (alveoli), 8.1; mandibular tooth row (alveoli), 7.8.

Specimens examined.—Five from the type locality.

Remarks.—This species, while obviously related to *Rattus penitus*, is readily distinguished by its much longer, softer pelage and the less thickened rostrum. Both species are large, high mountain forms of the *chrysocomus* group, with white-tipped tails.

Rattus rallus, sp. nov.

Type from Gimpoe, Middle Celebes. No. 219,595, U. S. National Museum; skin and skull of adult ♀ (teeth considerably worn); collected September 7, 1917, by H. C. Raven; original number, 3233.

Diagnosis.—A member of the *chrysocomus* group resembling *Rattus nigellus*, but smaller, with shorter hind foot, and much smaller teeth. Tail dark above, light below. Skull with flatter, less arched braincase, longer rostrum, and smaller auditory bullæ.

Measurements.—Type: Head and body, 145; tail, 130; hind foot, 32. Skull of type: Condylobasal length, 35.8; zygomatic breadth, 18.3; mastoid breadth, 15.3; interorbital breadth, 6.3; mandible, 20.3; maxillary tooth row (alveoli), 6.3; mandibular tooth row (alveoli), 6.4.

Specimens examined.—Eight, all from Middle Celebes: Gimpoe, 2; Goenoeng Lehio, 2; Lake Lindoe, 4.

Remarks.—This species differs conspicuously from the other member of the *chrysocomus* group inhabiting the same district (*Rattus penitus*), and externally resembles very closely *Rattus nigellus* from northern Middle Celebes. From *R. nigellus* it is chiefly distinguished by the smaller foot, more sharply bicolored tail; more slender skull with less inflated braincase; and smaller teeth. Two specimens out of the eight examined have the tip of the tail for 12 mm. whitish.

Rattus hellwaldii localis, subsp. nov.

Type from Laboea Sore (north of Parigi), Celebes. No. 218,120, U. S. National Museum; skin and skull of adult ♂ (teeth moderately worn); collected December 1, 1916, by H. C. Raven; original number 2987.

Diagnosis.—Like typical *Rattus hellwaldii* (Jentink) of Menado, North Celebes, but much lighter, less richly colored; pelage shorter and harsher, mixed on back with a few spinous hairs. Skull as in true *hellwaldii* but with larger auditory bullæ.

Measurements.—Type: Head and body, 174; tail, 186; hind foot, 43. Skull of type: Condylobasal length, 41.2; zygomatic breadth, 19.6; interorbital breadth, 7.2; mastoid breadth, 16.5; mandible, 23.5; maxillary tooth row (alveoli), 7.0; mandibular tooth row (alveoli), 7.4.

Specimens examined.—Twelve from the type locality and one from Parigi.

Remarks.—In a series of more than 60 specimens of typical *Rattus hellwaldii* from extreme northeastern Celebes, all of the skins are intensely colored. The specimens in the series from Laboea Sore differ conspicuously in their dull, paler coloration. No spiny hairs are apparent in any specimens of typical *hellwaldii*, but they are present in small proportion in all examples of the new race. A large series of specimens of this group from the interior of Middle Celebes seems inseparable from the typical form from Menado. In many individuals from this region the auditory bullae are abnormally swollen, a condition accompanied by the presence of a nematode parasite within the bullae. Such distortion is not present in skulls from other parts of Celebes, nor do we recall its occurrence in any other rats.

Rattus hellwaldii cereus, subsp. nov.

Type from Toli Toli, northwestern Celebes. No. 200,232, U. S. National Museum; skin and skull of adult ♂ (teeth moderately worn); collected November 30, 1914, by H. C. Raven; original number 1846.

Diagnosis.—Like *Rattus hellwaldii hellwaldii*, but larger, with longer hind foot; and less richly colored. Skull larger, with larger auditory bullæ.

Measurements.—Type: Head and body, 200; tail, 181; hind foot, 46. Skull of type: Condylobasal length, 43.2; zygomatic breadth, 20.6; inter-

orbital breadth, 6.8; mastoid breadth, 17.0; mandible, 25.2; maxillary tooth row (alveoli), 7.3; mandibular tooth row (alveoli), 7.2.

Specimens examined.—Thirteen from the type locality.

Remarks.—This large, well-marked subspecies of *hellwaldii* evidently intergrades with the typical form along the northern coast of Celebes. Specimens from Palelch River and Molengkapota are intermediate between the two forms. The Toli Toli form is almost exactly intermediate in coloration between true *hellwaldii* and *localis*, but it averages considerably larger than either of these forms, and has a larger skull.

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PROCEEDINGS

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GENERAL NOTES.

THE NAMES FOR TWO GENERA OF AFRICAN ARTIODACTYLA.

The generic name *Koiropotamus* Gray, 1843 (List Spec. Mamm. Brit. Mus., p. xxvii), is usually cited as a *nomen nudum*, but proves on examination to be a valid name. Although printed in one place in the body of the text as "*Choiropotamus*," it appears in the "Systematic List" in the front of the book and in the index as *Koiropotamus* only, and was evidently taken direct from the specific name *koïropotamus* of Desmoulins. *As Choiropotamus*, in the body of the text (p. 185), it has been accepted as a valid name, but has been considered as preoccupied by *Chaeropotamus*, "Cuvier, 1821," which name in reality first dates as a technical name for a fossil pig, not from Cuvier, but from Desmarest, 1822 (Mammalogie, vol. 2, suppl., p. 544). In 1854, when he proposed the substitute name *Potamochœrus*, Gray cited in synonymy from his 1843 work the name *Koiropotamus* only, and took *Choiropotamus* Gray from the Annals and Magazine of Natural History for October, 1852. It seems clear that *Choiropotamus* Gray, 1843, is a lapsus for *Koiropotamus* in the same work; that no error of transcription, *lapsus calami*, nor typographical error is evident in the case of *Koiropotamus*, since it was taken direct from the specific name *koïropotamus* of Desmoulins; and that the generic name *Koiropotamus* Gray is not invalidated by the earlier *Chaeropotamus* of Desmarest. The bush pigs would rightly be known, then, by the generic name *Koiropotamus* Gray (type *Sus africanus* Schreber, not Gmelin, = *Sus koiropotamus* Desmoulins).

Another genus of African ungulates that through error lost the name first proposed for it is that currently known as *Bubalis*. It was first named *Alcelaphus* by Blainville in 1816 (Bull. Soc. Philom., p. 75), type *A. buselaphus*. Later names, all with the same type species, are *Bubalis* Goldfuss, 1820 (Handb. Zool., vol. 2, p. 367); *Damalis* Hamilton Smith, 1827 (Griffith's Cuvier, vol. 4, p. 343); *Acronotus* Hamilton Smith, 1827 (l. c., p. 346); and *Bubalus* Ogilby, 1837 (Proc. Zool. Soc. London, 1836, p. 139; not of Smith, 1827). The name recently used for the genus, "*Bubalis* Lichtenstein, 1814," is not a valid generic name (see Lyon, Proc. Biol. Soc. Washington, vol. 27, p. 228, 1914). With the suppression of *Bubalis* Lichtenstein, it follows that the generic name for the hartebeests, instead of becoming *Bubalis* Goldfuss, should revert to the time honored *Alcelaphus* of Blainville, so long in use before it was erroneously supplanted by *Bubalis*.

—*N. Hollister.*

LOPHOTRICCUS VERSUS COMETORNIS.

In the Bulletin of the Museum of Comparative Zoölogy, Vol. LXIV, No. 4, 1921, p. 372, we stated that the earliest designation of the type of Lophotriccus was that of *Lophotriccus spicifer* (Lafresnaye), by Sclater in 1888, and accordingly we substituted Lophotriccus for Colopteryx, creating the genus Cometornis for *Todirostrum squamaecrista* Lafresnaye. Dr. Charles W. Richmond has just called our attention to a much earlier type fixation by Sharpe (Zoological Record, Vol. XX, 1884, Aves, p. 34) who designated *Lophotriccus squamicristatus* (Lafr.) [=*Lophotriccus squamaecrista* (Lafr.)]. Unfortunately we had overlooked this type designation which, no doubt, is the earliest.

Our Cometornis is thus a pure synonym of *Lophotriccus*, and *Cometornis vitiosus* Bangs and Penard becomes *Lophotriccus vitiosus* (Bangs and Penard). Also, the bird formerly known as *Colopteryx galeatus* (Boddaert), for which we had substituted *Lophotriccus galeatus*, should continue to be known as *Colopteryx galeatus* (Bodd.).

—*Outram Bangs and Thomas E. Penard.*

A NEW NAME FOR PACHYRAMPHUS POLYCHOPTERUS COSTARICENSIS CHUBB.

In our review of the forms of *Pachyramphus polychopterus* (Bull. M. C. Z., 1921, 64, p. 391) we used the name *Pachyramphus polychopterus costaricensis* Chubb for the form inhabiting Panama and western Costa Rica. This name however, is preoccupied by *Pachyramphus versicolor costaricensis* Bangs (Proc. N. E. Z. Club, 1908, 4, p. 26).

It was our intention to make this correction before the publication of our paper, but we neglected to do so. We therefore now propose **Pachyramphus polychopterus tantulus**, nom. nov., for the form of Panama and western Costa Rica to replace *Pachyramphus polychopterus costaricensis* Chubb preoccupied.

—*Outram Bangs and Thomas E. Penard.*

TEXTOR TEMMINCK VERSUS ALECTO LESSON.

The generic name *Textor* Temminck is usually cited from this author's "Nouveau Recueil Planches Coloriées," III, livraison 75, January 5, 1828, wrapper, and texte p. [1] to pl. 446, and its type commonly considered by monotypy to be *Textor alecto* Temminck, sp. nov., which equals *Coccothraustes albirostris* Vieillot. Temminck had, however, previously used (Nouv. Rec. Planch. Col., II, livr. 54, February 12, 1825, p. [2] to texte of genus *Oriolus* Linn. [in text]) this generic name for *Oriolus textor* Gmelin (=*Oriolus cucullatus* Müller=*Hyphantornis cucullatus* Auct.) in the following manner: "*Oriolus textor*, Ib. sp. 22 [Latham, Index Ornith., I, 1790, p. 180], est du genre Tisserin (Textor)." As *Oriolus cucullatus* Müller is the only species mentioned in this connection, it is thereby made the type by monotypy of the generic designation *Textor*, which must therefore be transferred to the group now called *Hyphantornis*.

The earliest usable name for the genus heretofore known as *Textor* is *Alecto* Lesson (Traité d'Ornith., about March 1, 1831, p. 433), type by monotypy, *Textor alecto* Temminck = *Coccothraustes albirostris* Vieillot. The forms now referable to this group appear to be as follows:

Alecto albirostris albirostris (Vieillot).
Alecto albirostris nyansae (Neumann).
Alecto albirostris intermedius (Reichenow).
Alecto albirostris senegalensis (Shelley).
Alecto niger (Smith).

The change of generic name from *Textor* to *Alecto*, as above indicated, necessitates the change of the family name Textoridae to Alectuidae.

—*Harry C. Oberholser.*

HYPHANTORNIS GRAY BECOMES TEXTOR TEMMINCK.

As we have already shown (Proc. Biol. Soc. Washington, XXXIV, 1921, p. 78), the original use of the generic name *Textor* Temminck (Nouv. Rec. Planch. Col., II, livr. 54, Feb. 12, 1825, p. [2] to texte of genus *Oriolus* Linn. [in text]) makes *Oriolus cucullatus* Müller its type by monotypy, and it is, therefore, applicable, as the earliest generic name, to the group heretofore known as *Hyphantornis* Gray. If this group be recognized as generically distinct from the genus *Ploceus*, the species composing it should bear the name *Textor;* if considered but subgenerically distinct the name will nevertheless supplant *Hyphantornis* as the subgeneric designation. The forms apparently now referable to this group are as follows:

Textor nigriceps (Layard).
Textor collaris (Vieillot).
Textor cucullatus cucullatus (Müller).
Textor cucullatus bohndorffi (Reichenow).
Textor cucullatus femininus (Grant).
Textor cucullatus abyssinicus (Gmelin).
Textor spilonotus (Vigors).
Textor spekii (Heuglin).

—*Harry C. Oberholser.*

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PROCEEDINGS
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THE JULIDAE AND ISOBATIDAE IN NORTH AMERICA.

BY RALPH V. CHAMBERLIN.

In contrast with the great abundance and variety of members of the diplopod families Julidae and Isobatidae in Europe, comparatively few forms of these families, as now restricted, have been recorded from North America, where they are almost wholly replaced by the Parajulidae. Having recently noted several European juloid species both in material taken at quarantine on plants arriving from Europe and in collections of established forms, I was led to suspect that we might not have any truly endemic species of Julidae or Isobatidae and to review the available American material in comparison with the corresponding portion of the European fauna. As a result I find all our species of these families thus far known to be in reality common European forms which are still often brought across the water with imported plants and other cargoes. Probably all were thus artificially introduced, most of them at early dates. They occur only in well-settled parts of the country and are as yet rare in the Middle and Far Western States.

The six valid species which I find to be established in this country together with their synonymy and known distribution here are indicated below.

JULIDAE.

Genus **Diploiulus** Berlese.

This is the Cylindroiulus of Verhoeff. Irrespective of varying definitions, Diploiulus must be applied to whatever generic group is made to include its type species, *Julus boleti* C. Koch (=*J. rufifrons* C. Koch). As this species is uniformly regarded as conforming to Cylindroiulus, this name must give way to Diploiulus.

Diploiulus londinensis (Leach).

1814. *Julus londinensis* Leach, Trans. Linn. Soc. London, XI, p. 378.
1864. *Julus caeruleo-cinctus* Wood, Proc. Acad. Sci. Phil., p. 14.
—— *Julus hortensis* Wood, ibid.

This is our most commonly observed member of the family. It is abundant throughout New England and adjoining parts of Canada and over New York State. It occurs westward as far as Indiana and Illinois and southward through Pennsylvania and New Jersey to the District of Columbia, though in these directions becoming less frequent. Particularly during periods of drought, it appears sometimes to attack gourds, potatoes, lettuce and other vegetables and plants, accusations of such action having come not infrequently from different parts of New York State. In England it is said at times to attack the roots of lucerne; and in Germany occasionally to damage the potato crop.

Diploiulus luscus (Meinert).

1868. *Julus luscus* Meinert, Naturh. Tidsskr., 3 R., V, p. 9.
1887. *Julus owenii* Bollman, Entom. Amer., II, p. 228.
1891. *Julus frisius* Verhoeff, Berl. Ent. Zeits., XXXVI, Hft. 1, p. 133, pl. 6, figs. 17–21.
1914. *Julus hesperus* Chamberlin, Canad. Ent., p. 314.

This is a small form ranging mostly from 10 mm. to 15 mm. in length. It is found throughout the range indicated for *D. londinensis* above and occurs as well in the Far West, the writer having taken it at Salt Lake City in Utah and at Santa Barbara and Los Angeles in California. He has also seen specimens from other localities in the latter State sent him for identification. There seems little doubt that this is the true *luscus* of Meinert; but if *luscus* is held to be indeterminable with certainty, then *owenii* must take precedence over *frisius*. Comparison of American specimens with some from Holland shows complete agreement in the gonopods of the male.

Genus **Brachyiulus** Berlese.

Byachyiulus pusillus (Leach).

1814. *Julus pusillus* Leach, Trans. Linn. Soc. London, XI, p. 379.
1841. *Julus exiguus* Brandt, Recueil, p. 85.
1864. *Julus virgatus* Wood, Proc. Acad. Sci. Phil., p. 14.
1875. *Julus stuxbergii* Fanzago, Atti d. Soc. Veneto-Trent., IV, p. 150.

This well-known species is widely distributed in this country, where it has hitherto been listed under Wood's name. It is common in New England and southward to North Carolina; and I have recently received specimens taken at Jackson, Miss. Westward it has been found in Ohio, Indiana and Illinois, and in California (e. g. at Stanford). This species is sometimes placed by European workers in a subgenus Microbrachyiulus; but as it is the type of Brachyiulus any genus or subgenus in which it is included must bear this name.

GENUS **Ophiulus** BERLESE.

Ophiulus longabo (C. Koch).

1847. *Julus longabo* C. Koch, Syst. d. Myr., p. 113.
1863. *Julus serpentinus* C. Koch, Die Myriap., II, p. 106, fig. 228.
—— *Julus ferreus* C. Koch, ibid., p. 107, fig. 229.
1864. *Julus canaliculatus* Wood, Proc. Acad. Sci. Phil., p. 12.
—— *Julus laqueatus* Wood, ibid., p. 13.
1868. *Julus fallax* Meinert, Naturh. Tidsskr., 3R., V, p. 15.

In recent years the name *fallax* of Meinert has been most used for this species. As there seems no longer reasonable doubt as to the identity of this species with Koch's *longabo*, the latter name is here adopted. As indicated above, Wood's names *canaliculatus* and *laqueatus* also have precedence over *fallax*. In this country the species is best established in Pennsylvania, particularly about Philadelphia, where I have found it in abundance. It was also apparently common there in Wood's day. It is frequent in New Jersey and in Delaware and the District of Columbia. I have never taken it in New England, although it probably will be found there since it occurs in Canada, being not infrequent about Quebec.

ISOBATIDAE.

The use of Protoiulidae for this family is inadmissible both because it is antedated by the names Isobatidae and Blaniulidae and also because it is not based upon an included genus.

GENUS **Blaniulus** GERVAIS.

Blaniulus guttulatus (Bosc).

1792. *Julus guttulatus* Bosc. Bull. d. l. Soc. philom. de Paris, p. 12.
1818. *Julus fragariarum* Lamarck, Hist. nat. d. anim. s. vert., V.
1837. *Blaniulus guttulatus* Gervais, Ann. d. Sci. Nat., ser. 2, VII, p. 45.

The use of Typhloblaniulus or Trichoblaniulus as generic or subgeneric names over this species is inadmissible since it is the type of Blaniulus. I have seen numerous specimens of this species collected about Quebec City, Canada, by Mr. Frits Johansen, and a few taken in Massachusetts, one of them many years ago by Dr. Hagen. It has doubtless been often overlooked because of its small size and obscure habits. In Europe it is said sometimes to be a pest in potato crops and also to injure beans, beets, cucumbers and gourds.

GENUS **Nopoiulus** MENGE.

Nopoiulus pulchellus (Leach).

1814. *Julus pulchellus* Leach, Trans. Linn. Soc. London, XI, p. 379.
1841. *Julus minutus*[1] Brandt, Recueil, p. 89.
1821. *Julus pusillus* Say (nom. preocc. Leach, 1814) Journ. Acad. Sci. Phil., p. 105.

[1]This name preoccupies the *Julus minutus* of Porat (1889). The latter may be replaced by **Julus cibdellus**, nom. nov.

1851. *Nopoiulus punctulatus* Menge, Neueste Schr. d. naturf. Ges. Danzig, IV, p. 4 Hft., p. 7.
1868. *Blaniulus venustus* Meinert, Naturh. Tidsskr., 3 R., V, p. 20.
1887. *Julus lineatus* McNeill, Proc. U. S. N. M., X, p. 324.
1888. *Nemasoma minutum* Bollman, Proc. U. S. N. M., XI, p. 339; and in subsequent writings.

In Europe this species has been most commonly known under Meinert's name, *Blaniulus venustus*. It is widespread in the United States, particularly in the region east of the Mississippi River. It is a common form nearly everywhere in New England, New York, Ohio, Indiana, Illinois, Tennessee, Pennsylvania, New Jersey, Delaware, etc.; but I have never seen it from any of the Pacific States. It is often found under the bark of decaying trees.

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PROCEEDINGS

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DIPTERA AND FUNGI.

BY HARRY B. WEISS.

The object of this paper is to call attention to certain Dipterous families which are more or less closely associated with fungi, particularly the fleshy fungi belonging to the families *Agaricaceae* and *Polyporaceae*. A survey of the general literature dealing with the food habits of dipterous larvae indicates that there are several families whose members in part inhabit fungi. These are shown in the following table in which other larval habits are indicated also. In the *Mycetophilidae* and *Platypezidae*, the fungus habit appears to be most pronounced. In the other families, only a comparatively few species have been found associated with fungi. The families mentioned in the table apparently contain most of the species having the fungus habit although some species of other families may also live in fungi.

Family	General Larval Habits
Tipulidae	In fungi, in earth, decomposing wood, in water.
Mycetophilidae	In fungi, in decaying matter, vegetable mould, under dead bark, etc.
Itonididae	Habits diverse, in fungi, in or on plant tissue usually forming galls, in decaying wood, predaceous.
Phoridae	In fungi, habits diverse, in decaying plant matter, in ants' nests, on decaying insects, in nests of burrowing bees, etc.
Platypezidae	Larvae live between lamellae of Agaric fungi.
Syrphidae	In fungi, in stems of plants, in decaying wood, in animal remains, in ants' nests, feeding on aphids.
Borboridae	In fungi, in algae, diseased potatoes, dung.
Helomyzidae	In fungi, in decaying animal and vegetable substances, in bat and rabbit dung, etc.

Johannsen in his "Fungus Gnats of North America"[1] has considerable to say concerning the *Mycetophilidae* and their relation to fungi. According

[1] Me. Agric. Exp. Sta. Bul. 172, 180, 196, 200.

to him, a large number of wild mushrooms are infested with the larvae of *Mycetophilinae*, particularly of the genera *Exechia* and *Mycetophila*. In several instances they were found with *Phora* larvae in numbers sufficient to ruin a cultivated mushroom bed. Most of the following information concerning *Mycetophilidae* has been compiled and tabulated from Johannsen's monograph. In the case of subfamilies not mentioned, no definite information was given.

Subfamily	Ceroplatinae	Larvae in rotten wood and in fungi.
"	Sciophilinae	Larvae in rotten wood and in fungi.
"	Mycetophilinae	Larvae in rotten wood and in fungi.
"	Sciarinae	Members occasionally reported as injuring mushrooms. After partial decay of fungus growths, *Sciara* larvae found in numbers and this has led mushroom growers to attribute the destruction to these gnats, when damage was probably done by species of *Mycetophila*, *Exechia* or *Phorids*.

In the *Sciophilinae* the genera *Tetragoneura*, *Sciophila* and *Mycoma* are mentioned as living in rotten wood and in fungi during their larval stages and Winnertz is recorded as rearing *Mycoma* from *Daedalea quercina* and *Polyporus* and *Sciophilae* from *Hydnum repandum*, *Boletus scaber* and *Daedalea quercina*. The last mentioned fungus is a Polypore which is rarely attacked by insects probably on account of its corky and consequently unpalatable context and it is quite likely that the above mentioned rearings were made from sporophores which were in an advanced stage of decay. According to Osten Sacken, the larvae of *Sciophila* live on the surface of the fungus which they cover with a web and do not burrow inside.

In the *Mycetophilinae*, the activities of the genera and species appear to be definitely known as follows.

Genus	Leia	Larvae in mushrooms.
"	Cordyla	Larvae in decaying wood and in fungi.
"	Rhymosia	Larvae in fungi (*Armillaria*, etc.) *R. inflata* Joh. bred from *Armillaria mellea*.
"	Exechia	Larvae frequently in wild mushrooms, occasionally in cultivated ones. *E. cincinnata* Joh., reared from *Boletus granulatus*. *E. satiata* Joh., from shelving mushroom. *E. nativa* Joh., from *Collybia* sp. *E. absoluta* Joh., from *Boletus granulatus*. *E. capillata* Joh., from *Collybia dryophila*.
"	Mycothera	Larvae in decaying wood and in fungi.
"	Mycetophila	Larvae frequently in wild mushrooms, sometimes in cultivated ones. *M. scalaris* Loew, reared from *Boletus* and *Polyporus*. *M. foecunda* Joh., from *Polyporus sp.* *M. lenta* Joh., from mushrooms.
"	Sceptonia	Larvae in decaying wood and in fungi.
"	Zygomyia	Larvae in decaying wood and in fungi.

In the subfamily *Sciarinae*, *Sciara multiseta* Felt has been reared from mushrooms and *Sciara agraria* Felt is recorded as being numerous at times in mushroom cellars. Definite information concerning the exact identity of the hosts of most of the *Mycetophilidae* is lacking although it is quite possible that almost any agaric or bolete will suit the tastes of many of these flies.

In the *Itonididae*, Dr. E. P. Felt has called my attention to the fungus and related habits of several species as recorded in several of his reports.[1] The more or less strictly fungous species were listed by Dr. Felt in his paper on "Hosts and Galls of American Gall Midges[2]" and these are presented as follows:

Host	Species
Fungus on rotting plum	Hyperdiplosis fungicola Felt.
Unknown fungus	Arthrocnodax macrofila Felt.
Aecidiospores of Uromyces pisi	Toxomyia rubida Felt.
Teleutospores of Puccinia	Toxomyia fungicola Felt.
Young mushrooms	Mycophila fungicola Felt.
Reared from Oecidium impatientis	Mycodiplosis impatientis Felt.
Larvae on Oecidium importatum affecting Peltandra sp.	Mycodiplosis sp.
Under hard, black carbonaceous fungus on decayed oak stump	Lasiopteryx flavotibialis Felt.
Fungus affected heartwood of pine	Monardia lignivora Felt.
Large yellowish fungus on rotten bark	Mycodiplosis fungiperda Felt.[3]

Of particular interest are the species of *Toxomyia* and *Mycodiplosis* which were reared from the spores of the rusts and smut. Many other species of *Itonididae* are mentioned by Dr. Felt as having been bred from decaying bark and wood and it is extremely probable that these may be more or less closely associated with the fungous hyphae which usually penetrate such objects.

In connection with Diptera and fungi, it is of interest to note the peculiar fungoid growth or development of the tissues which accompanies the activities of *Asteromyia* larvae in the leaves of *Solidago*. Writing about *Asteromyia carbonifera* Felt, the oval, blister-like gall of which is common upon the leaves of the narrow leaved *Solidago graminifolia*, Felt[4] states that "the characteristic blister galls produced by this and allied forms are usually filled, or nearly so, with a black carbonaceous matter, suggesting that the tissues may have become badly infected by fungus. This material is almost invariably present in many galls. Professor Peck states that after repeated examinations, he has failed to observe any evidence of the characteristic fruiting bodies of fungus, and consequently we must assume this malformation to be independent of fungus infection and produced by the activities of the larva. Doctor Trelease, writing in 1884,

[1]N. Y. St. Mus. Bul. 165, 175, 180, 198, 202.
[2]Jour. Econ. Ent. vol. 4, No. 5, p. 461.
[3]N. Y. St. Mus. Bul. 202, p. 196.
[4]N. Y. St. Mus. Bul. 198, p. 209.

states that some of these blister galls occur in the herbaria of mycologists, under the name of *Rhytisma solidaginis* and *R. asteris.*"

From the foregoing it appears that most but not all of the Diptera associated with fungi confine their feeding activities to members of the fungus families *Agaricaceae* and *Boletaceae,* the sporophores of which are fleshy and also to such members of the *Polyporaceae* which are fleshy. Several exceptions are those such as a *Winnertzia* sp., which was bred from a tough and leathery specimen of *Lenzites saepiaria* and *Monardia lignivora* Felt,[1] the larvae of whch were bred from the fungus-affected heartwood of *Pinus rigida,* where they were apparently attacking spongy as well as hard wood. It further appears that as far as known, most of the more or less strictly fungus inhabiting Diptera are confined to the families *Mycetophilidae* and *Platypezidae,* the members of the former being by far the most numerous. By reason of their food habits, members of these families are generally found in damp surroundings and are usually classed as scavengers although many are not true scavengers as they do not feed upon decaying vegetable matter. Most of them must of necessity have brief larval periods, because many of the agarics do not last more than ten days or two weeks. For many of the species definite information is lacking and little is known concerning their true relations with and dependence upon the lower forms of plant life.

[1] Univ. State of N. Y. Bul. 547, p. 191.

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PROCEEDINGS

OF THE

BIOLOGICAL SOCIETY OF WASHINGTON

DESCRIPTIONS OF SIX NEW SUBSPECIES OF AMERICAN BIRDS.

BY OUTRAM BANGS AND THOMAS E. PENARD.

In the course of our work we have discovered the following new subspecies of American birds:

Geranospiza caerulescens livens, subsp. nov.

Type.—M. C. Z., 224,793, adult ♀, parent of eggs; Northwestern Mexico: Alamos, State of Sonora, 9 February, 1888; M. Abbott Frazar.

Subspecific characters.—Similar to *Geranospiza caerulescens niger* (Du Bus), and of about the same size, but much paler, not blackish, between neutral gray and deep neutral gray of Ridgway; larger than *Geranospiza caerulescens caerulescens* (Vieillot), and darker, being intermediate in coloration between *G. c. caerulescens* and *G. c. niger.*

Measurements (in millimeters).—

	Sex	*Wing*	*Tail*	*Tarsus*	*Culmen from cere*
M. C. Z. 224,793 (type)	♀	349.0	242.0	97.0	22.0
" 224,792	♂	334.0	233.0	91.0	broken

Specimens examined.—

G. c. livens, two:—N. W. Mexico: Sonora, 1 ♂, 1 ♀.

G. c. niger, seven:—Mexico: Tampico, 1 ♀; Vera Cruz, 1 ♂. Costa Rica: Tenorio, 1 ♀; Boruca, 1 ♂; Bolson, 2 ♀♀. Panama: Dival, 1 ♂.

G. c. caerulescens, three:— "Brazil," 1 ♀. Surinam, 1 ♂, 1 ♀.

So far as we are aware, no bird of this genus has ever before been recorded from any locality so far northwest as Sonora. Both specimens, probably a pair, were collected at Alamos by Frazar on the same day.

Otus choliba luctisonus, subsp. nov.

Type.—M. C. Z., 116,530, adult ♂; Costa Rica: Escazu, 26 November, 1900.

Subspecific characters.—Similar to *Otus choliba crucigerus* (Spix) of the Amazon River Region, and of about the same size, but upper parts paler,

the dark central markings, above and below, much narrower, especially on the breast.

Measurements.— Type, adult ♂: wing, 167.5; tail, 90.5; tarsus, 30.5; culmen from cere, 14.2.

Specimens examined.—

O. c. luctisonus, ten:—Costa Rica, 2; Panama: Divala, 1; Pearl Islands, 7.

O. c. crucigerus, nine:— Surinam, 8; Cayenne (tradeskin), 1.

We have not seen specimens from the type locality of *crucigerus*, but assume that the Surinam bird is sufficiently close for comparison. The difference in coloration between the two forms is very decided. All the specimens we have examined are in the brown phase.

Mecocerculus leucophrys roraimae, subsp. nov.

Type.—M. C. Z., 83,090 (coll. T. E. P., 2009), adult ♀; British Guiana: Mount Roraima, 24 August, 1883; Henry Whitely.

Subspecific characters.—Similar to *Mecocerculus leucophrys nigriceps* Chapman, and of about the same size, but upper parts much darker, more olive-brownish, less olive-greenish; similar also to *Mecocerculus leucophrys setophagoides* (Bonaparte), but much smaller, and upper parts slightly darker.

Measurements.—Type, adult ♀: wing, 59.0; tail, 58.5; tarsus, 19.0; exposed culmen, 9.0.

Specimens examined.—

M. l. roraimae, one:— the type.

M. l. nigriceps Chapm., thirty:—Venezuela: Las Palmales, 1 ♂ (the type); Paramo de Rosas, 4; State of Lara, 6; Merida, 3. Colombia: Santa Marta region, 16 (including the type of *Myiopatis montensis* Bangs).

M. l. setophagoides (Bonap.), thirteen:—Colombia: Las Ventanas (Santander), 10; Bogotá, tradeskin, 1; unspecified, 2.

M. l. leucophrys (Lafr. and d'Urb.), one:—Bolivia.

? M. l. notatus Todd, two:—Colombia: Huila, Valle de las Pappas, Central Andes, 1,000 ft., 1 ♂, 1 ♀.

Hartert and Goodson (Nov. Zool., XXIV, 1917, p. 494) have called attention to two specimens from Roraima, which are as small as *M. l. nigriceps*, but dark above as *M. l. setophagoides*. They state that the Guiana specimens in the British Museum agree with those in Tring. Our own specimen showing these same characters, we have not hesitated to separate the Guiana form.

We are indebted to Dr. Frank M. Chapman and Mr. W. E. Clyde Todd for the loan of a good series of skins.

Nuttallornis borealis majorinus, subsp. nov.

Type.—M. C. Z., 55,371, adult ♂; Pine Flats, north fork of San Gabriel River, Los Angeles County, California, 19 July, 1905; C. H. Richardson, Jr.

Subspecific characters.—Similar to *Nuttallornis borealis borealis* of eastern

North America, but larger; under parts averaging darker, i. e., more dusky and less white.

Measurements.—

N. b. majorinus.—Type, adult ♂: wing, 115.0; tail, 76.0; tarsus, 15.0; exposed culmen, 18.5.

Eighteen males: wing, 111.3 (107.0–116.5); tail, 72.8 (70.0–77.0); tarsus, 14.9 (14.5–15.0); exposed culmen, 18.6 (18.0–20.0).

Twenty females: wing, 104.8 (100.5–109.0); tail, 68.9 (66.0–74.0); tarsus, 14.4 (13.5–15.0); exposed culmen, 17.4 (16.5–18.5).

N. b. borealis.—Nineteen males: wing, 105.6 (103.0–109.0); tail, 67.5 (64.0–70.0); tarsus, 14.2 (13.5–15.0); exposed culmen, 17.0 (16.0–18.0).

Nine females: wing, 99.4 (96.0–102.5); tail, 64.3 (61.0–67.0); tarsus, 13.9 (13.5–14.5); exposed culmen, 16.6 (16.0–17.5).

Specimens examined.—

N. b. majorinus, forty-four;—Montana, 1; Oregon, 3; Colorado, 11; California, 16; Arizona, 11; Mexico: Chihuahua, 1 ♀ (migrant—wing 110, perhaps a male); Colombia: La Concepcion, 1 ♀ (migrant—wing, 111.0, probably a male).

N. b. borealis, forty-five:—Maine, 14; New Hampshire, 4; Massachusetts, 7; Michigan, 2; New York, 2; North Carolina, 1 ♂ (migrant); Texas: Lomita Ranch, 1 ♂ (migrant); Mexico: Tamaulipas, 8 ♂♂, 2 ♀♀ (migrant); Costa Rica, 3 ♂♂ (migrant); Panama: Boquite, 1 ♂ (migrant).

In coloration the new form is practically identical with true *borealis* except that the underparts have a little less white. This character is far from constant, but in our series is noticeable. In size, however, the two forms are sufficiently distinct to enable us to trace their migration routes, provided the sexing is reliable.

The Peruvian specimens recorded by Taczanowski (Orn. Perou, II, 1884, p. 317—wing, 113; tail, 74) and by Hellmayr (Archiv für Naturgesch., 85 Jahrg., 1920, Abt. A, Heft 10, p. 60—adult ♀, wing, 103; tail, 74) belong without doubt to the western form.

Melanotis caerulescens effuticius, subsp. nov.

Type.—M. C. Z., 220,386, adult ♂; Mexico: Chihuahua, Hacienda de San Rafael, 4 May, 1888; M. Abbott Frazar.

Subspecific characters.—Similar to *Melanotis caerulescens caerulescens* (Swainson) of eastern Mexico, and of about the same size, but averaging paler bluish, less grayish blue, throughout; pileum, superciliary region, throat, and chest, paler, brighter bluish.

Measurements.—Type, adult ♂: wing, 115.0; tail, 125.0; tarsus, 30.0; exposed culmen, 22.5.

Specimens examined.—

M. c. effuticius, twenty-two:—Northwestern Mexico: Alamos (Sonora), 4; Chihuahua, 14; Los Flores (Sinaloa), 1; Escuinapa (Sinaloa), 1; Santiago (Tepic), 2.

M. c. caerulescens, twelve:—Eastern Mexico: Jalapa (Vera Cruz), 4; Orizaba (Vera Cruz), 3; Texolo (Vera Cruz), 4; "Mexico," 1.

We find that the palest birds are from Chihuahua (Cf. Ridgway, Birds of North and Middle America, Pt. 4, 1907, p. 211). A specimen from Escuinapa is intermediate. One bird in three from Texolo also approaches the western bird in coloration. This specimen probably represents an extreme variant of the eastern form, but is not nearly so pale as an extreme example of the northwestern form.

Females of both forms are duller than males, and immature birds are much duller and more brownish.

Tangara viridissima toddi, subsp. nov.

Type.—M. C. Z., 106,342, adult ♂; Colombia: San Francisco, Santa Marta Mountains, 7 February, 1899; W. W. Brown, Jr.

Subspecific characters.—Similar to *Tangara viridissima viridissima* (Lafresnaye)[1] of Trinidad, but, in fully adult plumage, head paler chestnut and underparts shining Scheele's Green of Ridgway, without any marked bluish tint.

Measurements.—Type, adult ♂: wing, 73.5; tail, 49.0; tarsus, 16.5; exposed culmen, 10.0.

Specimens examined.—

T. v. toddi, forty:—Colombia: Santa Marta Mountains.

T. v. viridissima, eight:—Trinidad, 6: Venezuela: Yacua, 2.

Mr. W. E. Clyde Todd, who has examined a large series of this species in connection with the preparation of his forthcoming paper on the birds of the Santa Marta region, informs us that birds from some parts of Venezuela are apparently intermediate.

We take great pleasure in naming this excellent form in honor of Mr. Todd, in recognition of his work on the birds of this region.

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[1] *Tangara viridissima* (Lafr.) replaces *Tangara desmaresti* (Gray), preoccupied. *Cf.* Hellmayr, Verh. Orn. Gesellsch., Bayern, XIV, Heft 4, 1920, p. 283.

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PROCEEDINGS

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TWENTY NEW MAMMALS COLLECTED BY H. C. RAVEN IN CELEBES.

BY GERRIT S. MILLER, JR. AND N. HOLLISTER.

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Further study of the mammals collected in Celebes by Mr. H. C. Raven and presented to the U. S. National Museum by Dr. W. L. Abbott has resulted in the discovery of eighteen new forms in addition to those recently described.[1]

Melasmothrix, gen. nov. (Murinæ).

Type.—*Melasmothrix naso*, sp. nov.

Characters.—A small rat with elongated snout, dense velvety fur, and short ears; feet scantily haired, the claws on fore feet longest, the thumb reduced to a small tubercle with a flattened nail; tail considerably shorter than head and body, densely and closely haired (the annulations scarcely visible), apparently without pencil (tip imperfect). Skull resembling that of *Echiothrix* in its general elongated form and the slender mandible, but interorbital region smooth, external pterygoid normally developed, zygomatic plate lying directly over m^1, and premaxillaries extending forward sufficiently to form the lower border of a short nasal tube in front of incisors. Teeth (much worn) apparently not different from those of *Echiothrix*, but upper toothrows not distinctly converging posteriorly and root of lower incisor not forming a capsule on outer surface of mandible.

Remarks.—This genus appears to be very distinct from any hitherto described. Externally the animal shows no striking peculiarities other than the lengthened muzzle and the large claws on the fore feet. The skull has the slender elongated form seen in *Echiothrix*, but the details of structure, particularly the unusual position of the anterior zygomatic root, entirely behind the level of the anterior border of m^1, and the normal, unreduced condition of the ectopterygoid readily distinguish it. The resemblance to *Echiothrix* appears to be purely superficial and may indicate no intimate relationship.

[1] Miller and Hollister, Descriptions of sixteen new murine rodents from Celebes, Proc. Biol. Soc. Wash., vol. 34, pp. 67–76, March 31, 1921.

Melasmothrix naso, sp. nov.

Type from Rano Rano, Middle Celebes. Skin and skull of old ♂ (teeth much worn); No. 219,752, U. S. National Museum; collected January 2, 1918, by H. C. Raven; original number 3368.

Characters.—Size, color, quality of fur and general appearance apart from the long fore claws much as in the South American *Melanomys caliginosus*. General coloration a rich blackish-bay; hairs with underfur broadly slate color and tips of golden brown; mixed throughout are some slightly longer hairs wholly of glossy black. Underparts scarcely differing from back and sides, glossy like upperparts but slightly less dark. Hands, feet, ears, and tail brownish black.

Skull.—In general form the skull resembles that of *Echiothrix leucura*, but the braincase is relatively larger, the rostrum less elongate, and the contours are all smoother and more rounded. The anterior border of the zygomatic plate is scarcely visible when the skull is viewed from above, while in *Echiothrix* it is a conspicuous feature. The dorsal surface of the nasals, essentially flat in *Echiothrix*, is noticeably concave at a level slightly behind that of the incisors. Glenoid surface not carried forward as a distinct shelf projecting into posterior region of the temporal fossa, and posterior zygomatic root not standing abruptly out from side of braincase. Auditory bullæ relatively larger than in *Echiothrix*, their form broad and low rather than narrow and high. Mandible resembling that of *Echiothrix* but with coronoid process more posterior in position relatively to angular process, and masseteric ridge crossing jaw obliquely and terminating beneath middle of toothrow, the position of the ridge obviously correlated with that of the zygomatic plate.

Measurements.—Type: Head and body, 124; tail, 90; hind foot (dry), 28; hind foot without claws, 26; middle hind claw, 2; middle fore claw, 5. Skull: Condylobasal length, 31.0; condyloincisive length, 28.6; zygomatic breadth, 12.4; interorbital constriction, 6.2; breadth of braincase, 14.2; depth of braincase at middle, 8.6; nasal, 12.5; diastema, 7.8; width of palate at middle of m^1, 2.8; width of palate at middle of m^3, 3.8; mandible, 17.2; maxillary toothrow (alveoli), 5.0; greatest width of m^1, 1.8; greatest width of m^3, 1.0; mandibular toothrow (alveoli), 4.6.

Specimen examined.—One, the type.

Remarks.—Mr. Raven's field catalogue states that this specimen was caught in a trap set under rotten, moss-covered logs. The superficial resemblance in the structure of the head to *Echiothrix* was noted by him.

Eropeplus, gen. nov. (Murinæ).

Type.—Eropeplus canus sp. nov.

Characters.—Like *Lenomys* but cheekteeth distinctly hypsodont (the crown of m^1 about as high as wide), and enamel pattern simplified in the direction of separate transverse plates; tubercles at outer side of maxillary teeth reduced in size and not sufficiently elevated to form a longitudinal groove between the outer and middle series; m^2 with only two tubercles on outer side; m^1 without trace of x-cusp, the two inner tubercles tending to become isolated from the median tubercles.

Remarks.—The genus *Eropeplus* apparently represents a hypsodont stock which occupies much the same position toward *Lenomys* as the Philippine genus *Bullimus* toward *Rattus.*

Eropeplus canus, sp. nov.

Type from Goenoeng Lehio (southwest from Lake Lindoe), Middle Celebes; above 6,000 feet altitude. No. 218,707 U. S. National Museum; skin and skull of female (teeth slightly worn); collected January 12, 1917, by H. C. Raven; original number 3079.

External characters.—A large gray rat with terminal third or half of tail white; general appearance as in *Lenomys longicaudus* but fur more silky and less wooly in texture; hairs of underfur on back 25–28 mm., the longer piles, abundant on posterior half of back and on flanks, 35–45 mm. General coloration above brownish gray, the hairs uniformly pale slate except at tip (3–5 mm.), where they become pale buff; long hairs black usually with buffy tips; the slaty under color appears everywhere at surface but more noticeably on sides than on back; underparts light gray in evident contrast with sides, but without sharp line of demarcation, a combination of the slaty under color and the pale buffy hair tips; feet thinly clothed with short blackish hairs; whiskers black.

Skull and teeth.—In all essential characters the skull resembles that of *Lenomys longicaudus,* but the size is noticeably less, the upper zygomatic root is narrower, the interparietal is relatively wider, and the auditory bullæ are less smoothly inflated. Teeth similar to those of *Lenomys* in their large size relatively to the narrow palate, but differing as already described in their conspicuously greater height and in the simplified enamel pattern.

Measurements.—Type: head and body, 195; tail, 265; hind foot (dry) 46 (43); greatest length of skull, 46.7; condylobasal length, 44.0; zygomatic breadth, 22.0; interorbital breadth, 5.6; nasal, 17.2; diastema, 11.6; mandible, 27.6; maxillary toothrow (alveoli), 10.0; mandibular toothrow (alveoli), 10.0.

Specimens examined.—Two, one from Goenoeng Lehio and one from Rano Rano (altitude about 1,800 m).

Remarks.—The two specimens differ slightly from each other and may represent distinct local forms. In the skin from Rano Rano (a male, slightly older than the type) the pale area on the underparts is narrower and strongly buffy, and the white portion of the tail is much longer (175 mm. instead of 100 mm.). Comparison of the skulls and teeth shows various small differences which further material might prove to be important.

Lenomys longicaudus, sp. nov.

Type from Gimpoe, Middle Celebes; No. 219,712, U. S. National Museum; skin and skull of adult ♀ (teeth moderately worn); collected September 1, 1917, by H. C. Raven; original number 3203.

Diagnosis.—Like *Lenomys meyeri* (Jentink) of Menado, North Celebes, but more grayish, less tawny in coloration; middle underparts yellowish buff; tail longer than head and body; teeth smaller; inner tubercles of first and second laminæ so drawn backward that each is more nearly in line with

the outer tubercle of the succeeding lamina than with that of its own lamina; x-cusp small, and no corresponding cusp on inner tubercle of first lamina; no small postero-external cusp in m^2.

Measurements.—Type: Head and body, 235 mm.; tail, 280; hind foot, 45. Skull of type: Greatest length, 53.6; condylobasal length, 52.0; palatal length, 29.5; zygomatic breadth, 27.0; interorbital breadth, 7.4; mastoid breadth, 18.8; mandible, 33.8; maxillary toothrow, alveoli, 11.5; mandibular toothrow, alveoli, 10.8.

Specimen examined.—One, the type.

Remarks.—The Middle Celebesian form of *Lenomys* appears to be specifically distinct from *Lenomys meyeri* and *Lenomys callitrichus* (Jentink), both from Menado. The two northern species have the tail described as shorter than head and body.

Rattus dominator camurus, subsp. nov.

Type from Pinedapa, Middle Celebes. No. 219,566, U. S. National Museum; skin and skull of adult ♂ (teeth moderately worn); collected January 15, 1918, by H. C. Raven; original number 3384.

Diagnosis.—Like *Rattus dominator dominator* Thomas, of North Celebes, but more grayish, less brownish, in color; skull with smaller auditory bullæ.

Measurements.—Type: Head and body, 235 mm.; tail, 257; hind foot, 51. Skull of type: Greatest length, 59.1; condylobasal length, 55.3; zygomatic breadth, 27.2; interorbital breadth, 7.7; mastoid breadth, 20.4; mandible, 34.7; maxillary tooth row, alveoli, 10.2; mandibular toothrow, alveoli, 9.1.

Specimens examined.—Seven, all from Middle Celebes: Laboea Sore, 2; Pinedapa, 4; Toware, Bada, 1.

Remarks.—This is the Middle Celebesian race of *Rattus dominator* Thomas. It is very much like the typical form, which is represented in the Raven collections by large series from North Celebes, but averages grayer in color. The skull is like that of true *dominator* but with considerably smaller auditory bullæ.

Rattus facetus, sp. nov.

Type from Goenoeng Lehio (southwest of Lake Lindoe), Middle Celebes; above 6,000 feet altitude. No. 218,677, U. S. National Museum; skin and skull of adult ♀ (teeth moderately worn); collected January 15, 1917, by H. C. Raven; original number 3092.

Diagnosis.—Like *Rattus marmosurus* Thomas, of Mount Masarang, Minahassa, but much smaller, with more hairy tail. Skull as in *marmosurus* but smaller, with much smaller auditory bullæ; and smaller, more slender, incisor teeth.

Measurements.—Type: Head and body, 135 mm.; tail, 175; hind foot, 33. Skull of type: Condylobasal length, 32.5; zygomatic breadth, 16.4; interorbital breadth, 5.3; mandible, 21.2; maxillary toothrow, alveoli, 6.8; mandibular toothrow, alveoli, 7.1.

Specimen examined.—One, the type.

Remarks.—Except for minor differences, as enumerated above, this

species is almost an exact miniature of *Rattus mamosurus* of the mountains of northeastern Celebes.

Rattus hamatus, sp. nov.

Type from Goenoeng Lehio, Middle Celebes. No. 218,680, U. S. National Museum; skin and skull of adult ♂ (teeth moderately worn); collected January 16, 1917, by H. C. Raven; original number 3095.

Diagnosis.—A medium-sized rat superficially resembling the darker members of the *Rattus chrysocomus* group, but with skull and teeth wholly unlike those species; apparently not belonging in any of the recognized species-groups of Rattus. Size about as in *Rattus marmosurus* Thomas; but tail much shorter and with only the distal half whitish. Pelage soft and full, but shorter than in *marmosurus*, and without the long overlying hairs of that species. Coloration above, dark gray, finely flecked with buff; sides like back; underparts buffy-gray, the hairs gray at bases and yellowish buff at tips; hands and feet dusky, the digits whitish. Vibrissæ long, reaching back to shoulders.

Skull resembling in general shape that of *Rattus dominator*, but much smaller; antorbital plate extending well forward, about as in *R. norvegicus;* rostrum long, much longer than in *norvegicus* or *rattus;* supraorbital ridges distinct over frontals, faintly indicated on parietals; auditory bullæ small and angular; palatal foramina reaching just back of anterior plane of first molars; palate projecting only slightly beyond plane of posterior edge of last molars. Pattern of molar teeth essentially as in *Rattus norvegicus*, but m^1 more elongated, the anterior column especially projecting far forward, with small supplementary tubercle; and the crown length of m^1 more than half the length of entire toothrow. Upper toothrows converging anteriorly; spreading posteriorly; incisors narrow, opisthodont (less so than in *R. dominator*).

Measurements.—Type: Head and body, 183; tail, 185; hind foot, 42; ear from notch, dry, 18.6. Skull of type: Greatest length, 46.1; condylobasal length, 41.3; palatal length, 25.0; zygomatic breadth, 22.6; interorbital breadth, 6.5; mastoid breadth, 7.3; nasals, 18.4 x 5.0; antorbital notch to end of premaxilla, 15.8; mandible, 26.6; upper toothrow, alveoli, 8.8; lower toothrow, alveoli, 8.3; m^1, crown, 4.6; m^2–m^3, crowns, 4.4.

Specimens examined.—Two from the type locality.

Remarks.—This peculiar rat resembles externally some of the darker, white-tailed members of the *chrysocomus* group. The characters of the skull and teeth, however, show it to be not a member of that group. The skull mostly resembles, in general characteristics, skulls of *Rattus dominator*, but is much smaller. The pattern of the molar teeth differs considerably from that of either *dominator*, *celebensis*, or *marmosurus*, and agrees well with the pattern normal to *Rattus norvegicus* and its allies. Except for the strictly *norvegicus*-like molar pattern and the projecting antorbital plate, the skull resembles in no other character skulls of *norvegicus*, and it is easy to believe that the relationship is not particularly close with the *norvegicus* group. The general characters of the skull would seem to throw the species in the composite "*xanthurus*" group, regardless of the external resemblance

to the darker species of *chrysocomus*, and the extreme *norvegicus*-like first molar. The species is one of the peculiar forms apparently restricted to the higher mountains of Middle Celebes.

Rattus punicans, sp. nov.

Type from Pinedapa, Middle Celebes. No. 219,625, U. S. National Museum; skin and skull of adult ♀ (teeth little worn); collected February 7, 1918, by H. C. Raven; original number 3501.

Diagnosis.—A rather large, reddish brown rat, not referable to any of the recognized species-groups. Pelage comparatively short and scant, inclined to be wavy, and without spinous hairs. Upperparts and sides chestnut or rich reddish brown, the longer hairs tipped with black; underfur and bases of all hairs light slate or brownish gray (a much older individual has the hairs of rump, lower back, and sides uniform reddish brown to bases). Underparts ochraceous, the bases of hairs pale grayish. Hands and feet brown. Tail shorter than head and body, uniform blackish brown, thinly haired.

Skull resembling in general characters skulls of *Rattus dominator*, but with antorbital plate extending still farther forward; bony palate not extending back of posterior plane of last molars; and incisors orthodont. Pattern of molar teeth essentially as in *Rattus celebensis*, but anterior lamina of m^1 with outer tubercle so reduced as to be practically absent (outer tubercles of second and third laminæ well developed).

Measurements.—Type, and a much older female, with teeth much worn, measurements of the latter in parentheses: Head and body, 185 (207); tail, 156 (185); hind foot with claws (dry), 45 (47); hind foot without claws (dry), 42.5 (43.5); ear from notch, dry, 17.4 (19.6). Skull of type: Greatest length, 46.0; condylobasal length, 41.5; palatal length, 22.8; mastoid breadth, 18.3; interorbital breadth, 6.4; mandible, 26.5; maxillary toothrow, alveoli, 8.9; mandibular toothrow, alveoli, 8.8.

Specimens examined.—Two from the type locality.

Remarks.—Externally this rat is distinguished from other Celebesian species by its rich chestnut brown coloration. It is possibly related to *Rattus celebensis*, but differs conspicuously from that species, not only in color, but by its short, blackish tail, without white tip; the extended antorbital plate; and the peculiar structure of the first upper molar.

Sciurus murinus necopinus, subsp. nov.

Type from Goenoeng Lehio (southwest from Lake Lindoe), Middle Celebes. No. 218,712, U. S. National Museum; skin and skull of adult ♂ (teeth moderately worn); collected January 20, 1917, by H. C. Raven; original number 3107.

Diagnosis.—Like *Sciurus murinus murinus* Müller and Schlegel, from Menado, North Celebes, but skull with decidedly smaller auditory bullæ.

Measurements.—Type: Head and body, 105 mm.; tail, 107; hind-foot, 29. Skull of type: Greatest length, 32.9; condylobasal length, 28.1; zygomatic breadth, 19.4; interorbital breadth, 11.8; mandible, 18.5; maxillary toothrow, 6.0.

Specimens examined.—Nine, all from Middle Celebes, as follows: Goenoeng Lehio, 1; Koelawi, 1; Pinedapa, 5; Rano Rano, 2.

Remarks.—This subspecies reaches its extreme form in the high mountains of the interior of Middle Celebes. Specimens from Pinedapa near the coast of the Gulf of Tomini, near Mapane, show an approach toward the typical race of North Celebes.

Sciurus evidens, sp. nov.

Type from Pulo Lembeh, off the shore of northeastern Celebes. No. 217,814, U. S. National Museum; skin and skull of adult ♀ (teeth moderately worn); collected January 16, 1916, by H. C. Raven; original number 2525.

Diagnosis.—Like *Sciurus murinus* Müller and Schlegel, from the mainland of Celebes, but paler, decidely more yellowish or rusty brown.

Measurements.—Type: Head and body, 125 mm.; tail, 107; hind foot, 33. Skull of type: Greatest length, 36.3; condylobasal length, 31.8; zygomatic breadth, 21.9; interorbital breadth, 13.7; nasals, 11.2; mandible, 22.6; maxillary toothrow, 6.2.

Specimens examined.—Six from the type locality.

Remarks.—The paler, more yellowish brown coloration of this form makes the animal conspicuously different from the dark, richly colored *Sciurus murinus* of the neighboring mainland of Celebes.

Harpyionycteris celebensis, sp. nov.

Type from Gimpoe, Middle Celebes, No. 219,349, U. S. National Museum; skin and skull of adult ♀ (sagittal crest well developed); collected August 23, 1917, by H. C. Raven; original number 3176.

Diagnosis.—Like *Harpyionycteris whiteheadi* Thomas, of Mindoro, but molars with crowns lower and cusps relatively higher, and pm^3 with a conspicuous secondary cusp on each side of main outer cusp.

Measurements.—Head and body, 153; tibia, 30; foot 29 (24); forearm, 90; thumb (with claw), 39; third finger, 170; its metacarpal, 63; greatest length of skull, 43.0; condylobasal length, 41.6; zygomatic breadth, 24.0; interorbital constriction, 7.0; postorbital constriction, 6.2; mandible 35.0; upper toothrow (exclusive of incisors), 16.6; mandibular toothrow, 17.8.

Specimen examined.—The type.

Remarks.—The Celebesian specimen of *Harpyionycteris* differs chiefly from the type of *H. whiteheadi*, hitherto the only known representative of the genus, in the obvious dental peculiarities just described. The external measurements, particularly thumb and foot, indicate a larger animal than *H. whiteheadi*, but the skulls of the two species are essentially identical in size. There are no evident differences in color, but the hairs are lighter basally than at tip in *H. celebensis*, while in the Philippine specimen they are uniform brown throughout.

Mr. Oldfield Thomas has kindly compared the type of *Harpyionycteris celebensis* with that of *H. whiteheadi*.

Pteropus arquatus, sp. nov.

Type from Koelawi, Middle Celebes. No. 218,612, U. S. National Museum; skin and skull of adult male (teeth slightly worn); collected January 5, 1917, by H. C. Raven; original number, 3067.

External characters.—A medium sized animal related to the members of the *alecto* and *conspicillatus* groups (Andersen, p. 96); forearm 133–141 mm.; ear essentially as in *Pteropus alecto;* general color both above and below a variegated golden brown; a dark area extending from muzzle to eyes and ears and across chin and throat; a faint whitish mark over eye; back sharply contrasted dark auburn in young individuals, this area in adults sprinkled to a varying degree with yellowish hairs which often become dominant and in some instances almost completely obscure the brown.

Skull and teeth.—The skull differs from that of *Pteropus alecto* (represented by a large series collected by Mr. Raven at Sigi, Middle Celebes), which it approaches in size, in its broader, more robust general form (zygomatic breadth in type 37 mm., greatest length 66.2; in an adult male *alecto* with the same zygomatic breadth the greatest length is 71.6), and especially in the reduced length of the rostrum (distance from anterior rim of orbit to tip of nasal in the two specimens just mentioned 19.6 and 25.4 mm. respectively), a peculiarity which makes it closely resemble the much smaller skull of *Pteropus capistratus.* Teeth resembling those of *Pteropus alecto* and *P. aterrimus* but m^1 and m_1 not conspicuously different from the preceding premolar, and m^2 with essentially the same structure as m^1.

Measurements.—Type: Head and body, 230; tibia, 64; foot, 42 (34); forearm, 138; thumb, 60; longest finger, 260; third metacarpal, 93; ear from crown (dry), 26; greatest length of skull, 66.2; condylobasal length, 64.0; zygomatic breadth, 37.0; interorbital constriction, 9.0; postorbital constriction, 7.2; breadth of braincase above zygomatic roots, 24.2; mandible, 52.2; maxillary toothrow, exclusive of incisors (alveoli), 24.8; crown of m^1 5.0 x 3.6; maxillary toothrow exlusive of incisors (alveoli), 28.6.

Specimens examined.—Twenty-nine, all from Middle Celebes: Koelawi, 11; Sigi, 18.

Cheiromeles parvidens, sp. nov.

Type from Pinedapa, Middle Celebes. No. 219,350, U. S. National Museum; skin and skull of adult female (teeth not worn); collected February 20, 1918, by H. C. Raven; original number 3547.

Characters.—Like *Cheiromeles torquatus* but general size slightly less and teeth disproportionately smaller.

Measurements.—Type: Head and body, 123; tail, 59; tibia, 28.4; foot, 22; forearm, 72; thumb, 19; third finger, 170; third metacarpal, 74; greatest length of skull, 30.0; condylobasal length, 27.2; zygomatic breadth, 20.0; interorbital constriction, 8.2; lachrymal breadth, 12.2; breadth of braincase, 15.0; mandible, 21.6 (24.2);[1] maxillary toothrow exclusive of incisors (alveoli), 10.0 (11.2); combined length of m^1 and m^2, 5.8 (6.6); width of m^1 at middle, 3.2 (3.6) mandibular toothrow (alveoli), 11.4 (12.8); combined length of m_1 and m_2, 5.8 (6.6).

[1]Measurements in parentheses are those of an adult female *Cheiromeles torquatus* from Borneo (No. 102,463).

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

Crocidura elongata, sp. nov.

Type from Temboan (southwest from Tondano Lake), northeastern Celebes. No. 217,534, U. S. National Museum; skin and skull of adult ♂ (basal suture obliterated, teeth moderately worn); collected August 1, 1916, by H. C. Raven; original number 2790.

Description.—A very long tailed species apparently related to *Crocidura lepidura* Lyon from eastern Sumatra; but lighter colored, with longer tail and larger, light-colored feet. Upperparts grayish sepia; underparts lighter, washed with rusty. Hands and feet flesh color, thinly haired, the hairs of fingers and toes whitish. Tail longer than head and body; dark brown, lighter along underside and at tip; thinly haired, a very few longer hairs near base. Skull long, high, and narrow, with weak maxillary processes. Teeth essentially as in *lepidura,* the second unicuspid smaller than third, and unicuspids all with distinct encircling cingulum shelves.

Measurements.—Type: Head and body, 94; tail, 120; hind foot, 22. Skull: Condylobasal length, 24.1; breadth of braincase, 10.1; maxillary breadth, 7.4; maxillary toothrow, entire, 11.1; mandibular toothrow, entire, 10.3.

Specimens examined.—Two from the type locality and two from Pinedapa, eastern Middle Celebes. The latter are young (basal sutures not entirely closed), but appear inseparable from the specimens from the type locality.

Crocidura nigripes, sp. nov.

Type from Temboan (southwest from Tondano Lake), northeastern Celebes. No. 217,545, U. S. National Museum; skin and skull of adult ♂ (basal suture obliterated); collected August 4, 1916, by H. C. Raven; original number 2866.

Description.—A medium sized, dark colored, blackish footed species; externally very closely resembling *Crocidura beatus* Miller from Mindanao. Skull larger than that of *beatus,* with heavier maxillary processes and larger teeth. Glossy blackish sepia above, very slightly browner below; hands, feet and tail blackish; the tail with a few longer hairs, especially on basal half, of a lighter color. Unicuspid teeth rather crowded, the second smaller than third.

Measurements.—Type: Head and body, 80; tail, 51; hind foot, 14. Skull: Condylobasal length, 20.9; breadth of braincase, 9.9; maxillary breadth, 7.3; maxillary toothrow, entire, 10.1; mandibular toothrow, entire, 9.2.

Specimens examined.—Eleven, all from northeastern Celebes: Ajermadidi, 1; Temboan, 10.

Crocidura nigripes lipara, subsp. nov.

Type from Gimpoe, Middle Celebes. No. 219,444, U. S. National Museum; skin and skull of adult ♂ (basal suture obliterated; teeth moderately worn); collected September 2, 1917, by H. C. Raven; original number 3207.

Diagnosis.—Like *Crocidura nigripes nigripes* of North Celebes, but larger; the tail and hind foot longer; skull larger.

Measurements.—Type: Head and body, 82; tail, 60; hind foot, 15. Skull: Condylobasal length, 22.5; breadth of braincase, 10.4; maxillary breadth, 7.8; maxillary tooth row, entire, 10.6; mandibular toothrow, entire, 9.8.

Specimens examined.—Sixteen, all from localities in Middle Celebes: Gimpoe, 3; Koelawi, 1; Lake Lindoe, 1; Pinedapa, 1; Towaré, 10.

Remarks.—This subspecies attains its extreme size in the mountains of the interior of western Middle Celebes. Specimens from Towaré and Pinedapa are slightly smaller, thus less distinct from the typical race of North Celebes.

Crocidura rhoditis, sp. nov.

Type from Temboan, northeastern Celebes. No. 217,550, U. S. National Museum; skin and skull of adult ♂ (basal suture obliterated); collected August 3, 1916, by H. C. Raven; original number 2834.

Description.—A medium-sized, dark brownish species with light-colored feet, the hairs of fingers and toes whitish. Tail longer than in *Crocidura nigripes*, thinly clothed with dark brown hair and with a whitish tip; a few long, light-colored hairs on basal half. Underparts distinctly lighter than back, washed with pale cinnamon brown. Skull larger and higher than that of *Crocidura nigripes nigripes*, with relatively heavier rostrum and much wider narial opening. Teeth essentially as in *nigripes*, the second unicuspid smaller than third.

Measurements.—Type: Head and body, 83; tail, 70, hind foot, 17. Skull: Condylobasal length, 21.7; breadth of braincase, 10.2; maxillary breadth, 8.4; maxillary toothrow, entire, 10.2; mandibular toothrow, entire, 9.8.

Specimens examined.—Eleven from the type locality.

Crocidura lea, sp. nov.

Type from Temboan, northeastern Celebes. No. 217,553, U. S. National Museum; skin and skull of adult ♂ (basal suture obliterated); collected August 3, 1916, by H. C. Raven; original number 2837.

Description.—A small, dark species; much smaller than *Crocidura nigripes* from the same locality, with relatively much longer tail. Upperparts dark fuscous; underparts paler. Feet thinly haired, the toes flesh color; tail thinly haired with blackish brown, a few long, light colored hairs near base. Skull small and delicate, flat, with weak maxillary processes. Second unicuspid smaller than third.

Measurements.—Type: Head and body, 60; tail, 51, hind foot, 14. Skull: Condylobasal length, 17.2; breadth of braincase, 8.1; maxillary breadth, 5.4; maxillary toothrow, entire, 7.8; mandibular toothrow, entire, 7.3.

Specimen examined.—One the type.

Remarks.—Among the four species of *Crocidura* inhabiting northeastern Celebes, this is conspicuous by its small size.

Crocidura levicula, sp. nov.

Type from Pinedapa, Middle Celebes. No. 219,450, U. S. National Museum; skin and skull of adult ♀ (basal suture obliterated); collected February 13, 1918, by H. C. Raven; original number 3521.

Description.—Related to *Crocidura lea* of northeastern Celebes, but rich bistre in color, with shorter tail, smaller hind foot, and smaller skull. Tail more heavily haired and with many more of the soft, longer hairs on basal half. Skull smaller than in any other known Celebesian species; toothrow crowded, the molars squarish and set closely together; second unicuspid smaller than third.

Measurements.—Type: Head and body, 64; tail, 44; hind foot, 11. Skull: Condylobasal length, 16.1; breadth braincase, 7.8; maxillary breadth, 5.3; maxillary toothrow, entire, 7.2; mandibular toothrow, entire, 6.7.

Specimen examined.—One, the type.

Following is a key to the species of Crocidura known from Celebes:

Tail longer than head and body ..... *C. elongata.*
Tail shorter than head and body.
  Very small; head and body under 65; skull under 18; maxillary processes weak.
    Color brownish (rich bistre) ..... *C. levicula.*
    Color blackish (dark sepia) ..... *C. lea.*
  Larger; head and body over 65; skull over 20; maxillary processes heavy.
    Hands and feet flesh color; tail white tipped ..... *C. rhoditis.*
    Hands and feet blackish; no white tip on tail.
      Smaller; skull 20.9 (North Celebes) ..... *C. nigripes nigripes.*
      Larger; skull 22.5 (Middle Celebes) ..... *C. nigripes lipara.*

Tarsius fuscus dentatus, subsp. nov.

Type from Laboea Sore (north of Parigi), Celebes. No. 218,071, U. S. National Museum; skin and skull of adult ♂ (teeth slightly worn); collected November 15, 1916, by H. C. Raven; original number 2956.

Diagnosis.—Like specimens of *Tarsius fuscus fuscus* from northeastern Celebes, but more grayish in color, with longer tail, and larger skull. Teeth larger.

Measurements.—Type: Head and body, 120; tail, 270; hind foot, 65. Skull: Greatest length, 38.2 (37.6);[1] condylobasal length, 31.4 (30.6); greatest breadth, 29.6 (29.1); mandible, 24.2 (24.3); maxillary tooth row, entire, 16.0 (15.7); upper molar-premolar series, 13.3 (13.0); mandibular tooth row, entire, 14.8 (14.5).

Specimens examined.—Three from the type locality and one from Parigi.

Tarsius pumilus, sp. nov.

Type from Rano Rano, Middle Celebes. No. 219,454, U. S. National Museum, skin and skull of adult ♀ (teeth considerably worn); collected December 31, 1917, by H. C. Raven; original number 3366.

[1]Measurements in parentheses are those of an adult female topotype (No. 218,070).

Diagnosis.—In general like *Tarsius fuscus* but very much smaller; upperparts much richer colored, less buffy, more reddish brown; the pelage longer. Spot behind ear buffy rather than white. Tail and feet haired as in *fuscus*. Skull very much smaller than that of *fuscus*, appearing scarcely more than half its bulk (actual relationship about as 12 to 19); mandible particularly small and weak; lower incisors relatively much higher; second unicuspid smaller than first.

Measurements.—Type: Head and body, 95; tail, 205; hind foot, 55. Skull: Greatest length, 31.0; condylobasal length, 25.1; greatest breadth, 26.3; mandible, 18.7; maxillary toothrow, entire, 12.7; upper molar—premolar series, 10.7; mandibular toothrow, entire, 11.8.

Specimens examined.—Three, the type and two from Gimpoe, Middle Celebes.

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PROCEEDINGS

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MUTANDA ORNITHOLOGICA.

XI.

BY HARRY C. OBERHOLSER.

Six thrushes belonging to the genus now commonly called *Merula* Leach or *Planesticus* Bonaparte have need of a change of name.[1] These alterations in nomenclature are detailed below.

The genus *Turdus* was first instituted by Linnæus (Syst. Nat. ed. 10, I, 1758, p. 168) to include a group of 16 species, none of which can be considered the type by either tautonymy or original designation. The type of this genus has commonly been considered to be *Turdus viscivorus* Linnæus, as designated by Gray (List Genera Birds, 1840, p. 27). The first author, however, so far as we are aware, definitely to designate the type for this group was Selby (Illust. Brit. Ornith., text of Land Birds, pt. 1, 1825, p. xxix), who selected the English Blackbird, *Turdus merula* Linnæus. It thus becomes necessary to transfer the generic name *Turdus* from the group to which it has commonly been applied, to the group now known as *Merula* Leach, or more properly, *Planesticus* Bonaparte. By this change the species now commonly placed in the group called *Turdus* will take for their generic name *Arceuthornis* Kaup (Skizz. Entwick.-Gesch. Natürl. Syst. Eur. Thierw., 1829, p. 93; type by subsequent designation, *Turdus pilaris* Linnæus). This transfer of the generic name *Turdus* to *Merula* (*Planesticus*) causes the preoccupation of several specific and subspecific names in the group, and it is of interest to note that these preoccupations occur whether or not the genus *Turdus* (olim *Merula* or *Planesticus*) is recognized as distinct from *Arceuthornis* (olim *Turdus*).

Family TURDIDAE.

Merula albifrons Ramsay.

By the above explained change of the generic term *Merula* to *Turdus*, *Merula albifrons* of Ramsay (Proc. Linn. Soc. New South Wales, ser. 1,

[1] For the ten preceding articles in this series, *cf.* Proc. Biol. Soc. Wash., XXX, pp. 75–76; 125–126; XXXI, pp. 47–49; 125–126; XXXII, pp. 7–8; 21–22; 127–128; 239–240; XXXIII, pp. 83–84; XXXIV, pp. 49–50.

III, pt. 4, 1879, p. 336; "mountainous parts of the island of Eromanga, New Hebrides") becomes preoccupied by *Turdus albifrons* Gmelin (Syst. Nat., I, ii, 1789 [not after April 20], p. 822; "Nova Seelandia"), which is now known as *Miro albifrons* (Gmelin). Since *Merula albifrons* Ramsay has apparently no synonym, it may be known as **Turdus proleucus,** nom. nov.

Merula tristis Swainson.

Since *Merula tristis* Swainson (Philos. Mag., new ser., I, No. V, May, 1827, p. 369; [Temiscaltipec, Mexico]) now takes *Turdus* for its generic name, it needs also a new subspecific name, for it thus becomes preoccupied by *Turdus tristis* Müller (Vollst. Natursyst., Suppl., 1776, p. 145; "Senegal"), which is a questionable synonym of *Pycnonotus xanthopygus.* As no name seems to be left for *Merula tristis* Swainson, we propose **Turdus assimilis lygrus** nobis. Since *Merula tristis* is no longer available as a specific term, the oldest tenable name among the races of this species becomes *Turdus assimilis* Cabanis (Mus. Hein., I, 1850, p. 4; "Xalapa"), and the forms of the species will now stand as follows:

Turdus assimilis assimilis Cabanis.
Turdus assimilis lygrus Oberholser.
Turdus assimilis cnephosa (Bangs).
Turdus assimilis leucauchen Sclater.

Merula grayi lurida (Bonaparte).

The *Planesticus luridus* of Bonaparte (*Pl* [*anesticus*]. *luridus* Bonaparte, Comptes Rendus Acad. Sci., XXXVIII, No. 1, January 9, 1854, p. 4, in text of footnote; "Nouvelle Grenade"), when used in combination with the generic name *Turdus,* is preoccupied by *Turdus luridus* Hermann (Observ. Zool., 1804, p. 202; [no locality]). Its earliest available name, therefore, is *Merula incompta* Bangs (Proc. Biol. Soc. Wash., XII, June 3, 1898, p. 144; "Santa Marta, Colombia"), which Dr. C. E. Hellmayr (Journ. f. Ornith., 1902, pp. 50, 52) considers of identical application. The proper name for this bird therefore becomes *Turdus grayi incomptus* (Bangs).

Merula bicolor Layard.

The transference of the generic name *Turdus* to *Merula,* in so far as it concerns *Merula bicolor* Layard (Ibis, ser. 3, Vol. VI, No. XXII, April, 1876, p. 153; [Kandavu Island, Fiji Islands]) renders the specific name of this species invalid on account of *Turdus bicolor* Gmelin (Syst. Nat., I, ii, 1789 [not after April 20], p. 835; "Caput Bonae spei"), which is now *Spreo bicolor* (Gmelin). Its next available name is *Merula ruficeps* Ramsay (Proc. Linn. Soc. New South Wales, ser. 1, I, pt. 1, 1876, p. 43; "Fiji Islands"), and it will therefore now stand as *Turdus ruficeps* (Ramsay).

Merula flavirostris Swainson.

When *Merula flavirostris* Swainson (Philos. Mag., new ser., I, No. V, May, 1827, p. 369; "[Temiscaltipec] Mexico") becomes *Turdus flavirostris* (Swainson), it is ineligible for use on account of *Turdus flavirostris* Horsfield

(Trans. Linn. Soc. Lond., XIII, pt. 1, May, 1821, p. 149; "Java"), which latter is now *Myophonus flavirostris* (Horsfield). There is, however, an available name in *Turdus rofo-palliatus* [sic] Lafresnaye (Rev. Zool., III, No. 9, September, 1840, p. 259; "Monterey en Californie"), and we may therefore call the species *Turdus rofopalliatus* Lafresnaye. As the locality given in the original description, Monterey, California, is, of course, erroneous, it seems advisable now to select a proper type locality, and we hereby designate Acapulco, Guerrero, Mexico, as such, since the specimen from which Lafresnaye prepared his description was collected by Leclancher during the voyage of the "Venus."

Merula cinerascens Reichenow.

Another specific name that becomes invalid by the change of *Merula* to *Turdus* is *Merula cinerascens* Reichenow (Ornith. Monatsber., VI, No. 5, May, 1898, p. 82; "Tabora und Kakoma im Innern Deutsch Ost Afrika"), since it thereby becomes preoccupied by *Turdus cinerascens* Latham (Ind. Ornith., I, 1790, p. 352; "India"). Since it has no other available name, we propose that it be known as **Turdus tephrinus**, nom. nov.

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A NEW OPHIURAN OF THE GENUS OPHIOPSILA FROM SOUTHERN CALIFORNIA.

BY AUSTIN H. CLARK.[1]

Of the curious genus *Ophiopsila* ten species have been described from various localities in the warmer portions of the world. These ten species are: *O. aranea* Forbes, 1843, Mediterranean; *O. annulosa* Sars, 1857, Mediterranean; *O. riisei* Lütken, 1859, West Indies; *O. fulva* Lyman, 1878, West Indies; *O. pantherina* Kœhler, 1898, East Indies; *O. maculata* Verrill, 1899, West Indies; *O. paucispina* Kœhler, 1907, Mozambique; *O. hartmeyeri* Kœhler, 1913, West Indies; *O. polysticta* H. L. Clark, 1915, West Indies; and *O. polyacantha* H. L. Clark, 1915, East Indies.

The new species described below is the first to be reported from the Pacific coast of America.

Ophiopsila californica, sp. nov.

The disk is 4.5 mm. in diameter; the arms are about 25 mm. long.

The dorsal surface of the disk is covered with very thin minute rounded overlapping scales, appearing naked except under close examination. The radial shields are very narrow, long-triangular, with the distal border upturned and swollen.

The upper arm plates are about as long as broad, the angles well rounded, the sides slightly convex. The arm spines are five in number, broad and flattened; the lowest is much the longest and narrowest, half again to twice as long as the next, which resembles it; the other three are short, broad, flat, rounded distally, the uppermost slightly the longest.

The oral shields are half again as broad as long, triangular, the angles, especially the lateral, rounded, the anterior sides slightly concave, the median third of the distal border occupied by a prominent posterior process.

The side mouth shields are very small and narrow, inconspicuous and difficult to make out.

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

The outermost mouth papilla is large, broadly oval, slightly longer than broad; the next is similar, slightly smaller and so set on the mouth frame that the plane of its flattening is parallel with the median interradial line; slightly beyond (proximal to) this, outside of and below it, deep in the mouth groove, is a large spiniform mouth papilla; beyond the second mouth papillæ and in line with them are two long thick blunt papillæ, which may be apical mouth papillæ, or lateral tooth papillæ, though they are very much larger than the other tooth papillæ. The tooth papillæ are few, rather large.

The tentacle scales are two, the inner very long, narrowly leaf like, distally overlapping that on the opposite side of the arm, the outer much shorter; on the first side arm plate the outer is about half as large as the inner, which is here relatively small; on the next three side arm plates the outer is about one third as large as the inner; on the outer part of the arm it is usually small, not much longer than broad, well rounded; distally it becomes proportionately longer again, and narrow.

The color is light yellowish brown, the disk with scattered small irregular spots and an interrupted border of sepia; the upper arm plates have a narrow median light line, and on either side of it an indistinct blotch of darker. On the upper surface of the arms there are traces of red bands narrowly bordered with black, about three upper arm plates in width, separated by somewhat broader bands of yellow mixed and clouded with black. Beneath the color is a uniform light yellow brown.

Type.—Cat. No. 38,662 U. S. N. M., from "Albatross" Station 2,944, off southern California, in 30 fathoms.

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PROCEEDINGS

OF THE

BIOLOGICAL SOCIETY OF WASHINGTON

A NEGLECTED FERN PAPER.[1]

BY WILLIAM R. MAXON.

While preparing a brief account of the ferns and fern allies of the District of Columbia for publication two or three years ago the writer had his attention called by Mr. C. A. Weatherby to the fact that the common gray polypody or resurrection fern of the southern United States and tropical America long known as *Polypodium incanum* Swartz, but more recently as *P. polypodioides* (L.) Hitchc., ought properly to be known as *P. polypodioides* (L.) Watt, Watt having been the first to transfer to *Polypodium* the Linnaean species *Acrostichum polypodioides* in a little known paper published long ago. The reference to the article in question was supplied subsequently by Miss Mary A. Day, Librarian of the Gray Herbarium. Besides the instance just mentioned there are in this paper several other transferred names which appear to have been completely overlooked by fern writers, including Christensen in the Index Filicum. It seems worth while to place these omissions on record.

The paper under discussion was published in the Canadian Naturalist, series II, vol. 13, pp. 157–160, 1867, under the title, "Review. Ferns: British and Foreign; by John Smith, A. L. S." The review proper (pp. 157, 158), signed "W.," is followed by a fern list of about two and one-half pages of fine print in double column, with the following prefatory remark by Watt: "We append a catalogue of northern North American ferns, giving our views of the nomenclature and classification of this order; it includes all the species mentioned by Michaux and by Dr. Gray, and most of those mentioned by Pursh and by

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

Hooker." The authorship of the entire paper is clearly indicated by the running head of page 159, "Watt—Catalogue of Ferns." The "list" is not only full of interesting comments but includes ample synonymy in condensed form. The Linnaean references are to the second edition of the Species Plantarum (1763).

The transferred names, most of which were coined later and independently by other writers, are as follows:

Polypodium polypodioides (L.) Watt, Canad. Nat. II. **13**: 158. 1867.

This is a transfer of *Acrostichum polypodioides* L., antedating *P. polypodioides* (L.) Hitchc., 1893, applied to the same plant.

Phegopteris connectile (L.) Watt, op. cit. 159.

A transfer of *Polypodium connectile* Michx., 1803, which is usually regarded as a synonym of *Polypodium phegopteris* L., 1753. This is *Dryopteris phegopteris* (L.) C. Chr., 1905.

Phegopteris rhaetica (L.) Watt, op. cit. 159.

This, which antedates *Phegopteris rhaetica* Pérard, 1869, is a transfer of *Polypodium rhaeticum* L., with citation of three synonyms and of two collections from western North America. *Polypodium rhaeticum* of Linnaeus is an aggregate, containing European elements usually referred to *Athyrium filix-femina* (L.) Roth and *Athyrium alpestre* (Hoppe) Rylands. The American plants referred to by Watt are presumably *Athyrium americanum* (Butters) Maxon, 1918.

Phegopteris montana (Vogler) Watt, op. cit. 159.

This is clearly *Dryopteris oreopteris* (Swartz) Maxon, 1901, often known as *Dryopteris montana* (Vogler) Kuntze, 1891.

Dryopteris[1] **spinulosa dilatata** (Hoffm.) Watt. op. cit. 159.

A transfer of *Polypodium dilatatum* Hoffm., 1795, antedating *D. spinulosa dilatata* (Hoffm.) Underw., 1893 = *Dryopteris dilatata* (Hoffm.) Gray, 1848. The name as written by Watt is "*D. spinulosa-dilatata.*"

Dryopteris spinulosa (Retz.) Watt, op. cit. 159.

A transfer of *Polypodium spinulosum* Retz., 1795, antedating *D. spinulosa* (Retz.) Kuntze, 1891. The name is written by Watt as "*D. spinulosa-vera,*" apparently to indicate the typical form of this variable species.

This is the common North American and Eurasian plant listed by Christensen as "*Dryopteris spinulosa* (Müll.) Kuntze" and as a transfer of *Polypodium spinulosum* Müll., 1767. The name transferred by Kuntze,

[1] *Aspidium* is recognized by Watt as a genus with two sections, *Dryopteris* and *Polystichum*. In the enumeration of species these are given the rank of genera, the genus names being abbreviated to "*D.*" and "*P.*," and the species names changed to feminine form in the case of *Dryopteris*. Later in the same volume (p. 403, 1868) *Dryopteris* and *Polystichum* are taken up as fully valid genera, without any reference to *Aspidium*.

however, is that of Retzius, and it is questionable whether the substitution (by Christensen) of Müller as parenthetical authority in the Kuntze citation is justifiable. The Müller reference was known to Watt and apparently was regarded by him as that of the earliest publication, for at page 403 of the same volume (1868) he definitely lists the species as *D. spinulosa* (Müll.).

Dryopteris spinulosa remota (A. Br.) Watt, op. cit. 159.

The name is written by Watt "*D. spinulosa-remota*" and the entry is as follows:

"*Aspd. remotum* A. Br.; *Nephrodium r* [*emotum*] Hook. Br. Ferns, *t. 22; Aspd. Boottii* Tuckerman. Dr. Gray refers *Dryopteris remota* here (as *A. spinulosum* var. *Boottii*)—it may prove to be a distinct species; it is not well known to me."

According to Christensen's Index Filicum *Aspidium remotum* is *Dryopteris filix-mas* × *spinulosa*. The plant of eastern North America formerly called *Aspidium Boottii* or *Dryopteris Boottii* is now regarded as a hybrid, *D. cristata* × *intermedia* Dowell, 1908.

Dryopteris arguta (Kaulf.) Watt, op. cit. 159.

A proper transfer of *Aspidium argutum* Kaulf., 1824, *Nephrodium rigidum* var. *americanum* Hook., 1862, being cited as a synonym. This is the Pacific Coast plant which has usually been known as *Dryopteris rigida arguta* (Kaulf.) Underw., 1893. It is, however, specifically distinct from the European *D. rigida* and has recently been reinstated[1] by the writer as *D. arguta* (Kaulf.) Watt.

Dryopteris rigida (Hoffm.) Watt, op. cit. 159.

Watt's entry after this name is as follows:

"Not of Gray, l. c. 631. [1848.] *A. rigidum*, Swartz, 53. Attributed to North America by Mr. Bentham—doubtless in error."

The reference here is clearly to the European plant which has been confused with its two American allies, *D. arguta* (Kaulf.) Watt and *D. cristata* × *intermedia* Dowell.

Cystea bulbifera (L.) Watt, op. cit. 160.

A transfer of *Polypodium bulbiferum* L. This is the common plant of eastern North America generally known as *Cystopteris bulbifera* (L.) Bernh., 1806, or perhaps more properly as *Filix bulbifera* (L.) Underw., 1900.

Cystea montana (Lam.) Watt, op. cit. 160.

A transfer of *Polypodium montanum* Lam., 1778, partly by association with *Aspidium montanum* Swartz, 1801.

This is the boreal plant of Eurasia and North America known as *Cystopteris montana* (Lam.) Bernh. or *Filix montana* (Lam.) Underw., 1900.

[1] Amer. Fern Journ. 1:3. 1921.

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PROCEEDINGS

OF THE

BIOLOGICAL SOCIETY OF WASHINGTON

NEW MELIACEAE FROM MEXICO.

BY S. F. BLAKE.

While engaged in the preparation of a brief synopsis of the Meliaceae of Mexico for Mr. Paul C. Standley's "Trees and Shrubs of Mexico," I have found several new species of the genus *Guarea*. A new species of *Cedrela* has also turned up since the publication of my paper on this genus.[1] As the plan of Mr. Standley's work does not permit of full descriptions, these are given here.

Cedrela ciliolata Blake, sp. nov.

Branchlets puberulous; leaves 6- to 10-foliolate; petiole and rachis pilosulous, together 10 to 25 cm. long; petiolules 1 to 1.7 cm. long, opposite or subopposite; blades ovate or oblong-ovate, or the lowest suborbicular-ovate, the larger 9 to 12.5 cm. long, 3.3 to 5 cm. wide, narrowly falcate-attenuate, at base unequal and usually broadly rounded or subcordate, or rarely acute, pergamentaceous, above deep green, somewhat shining, sparsely puberulous along costa or glabrous, ciliolate with whitish hairs, beneath slightly paler or brownish green, spreading-pilosulous or puberulous chiefly along costa and the 12 to 16 pairs of lateral veins or glabrescent, somewhat prominulous-reticulate; panicles puberulous, when young dense, at maturity loose, about 14 cm. long and wide, with spreading or deflexed branches; pedicels 2 to 3 mm. long; calyx 2 mm. long, puberulous, the 5 teeth short, deltoid, acutish to obtuse, sometimes apiculate; petals linear-oblong, 6.5 to 7.5 mm. long, obtuse, densely griseous-puberulous outside; stamens 3.8 mm. long, glabrous, the anthers 1.5 mm. long, apiculate; pistil 4 mm. long, distinctly exceeding the disk (this 2.5 mm. long), the style exceeding the ovary; capsule (? obovoid-) ellipsoid, 4 to 4.5 cm. long, fuscous; seeds chestnut, 2.4 cm. long or more.

Type in the U. S. National Herbarium, No. 1,001,194, collected at Rincón, near Morelia, Michoacan, altitude 1900 meters, June 20, 1909, by G. Arsène (No. 2728). Duplicates from the same locality and collector in 1909 (No. 3075) and 1911 (No. 5390).

[1] Proc. Biol. Soc. Wash. **33**: 107–111. 1920.

This species is close to *Cedrela dugesii* S. Wats., of Guanajuato, which agrees in its conspicuously ciliolate leaflets, but has much smaller fruit, only 2.5 cm. long, and leaflets very acute at base. The vernacular name of *C. ciliolata* is given by the collector, with a mark of interrogation, as "nogal corriente."

Guarea chiapensis Blake, sp. nov.

Branchlets strigillose; leaves 4- or 6-foliolate, the petiole (12 to 22 mm. long) and rachis (2.5 to 12 cm. long) strigillose; petiolules stout, 2 to 4 mm. long; blades opposite, obovate to elliptic or obovate-elliptic, the larger 10 to 16.5 cm. long, 4 to 6 cm. wide, obtusely short-pointed, at base cuneate, papery, above deep green, finely puberulous along costa and lateral veins, beneath strigillose along costa and chief veins, the lateral veins 8 to 10 pairs, flat or impressed above, prominent beneath, the secondaries prominulous-reticulate chiefly beneath; panicles axillary, 5 cm. long, strigillose, bifurcate from base, the lower branches about 1 cm. long, about 5-flowered, the upper very short or suppressed, about 3-flowered; bracts and bractlets very small; pedicels clavate, about 3 mm. long; calyx saucer-shaped, 1 mm. high, strigillose, shallowly 4-toothed, the teeth deltoid, acutish; petals 4, oblong, 5.8 mm. long, valvate, obtuse, densely griseous-strigillose outside; stamens 8, the tube 4 mm. long, strigillose outside, shallowly 8-crenate, the linear-oblong anthers 1.3 mm. long; pistil 4.8 mm. long, the gynophore glabrous, very short, the ovary densely strigose, 1.8 mm. long, 4-celled, the ovules solitary, the style sparsely strigose, 2.2 mm. long, the stigma 0.8 mm. wide.

Type in the U. S. National Herbarium, No. 567,587, collected at Finca Irlanda, Chiapas, June, 1914, by C. A. Purpus (No. 7374).

This species is related to *Guarea donnell-smithii* C. DC., which is described as having a simple racemiform panicle equaling the leaf rachis.

Guarea excelsa dubia Blake, subsp. nov.

Similar to the typical form in every character, except that the ovary is sparsely strigose above, and the capsule sparsely strigillose.

Type in the U. S. National Herbarium, No. 345,974, collected on Maria Madre Island, Tres Marias Islands, Tepic, May 3–25, 1897, by E. W. Nelson (No. 4230). Also collected at the same place and time by Nelson (No. 4222 in part) and F. S. Maltby (No. 43 in part).

Both *Nelson* 4222 and *Maltby* 43 are mixtures of the true *Guarea excelsa* H. B. K. and *G. excelsa dubia*. I can discover no difference whatever between them except in the presence or absence of pubescence on the ovary and capsule, but as this is a technical character of considerable importance in the genus it seems advisable to distinguish the pubescent form as a subspecies. Field studies on the constancy of this character are greatly to be desired. I have seen no specimens of *G. excelsa* showing a pubescent ovary from any other point in its range.

Guarea heterophylla Blake, sp. nov.

Branchlets stout, glabrate; leaves 2- to 10-foliolate; petiole (2 cm. long) and rachis (2.5 to 10.5 cm. long) strigillose, glabrate; petiolules 2 to 4 mm.,

long, glabrate; blades opposite, obovate-oblong or elliptic-obovate, the lower about 6 cm. long, the upper 9 to 13 cm. long, 3.5 to 5 cm. wide, obscurely and obtusely short-pointed, at base cuneate and unequal, pergamentaceous, above glabrous, beneath barbate in the axils, along costa sparsely strigillose or glabrous, the lateral veins about 8 pairs, prominent beneath, the secondaries prominulous-reticulate on both sides; panicles axillary, 7.5 to 14.5 cm. long, strigillose, glabrescent, the branches remote, the lowest spreading, up to 2.5 cm. long, the upper very short, the cymules about 3-flowered; pedicels 1.5 mm. long; calyx saucer-shaped, 1 mm. long, 4-denticulate, strigillose; petals 4, strigillose above, 4 mm. long; stamens 8, the tube 3 mm. long, sparsely strigillose near middle, crenate with emarginate lobes, the anthers oblong, 1 mm. long, exserted for half their length; pistil glabrous, the ovary 4-celled, the cells 1-ovulate, the style about 0.8 mm. long, shorter than ovary.

Type in the U. S. National Herbarium, No. 573,203, collected at Pinotepa, Oaxaca, May, 1845, by H. Galeotti (No. 7247 D).

Related to *Guarea polyantha* Blake, which has much longer and comparatively narrower lance-elliptic acuminate leaflets.

Guarea polyantha Blake, sp. nov.

Large compact shrub; branchlets strigillose, glabrescent; leaves 4- to 10-foliolate; uppermost leaves with about 5 oblong-elliptic obtuse alternate leaflets about 8.5 cm. long; main leaves 10-foliolate, the petioles (3 cm. long) and rachis (23 cm. long) essentially glabrous; petiolules 3 to 6 mm. long; lowest pair of leaflets oblong-elliptic, 7 cm. long, the others elliptic or lance-elliptic, 12.5 to 19 cm. long, 4 to 5.5 cm. wide, obtusely acuminate, at base unequally cuneate, pergamentaceous, equally green on both sides, glabrous on both sides except for ferruginous tufts in the axils beneath, the lateral veins about 8 pairs, prominent beneath, the secondaries prominulous-reticulate on both sides; panicles axillary, 10 to 24 cm. long, strigillose, glabrescent, pyramidate, branched from near the base, the branches 9 cm. long or less, spreading or ascending, their branchlets frequently subverticillate, the cymules mostly 3-flowered; pedicels clavellate, 2 to 4 mm. long; calyx saucer-shaped, 0.8 mm. long, strigillose and ciliolate, the 4 short teeth acutish; petals 4, white, oblong, 3.8 mm. long, obtuse, sparsely strigillose toward apex; stamens 8, the tube 3 mm. long, glabrous, shallowly crenate with emarginate lobes, the anthers oblong, 0.7 mm. long, exserted for half their length; pistil glabrous, 3.2 mm. long, the stout gynophore 0.8 mm. long, the ovary 1.2 mm. long, 4-celled, the cells 1-ovulate, the style 1 mm. long, the stigma 0.8 mm. wide.

Type in the U. S. National Herbarium, No. 266,358, collected in thick, shady woods on low ground in Acapulco or vicinity, Guerrero, March 1–10, 1895, by E. Palmer (No. 578).

According to the collector the flowers have a strong odor of honey, and the vernacular name is "cedrillo."

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PROCEEDINGS

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A NEW ASPILIA FROM TRINIDAD.

BY S. F. BLAKE.

A composite from Trinidad, British West Indies, recently referred to me for determination by Dr. N. L. Britton, proves to represent a new species of *Aspilia*. It is described here in order that the name may be available for use in another connection.

Aspilia nigropunctata Blake, sp. nov.

Shrub 2 meters high; stem herbaceous above, slender, strigose, the internodes 7 to 13 cm. long; leaves opposite; petioles 6 to 11 mm. long, hispid-pilose or strigose; blades ovate, 6.5 to 10 cm. long, 3 to 4 cm. wide, acuminate, at base acute, papery, serrulate (the teeth small, 3 to 6 mm. apart), dark green above, somewhat paler green beneath, evenly but not densely strigose and strigillose on both sides, bearing black dots along the veinlets on the lower surface, triplinerved about 1 cm. above the base, the primary veins prominulous on both sides, the secondaries not prominulous; heads 1 to 5 at tips of stem and branches, about 2 cm. wide, on puberulous and strigose pedicels 3 to 5 cm. long; disk 6 to 8 mm. high, 7 to 9 mm. thick; involucre 3-seriate, 9 to 10 mm. high, scarcely graduated, the outer phyllaries 4, oblong-ovate, 3 to 6 mm. wide, with pale indurated base and subequal reflexed or spreading acute black-dotted herbaceous apex, strigose on their exposed surface; two inner series oblong-oval, rounded, subscarious, essentially glabrous, black-dotted and lined above; rays yellow, about 8, neutral, the lamina oval, 9 to 11 mm. long, 5 mm. wide; disk corollas yellow, with the teeth papillose-barbate within near the margin, otherwise glabrous, 5 mm. long (tube slender, 1.2 mm., throat tubular-funnelform, 2.3 mm., teeth triangular, 1.5 mm.); achenes somewhat compressed, blackish brown, obovoid, 3.5 mm. long, rather sparsely pilose, sometimes narrowly wing-margined toward base; pappus coroniform, 0.5 mm. long, lacerate-fimbriate, contracted at base into a short neck, without awns.

Type in the U. S. National Herbarium, No. 1,047,159, collected on a moist bank at Mt. Tocuche, Trinidad, April 3–5, 1920, by N. L. Britton, T. E. Hazen, and W. Mendelson (No. 1320).

This species is close to **Aspilia verbesinoides** (DC.) Blake,[1] also of Trinidad, of which I have seen authentic material in the Gray Herbarium. The latter species, however, has lance-ovate leaves prominently reticulate beneath and smaller heads, and the awns of the pappus are present and distinctly longer than the squamellae. Its name-bringing synonym, *Gymnopsis verbesinoides* DC., was wrongly referred by O. E. Schulz[2] to the synonymy of *Wedelia jacquini caracasana* (DC.) O. E. Schulz.

[1] *Gymnopsis verbesinoides* DC. Prodr. 5:561. 1836.
[2] In Urb. Symb. Antill. 7:105. 1911.

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PROCEEDINGS

OF THE

BIOLOGICAL SOCIETY OF WASHINGTON

THOMOMYS DOUGLASII SHAWI, A NEW SUBSPECIES OF POCKET GOPHER FROM MOUNT RAINIER, WASHINGTON.

BY WALTER P. TAYLOR.

Investigations by the U. S. Biological Survey and the State College of Washington in Mount Rainier National Park, Pierce County, Washington (1919), and in the Cascade Mountains of western Yakima County, Washington (1917), have disclosed the existence in the high mountains of that region of an undescribed subspecies of pocket gopher, belonging to the *douglasii* group. I take pleasure in naming this form in honor of Professor William T. Shaw, Zoologist of the State College of Washington, Pullman, Washington, a leader in distributional and ecological studies of the higher vertebrates of the State.

Thomomys douglasii shawi, new subspecies.

RAINIER POCKET GOPHER.

Type.—From Owyhigh Lakes, 5,100 feet, Mount Rainier, Washington; No. 232,807, U. S. National Museum, Biological Survey collection; adult male, skin and skull; collected by George G. Cantwell, August 9, 1919; collector's number 1464.

Diagnostic characters.—Similar to *Thomomys douglasii limosus*[1] but tending to be larger, paler, and less intense brown. Zygomata narrower and mastoid width tending to be less.

Geographic range.—East side of Mount Rainier National Park; also the Cascade Mountains in the vicinity of Mount Aix, Cowlitz Pass, and Goat Rocks. Life Zone, Hudsonian.

Color.—Above (in August specimens) cinnamon-buff or clay color, paling to pinkish buff on sides; the postauricular spot blackish plumbeous, inconspicuous; fore part of face varying between deep and light mouse gray, tip of nose often with white spot; underparts whitish, lightly washed with buffy, and with whitish areas on chin and occasionally on the middle of the breast or in the inguinal region; top of both fore and hind feet white;

[1]Specimens from localities intermediate between the type localities of *Thomomys douglasii douglasii* and *T. d. limosus* indicate intergradation between them.

hairs of tail whitish. The dark plumbeous hair bases show through to some extent on the underparts, and cause an appreciable darkening effect. The same is true to a lesser extent above. Young specimens are in better pelage than adults; the color of their upperparts is like that of adults, but the underparts are more whitish. Every adult shows from one to four molt lines, and in some specimens the pelage is obviously much worn.

Skull.—Similar to that of *Thomomys douglasii douglasii*, but with shorter brain-case, zygomatic width tending to be less and zygomata more nearly square, the arches distinctly broader posteriorly than in *douglasii*. Similar to that of *T. d. limosus*, but zygomatic width less, the arches less expanded.

Measurements.—Type: Total length, 230 mm.; tail vertebrae, 70; hind foot, 33. Skull: Basal length, 34.5; nasals, 14.9; zygomatic breadth, 21.5; mastoid breadth, 19.2; interorbital breadth, 6.3; alveolar length of upper molar series, 8.3. *Average of five males:* Total length, 227 (max. 232, min. 222); tail vertebrae, 72 (76–70); hind foot, 32.6 (34–31). Skull: Basal length, 34.1 (34.5–33.6); nasals, 14.5 (14.9–14.0); zygomatic breadth (four specimens), 21.6 (21.9–21.2); mastoid breadth, 19.0 (19.4–18.8); interorbital breadth, 6.6 (7.0–6.1); alveolar length of upper molar series, 8.4 (8.6–8.2). *Average of three females:* Total length, 206 (max. 215, min. 195); tail vertebrae, 64 (70–60); hind foot, 30 (30–30). Skull: Basal length, 31.5 (32.0–31.3); nasals, 13.6 (14.0–13.2); zygomatic breadth (one specimen), 20.5; mastoid breadth, 18.0 (18.5–17.7); interorbital breadth, 6.4 (6.5–6.3); alveolar length of upper molar series, 8.0 (7.9–8.3).

Remarks.—Contrary, perhaps, to expectations, the Rainier Pocket Gopher finds its closest affinities with the *douglasii* group, heretofore known only from the lowland country west of the Cascade Mountains in Washington and Oregon, the Olympic Mountains, and the Washington side of the Columbia River east to White Salmon, Klickitat County. Externally and cranially the Rainier Pocket Gopher is similar to *Thomomys douglasii limosus;* and intergradation with this form is shown by specimens from Signal Peak, Yakima County, and Trout Lake, Klickitat County. The relations of the new form to the pocket gophers found east of its range are not so clear. Specimens from Conrad Meadows, McAllister Meadows, and Bumping Lake, on the east slope of the Cascade Mountains in Yakima County, seem to show intergradation with the *fuscus* group.

The new form has quite certainly ingressed to Mount Rainier from the Cascade Mountains to the east, and is found at present only on the east side of the Mountain, from about Cowlitz Divide to Grand Park.

Specimens examined.—Total number, 15, as follows:

Mount Rainier, Pierce County, Washington: Owyhigh Lakes, 5,100 feet, 6; Glacier Basin, 5,935 feet, 6.

Yakima County, Washington: Twin Sister Lakes, near Cowlitz Pass, 5,300 feet, 1; 2 miles southwest of Conrad Meadows, 4,200 feet, 1; head of Hindoo Creek on Mount Aix, 6,500 feet, 1.

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PROCEEDINGS

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MEMBRACIDAE OF THE VICINITY OF WASHINGTON, D. C.

BY W. L. McATEE.

The Membracidae or tree-hoppers, notable for great development and varied shape of the pronotum, are best collected by beating shrubs and trees. Vigorous young trees are favored by them and collecting is at its best where new growth is just replacing a cut-off forest. The present list of tree-hoppers of the District of Columbia region is only preliminary, for numbers of species will be added by diligent collecting, as well as by the elucidation of such complex genera as *Telamona* and *Cyrtolobus*. Only 46 species are here recorded, while 54 are listed for New Jersey[1] and 68 for Connecticut.[2]

Grateful acknowledgment is made of the assistance of Drs. E. D. Ball and W. D. Funkhouser in clearing up various difficulties encountered in working up the present list.

KEY TO THE SUBFAMILIES.

A. Scutellum covered by the conspicuously developed pronotum.
  B. Tarsi of equal length or the hind pair longest.
    C. Tibiae simple, never greatly dilated, tegmen chiefly membranous, coriaceous and punctured only at base ..... *Smiliinae* p. 123.
    CC. Front and mid tibiae distinctly dilated ..... *Membracinae* p. 132.
  BB. Hind tarsi shorter than others ..... *Hoplophorinae* p. 132.
AA. Scutellum exposed ..... *Centrotinae* p. 132.

SMILIINAE.

KEY TO THE TRIBES.

A. Clavus not covered, its inner margin in contact with pronotum. ..... *Ceresini* p. 124.

[1] Smith, J. B. Report on the Insects of New Jersey. Rep. N. J. State Mus. 1909, pp. 90–94.

[2] Britton, W. E. Check-list of the Insects of Connecticut. Bul. 31, Conn. Geol. and Nat. Hist Survey, 1920, pp. 53-55, 356.

AA. Clavus and frequently more or less of corium covered by pronotum.
B. Wing with the terminal cell truncate at base..*Telamonini* p. 126.
BB. Wing with the terminal cell angled at base.
C. First sector of tegmen branching near middle; subcostal cell short.....*Polyglyptini* p. 130.
CC. First sector branching near base; subcostal cell long *Smiliini* p. 128.

CERESINI.

Key to the Genera.

A. Pronotum with suprahumeral horns.....*Ceresa* p. 124.
AA. Pronotum without suprahumeral horns.
B. Anteapical cells mostly distinctly longer than apical; species chiefly greenish..... *Stictocephala* p. 125.
BB. Anteapical cells of about same length as apical; species chiefly black, or black at least on top of pronotum.
C. Tegmen with five cells at apex, veins dark *Acutalis* p. 125.
CC. Tegmen with four cells at apex, veins hyaline *Micrutalis* p. 126.

CERESA Amyot and Serville.

Key to the Species.

A. Species with transverse color bands, especially noticeable near posterior end of pronotal extension.
B. Femora with conspicuous brown to black bands or spots; color in general darker.....*diceros.*
BB. Femora without dark markings; color in general paler *albescens.*
AA. Species without transverse bands.
C. Horns projecting almost straight laterally, both as viewed from above and from in front.
D. Smaller, front of pronotum distinctly hairy *borealis.*
DD. Larger, front of pronotum not hairy....*bubalus.*
CC. Horns noticeably curved either upward, backward or both.
E. Horns distinctly curved backward, but not upward, front of pronotum convex.....*brevitylus.*
EE. Horns curved both upward and backward.
F. Smaller, with more or less purplish brown coloration, horns more strongly curved, genital segment of female with a broad cleft, rounded at bottom .....*constans.*

FF. Larger, color decidedly greenish, horns less strongly curved, genital segment of female with a narrow acute cleft *taurina.*

C. albescens Van Duzee.—Plummers Id., Md., Aug. 27, 1905, McAtee; Sept. 29, 1907, A. K. Fisher; Scott's Run, Va., July 4, 1918, McAtee; Dead Run, Va., Aug. 6, 1915, R. C. Shannon; Hyattsville, Md., Aug. 4, 1907, F. Knab.

C. borealis Fairmaire.—Fairly common; all records so far are from Piedmont[1] localities, the dates of capture ranging from June 29 to Oct. 4, P. I.[2]

C. brevitylus Van Duzee.—Common in both Coastal Plain and Piedmont localities, season April 22 to July 23. P. I.

C. bubalus Fabricius.—Fairly common, generally distributed; dates of collection extend from July 23 to Aug. 30. P. I.

C. constans Walker.—Washington, D. C., Aug. 1, 1908, McAtee; July 2, 1917, M. Taylor.

C. diceros Stal.—Plummers Id., Md., July 19, 1914, Maryland near Plummers Id., July 13, 27, 1913, McAtee; Branchville, Md., Aug. 19, 1919, L. L. Buchanan; Oxon Run, Md., Sept. 6, 1915, McAtee; Marshall Hall, Md., June 24, 1890, O. Heidemann; Kensington, Md., Aug. 1, 1898, F. C. Pratt; Washington, D. C., May 25, 1903, E. S. G. Titus.

C. taurina Fitch.—Beltsville, Md., June 23, 1918, adult and nymphs, McAtee.

Ceresa palmeri Van Duzee, a form of rather northern range, was taken at Poolesville, Md., July, 1898, F. C. Pratt, and at Bluemont, Va., July 1, 1914, McAtee.

STICTOCEPHALA Stal.

S. lutea Walker.—Very common and generally distributed; has been collected from April 27 to July 7. P. I.

Stictocephala inermis Fabricius and *S. substriata* Walker apparently should occur here, but they have not yet been collected.

ACUTALIS Fairmaire.

A. tartarea Say.—The only species collected here has two color varieties which may be distinguished by the following characters:

A. Tegmen with only the veins dark, only disk of pronotum black var. *semicrema.*

AA. Tegmen more extensively darkened, whole pronotum black var. *tartarea.*

[1] For explanation of the physiographic areas of the District of Columbia region, see Bul. 1, Biol. Soc. Wash., 1918. A Sketch of the Natural History of the District of Columbia by W. L. McAtee.

[2] P. I. signifies occurrence on Plummers Island, Md., and V. P. I. in the vicinty of that locality.

The typical variety is common and generally distributed, the dates of occurrence ranging from June 13 to Oct. 8. P. I. Variety *semicrema* Say has been collected at Plummers Id., Md., Sept. 5, 1905, O. Heidemann; Oct. 1907, W. Palmer; Oct. 5, 1913, McAtee; July 12, 1914, L. O. Jackson; near Chevy Chase Lake, Md., July 6, 1913, McAtee; Silver Hill, Md., Sept. 26, 1915, L. O. Jackson; near mouth of Four-mile Run, Va., Sept. 17, 1916, McAtee, New Alexandria, Va., Oct. 1907, W. Palmer; and Washington, D. C., June 17, 1906, D. H. Clemons.

MICRUTALIS Fowler.

M. calva Say.—The only species occurring here exhibits two color varieties:

A. Pronotum, except apex, black ..... var. *calva*.

AA. Pronotum more or less pale along sides, the pale color encroaching on the black so as to leave a peninsula of this color on posterior part of pronotum ..... var. *illinoiensis*.

The typical variety is common, occurs in all parts of the region and has been collected as early as June 15 and as late as Sept. 7. P. I. Variety *illinoiensis* Goding has been collected at Silver Hill, Md., Sept. 26, 1915, L. O. Jackson; Eastern Branch near Benning, D. C., Aug. 29, 1915, McAtee; Sept. 13, 1914, L. O. Jackson; Veitch, Va., June 17, 1914, McAtee, and Washington, D. C., Sept. 4, 1881.

TELAMONINI.

KEY TO THE GENERA.

A. Pronotum transversely rounded, without horn or crest. *Carynota* p. 126.

AA. Pronotum with a distinct horn or compressed into a prominent median crest or process.

B. Pronotum with a conspicuous forward projecting horn *Thelia* p. 127.

BB. Pronotum with an erect horn or crest.

C. Pronotum with a narrow compressed horn, erect or nearly so, over the humeri ..... *Glossonotus* p. 127.

CC. Pronotal process not horn-like or if apparently so, farther back than humeri.

D. Pronotal crest high and regularly arched *Archasia* p. 127.

DD. Pronotal crest not regularly arched.

E. Pronotal crest rather narrow with a distinct notch or step posteriorly *Heliria* p. 127.

EE. Pronotal crest usually broader, without step ..... *Telamona* p. 127.

CARYNOTA Fitch.

C. mera Say.—Plummers Id., Md., July 5, 1912, H. S. Barber; June 17, 1913, J. D. Hood.

Apparently *C. marmorata* Say also may occur here.

THELIA Amyot and Serville.

T. bimaculata Fabricius.—Common, breeding on black locust (*Robinia pseudacacia*); adults have been collected from June 23 to Aug. 31. P. I.

GLOSSONOTUS Butler.

G. godingi Van Duzee.—Beltsville, Md., June 8, 1919, L. O. Jackson; June 23, 1918, McAtee.

HELIRIA Stal.

H. cristata Fairmaire.—Plummers Id., Md., June 8 1913, July 19, 26, 1914, McAtee.

TELAMONA Fitch.

A. Pronotal crest about as high in front as long.
  B. Color darker, markings prominent.
    C. Posterior edge of crest pale with a dark vitta *ampelopsidis.*
    CC. Posterior edge of crest broadly pale ..... *querci.*
  BB. Color paler, markings nearly obsolete.
    D. Color (in cabinet) yellowish, plain in female with some dark markings in male; suprahumeral angles less prominent ..... *unicolor.*
    DD. Color yellow with light-brown markings; suprahumeral angles very prominent *pruinosa.*
AA. Pronotal crest much longer than high ..... *westcotti.*

A genus in which the species are little understood; apparently, *T. collina* Walker, in addition to those here listed, should occur in the District of Columbia region.

T. ampelopsidis Harris.—Plummers Id., Md., June 7, 1914, June 20, 1909; McAtee; June 28, 1908, E. A. Schwarz; Beltsville, Md., June 18, 1916, July 4, 1915, McAtee.

T. pruinosa Ball.—Plummers Id., Md., July 5, 1914, McAtee; Virginia near Pls. Id., July 20, 1912, P. R. Myers.

T. unicolor Fitch.—Plummers Id., Md., July 8, 1902, H. S. Barber; Bladensburg, Md., June 1, 1919, L. L. Buchanan.

T. westcotti Goding. (*T. obsoleta* Ball).—Beltsville, Md., June 14, 1914, June 23, 1918, McAtee.

ARCHASIA Stal.

A. Pronotal crest continuously curved throughout ..... *galeata.*
AA. Pronotal crest with a prominent sinuation in its posterior third *belfragei.*

A. belfragei Stal.—Beltsville, Md., June 14, 1914, McAtee.

A. galeata Fabricius.—Beltsville, Md., June 23, 1918; Veitch, Va., June 17, 1914, McAtee; Great Falls, Va., July 6, 1913, A. Wetmore.

SMILIINI.

A. Corium with crossvein between the two interior longitudinal veins.
B. Pronotum transversely rounded, without distinct crest *Ophiderma* p. 130.
BB. Pronotum compressed into a distinct crest *Cyrtolobus* p. 128.
AA. Corium lacking this crossvein; pronotum compressed into an arched crest, highest in front *Smilia* p. 128.

SMILIA Germar.

S. camelus Fabricius.—Beltsville, Md., May 31, 1920, McAtee; July 12, 1919, L. L. Buchanan.

CYRTOLOBUS Goding.

The species of this genus and their relationships are very imperfectly understood. Several of the named forms besides those listed here have been reported from ranges which would indicate that they may occur in our region. There are on hand also four apparently undescribed species.

Cyrtolobus (*Xantholobus*) *nitidus* Van Duzee was described from specimens one of which was collected at Washington, D. C., in June, 1905. (Studies, 1908, p. 97.)

It should be noted that *Cyrtolobus gloveri* Goding (Catalogue, 1894, p. 434), said to be probably from Maryland, is a legitimately published species, though no doubt an unidentifiable one. Van Duzee (Catalogue, 1917, p. 548) calls this a *nomen nudum*. What Goding refers to as Glover's ms. Journ. Hom. is a published work, 12 copies of which were distributed to leading libraries. A bibliographical citation is herewith given:

Glover, Townend. Illustrations of North American Entomology in the orders of Coleoptera, Orthoptera, Neuroptera, Hymenoptera, Lepidoptera, Hemiptera and Diptera. Washington, D. C., 1878. Title page printed, text and plates lithographed. Copyrighted 1878.

Homoptera Plate I, fig. 14 is *Cyrtosia* sp. afterward named *gloveri* by Goding. *Hoplophora gloveri* Goding, another membracid name based on this work, is not accounted for in the Van Duzee Catalogue.

Key to the Species of Cyrtolobus.

A. Pronotal crest not pinched-in laterally at any point, evenly curved, highest over humeral angles (subgenus *Atymna*).
B. Pronotum more elevated, highest over humeri, curve of anterior end of dorsal crest as if made by rounding off a right angle, females green, males green or with dark markings *castaneae*.
BB. Pronotum less elevated, highest distinctly behind humeri, curve of anterior end of dorsal crest much more obtuse.
C. Face more smooth, clypeus larger and more polished; both sexes green *inornata*.

CC. Face distinctly punctured, clypeus not polished, females green, pronotum of males dark on sides with a pale median dorsal vitta interrupted before apex..... *querci*.

AA. Pronotal crest pinched-in laterally at one or more points, thus having compressed and inflated portions; often with one or more sinuations in the dorsal outline, and usually highest behind humeral angles. (Subgenus *Cyrtolobus*.)

D. Highest point in pronotal crest immediately behind humeri, dorsal outline very evenly curved.

E. Dark brown with pale oblique median and subapical crossbands.

F. Larger, markings less contrasted.....*fenestratus*.

FF. Smaller, markings more contrasted....*inermis* ♂.

EE. Without definite crossbands.

G. Pronotal crest twice as high as head *ovatus*.

GG. Pronotal crest less than twice as high as head .....*inermis* ♀.

DD. Highest point in pronotal crest farther back, dorsal outline with a distinct hump bounded by a smaller anterior and a more pronounced posterior depression.

H. Pale brownish in color without distinct markings *intermedius*.

HH. With distinct bands across pronotum.

I. Principal oblique dark color band separated from dark apex of pronotum by a pale subapical crossband. .....*vau*.

II. This color band paler except along anterior edge, but very broad, covering posterior half of pronotum; no subapical pale band.....*sculptus*.

Subgenus ATYMNA Stal.

C. castaneae Fitch—Has been abundant, but unless it is adaptive enough to change its food plant, it will practically disappear as has its host the chestnut (*Castanea dentata*). Dates of collection of adults range from May 28 to July 12.

C. inornata Say.—Scotts' Run, Va., July 25, 1915, McAtee.

C. querci Fitch.—Beltsville, Md., June 23, 1918, McAtee; May 28, 1919,

L. L. Buchanan; Odenton, Md., July 4, 1913, Dyke, Va., May 19, 1918, McAtee. Has been taken on *Quercus alba.*

Subgenus CYRTOLOBUS Goding.

C. fenestratus Fitch.—Branchville to Beltsville, Md., June 4, 1914, McAtee; Washington, D. C., June 30, 1919, L. L. Buchanan.

C. inermis Emmons.—Beltsville, Md., June 14, 1914, June 15, 1913, June 23, 1918, Washington, D. C., June 6, 8, 1906, McAtee.

C. intermedius Emmons.—Branchville to Beltsville, Md., June 4, 1914; Beltsville, Md., June 14, 1914, June 23, 1918; Mt. Vernon, Va., June 6, 1915, McAtee.

C. ovatus Van Duzee.—Beltsville, Md., June 8, 1919, L. L. Buchanan.

C. sculptus Fairmaire.—Beltsville, Md., May 25, 28, 1919, May 31, 1920, June 14, 1914; Odenton, Md., July 12, 1914; Dyke, Va., May 28, 1915, McAtee; Woodridge, D. C., May 15, 1915, E. R. Kalmbach. Has been taken on *Quercus marilandica.*

C. vau Say. The most common species of the genus; dates of collection range from May 28 to July 12. Has been taken on *Quercus alba* and *Q. minor.*

OPHIDERMA Fairmaire.

Key to the Species.

A. Color (in cabinet) uniform yellowish ..... *flava.*
AA. Color darker with pale crossbands.
B. Color usually castaneous, crossbands faint ..... *flavicephala.*
BB. Color usually paler, crossbands conspicuous ..... *pubescens.*

O. flava Goding.—Dunn-Loring, Va., Aug. 30, 1916, McAtee.

O. flavicephala Goding.—Beltsville, Md., May 28, 1919, L. L. Buchanan; June 14, 1914, June 23, 1918, on *Quercus alba,* McAtee.

O. pubescens Emmons.—Forest Glen, Md., May 28, 1914, at light, O. Heidemann; Beltsville, Md., May 25, 1919, May 31, 1920, Washington, D. C., June 8, 1906, McAtee.

Another species, *O. salamandra* Fairmaire, has been recorded from the District of Columbia (*Van Duzee,* Catalogue, 1917, p. 550.)

POLYGLYPTINI.

A. Pronotum more or less elevated, the surface with longitudinal ridges, sometimes reticulated.
B. Pronotum strongly compressed and elevated, the crest divided by a deep notch ..... *Entylia* p. 131.
BB. Pronotum less compressed and elevated, with a shallow notch ..... *Publilia* p. 132.
AA. Pronotum transversely rounded, without longitudinal ridges ..... *Vanduzea* p. 130.

VANDUZEA Goding.

V. arquata Say.—Abundant everywhere on black locust (*Robinia pseudacacia*), adults have been collected May 28 to Oct. 5. P. I.

In connection with the genus *Vanduzea,* it should be mentioned that *V. vestita* Goding was described (Catalogue, 1894, pp. 440–441) from Arizona and District of Columbia. Goding notes "Type in author's collection," a collection now in the National Museum. A specimen there labelled Type of *Vanduzea vestita* Goding, Washington, D. C. 9.4.81, is, as would be expected, a male of *V. arquata* Say. Thus if we follow the method of specific types we must consider *V. vestita* Goding a straight synonym of *V. arquata* Say. If this specimen is not really the type or if we ignore the type system of identifying species, the name *vestita* would be available for the western form most closely related to *arquata.* This has recently been called *V. triguttata* Burmeister, probably without positive identification.

Following is a key worked out by the writer in an endeavor to get a better understanding of the species of *Vanduzea.* More work needs to be done particularly on the forms now lumped as *segmentata* Fowler.

A. Pronotum neither pinched-in nor angulate-compressed at any point.
  B. Length 4.5–6 mm.; sexes very different in size and coloration, males blackish, females brownish ..... *arquata* Say.
  BB. Length 3–4.5 mm.; sexes of about the same size and color, blackish ..... (?) *triguttata* Burmeister.
AA. Pronotum angulate-compressed posteriorly.
  C. Pronotum gibbous above eyes, the latter not prominent as seen from above; pronotum angulate-compressed for the posterior third of its length. *segmentata* Fowler.
  CC. Pronotum sloping backward above eyes, the latter prominent as seen from above; pronotum angulate-compressed for the posterior half of its length.
    D. Dorsal outline of pronotum with a distinct sinuation at middle which together with the pronounced pinching-in at the same point gives the pronotum a strongly bivesicular appearance ..... *bajula* Goding.
    DD. Dorsal outline of pronotum without distinct sinuation at middle ..... *laeta* Goding.

ENTYLIA Germar.

A. Anterior division of pronotal crest broad, considerably higher than posterior, its anterior outline distinctly angulate; color usually pale ..... *concisa.*
AA. Anterior division narrower, but little higher than posterior, its anterior margin merely sinuate; color usually dark ..... *sinuata.*

E. concisa Walker.—Common and widespread; season May 9 to Sept. 29. P. I.

E. sinuata Fabricius.—Much less abundant than the preceding species, but as widely distributed; dates of collection range from April 28 to Oct. 27. P. I.

PUBLILIA Stal.

P. reticulata Van Duzee.—Forest Glen, Md., May 30, 1914, Plummers Id., Md., April 28, 1915, McAtee; July 7, 1906, O. Heidemann; Dead Run, Va., May 27, 1917, Great Falls, Va., Aug. 15, 1915, McAtee; Washington, D. C., May 25, 1879; Sept. 10, 1887.

HOPLOPHORINAE.

A single genus.....*Platycotis* p. 132.

PLATYCOTIS Stal.

A. Color olive varied with yellow to orange spots.....*sagittata.*
AA. Color stramineous with orange to red longitudinal streaks *quadrivittata.*

P. quadrivittata Say.—Plummers Id., Md., nymphs and adults on *Quercus rubra*, June 7, 1914, nymphs Oct. 5, 1915; Widewater, Chesapeake and Ohio Canal, Md., nymphs Sept. 28, 1913; Branchville to Beltsville, Md., nymphs, June 4, 1914; Glencarlyn to mouth of Four-mile Run, Va., nymphs, Sept. 27, 1914, McAtee.

P. sagittata Germar.—Beltsville, Md., June 14, 1914, McAtee; July 12, 1919, L. L. Buchanan; Widewater, Chesapeake and Ohio Canal, Md., Sept. 28, 1913; Eastern Branch near Benning, D. C., Aug. 17, 1913, McAtee; Four-mile Run, Va., June 29, 1913, A. Wetmore.

MEMBRACINAE.

Key to the Genera.

A. Lateral ridges of pronotal process about equally distant from upper and lower margins both of which are carinate.....*Enchenopa* p. 132.
AA. Lateral ridges of pronotal process near upper margin, which is carinate, while the lower is not.....*Campylenchia* p. 132.

CAMPYLENCHIA Stal.

C. latipes Say.—Common and widespread; season June 15 to October 13. P. I.

ENCHENOPA Amyot and Serville.

E. binotata Say.—Common, everywhere; dates of collection extend from May 18 to Sept. 14.

CENTROTINAE.

A single genus.....*Microcentrus* p. 132.

MICROCENTRUS Stal.

Key to the Species.

A. Pronotum without horns, its posterior process little if at all surpassing scutellum.....*caryae.*
AA. Pronotum with compressed suprahumeral horns, its posterior process sometimes surpassing scutellum.....*perdita.*

M. caryae Fitch.—Plummers Id., Md., Aug. 26, 1901, R. P. Currie; Aug. 20, 30, 1914, Aug. 27, 1905, Sept. 13, 1914, Sept. 14, 1913, McAtee.

M. perdita Amyot and Serville.—Plummers Id., Md., Aug. 26, 1901, R. P. Currie; Aug. 30, 1914, Sept. 13, 1914, McAtee; Sept. 28, 1912, P. R. Myers; Oct. 5, 1913, Beltsville, Md., June 14, 1914, June 15, 1913, July 4, 1915, McAtee; Washington, D. C., July 2, 1901, O. Heidemann.

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Goding, F. W.

Bibliographical and Synonymical Catalogue of the Described Membracidae of North America. Bul. Ill. State Lab. Nat. Hist., Vol. III, pp. 391–478, 1894.

Records 4 species from the District of Columbia, one of which, *Vanduzea vestita*, is described as new.

Van Duzee, E. P.

Studies in North American Membracidae. Bul. Buffalo Soc. Nat. Sci., Vol. IX, pp. 29–129, 2 pls., April 18, 1908.

Cyrtolobus (*Xantholobus*) *nitidus*, new species, described from specimens, one of which was collected at Washington, D. C.

Catalogue of the Hemiptera of America North of Mexico. Univ. Calif., Tech. Bul., Entomology, Vol. 2, Membracidae, pp. 520–568, Nov. 30, 1917.

Records 13 species and one variety from the District of Columbia.

Vol. 34, pp. 135–138 June 30, 1921

PROCEEDINGS
OF THE
BIOLOGICAL SOCIETY OF WASHINGTON

GENERAL NOTES.

CHOIROPOTAMUS VERSUS KOIROPOTAMUS.

In a recent note[1] Mr. Hollister has rightly shown that these names, both published in Gray's "List" of 1843, are valid nomenclaturally and the only question is as to which of them should be granted precedence.

Koiropotamus is given in the introductory systematic list (p. xxvii) and in the index, p. 207; Choiropotamus in the body of the work, p. 185.

Mr. Hollister says that "it seems clear that Choiropotamus is a *lapsus* for Koiropotamus * * * since it was taken direct from the specific name koïropotamus of Desmoulins," but he has no proof of this, and I should rather be disposed to say that finding Koiropotamus—classically incorrect—in existence, Gray deliberately corrected it by the alteration of K into Ch.

That he then later used Koiropotamus in the two indices, systematic and alphabetical,—obviously both prepared and printed later than p. 185,—does not affect the fact that in the first instance he used the proper classical transliteration. Why he altered the name does not appear, but as he did not definitely state that the change was the correction of a misprint or *lapsus calami* I should not admit it as such, and would now maintain that Choiropotamus is the form we ought to use.

So far as I am aware, no general ruling has been given as to the relative priority of introduction and body of work, but certainly in this case it is quite clear that Choiropotamus must have been printed first, or else the page number could not have been inserted in the introduction where Koiropotamus occurs.

Perhaps an official ruling should be asked for, but pending such I should propose to use Choiropotamus as the tenable name of the River Hogs.

—*Oldfield Thomas.*

A NEW NAME FOR THE WEST AFRICAN PYGMY SQUIRREL.

The name *Myosciurus minutus*, now in use for the West African pygmy squirrel, is preoccupied by *Sciurus minutus* Lartet, Notice sur la Colline de Sansan, suivie d'une Récapitulation des diverses Espèces d'Animaux Vertébrés Fossiles, etc., p. 20, 1851. The African species (*Sciurus minutus* Du Chaillu, Proc. Boston Soc. Nat. Hist., vol. 7, p. 366, 1861) requires a new name and may be known as *Myosciurus* **minutulus.**

—*N. Hollister.*

[1] Supra, p. 77.

LIOPTILUS CABANIS PREOCCUPIED.

The generic name *Lioptilus* Cabanis (Mus. Hein., I, 1850, p. 88), proposed for a genus of Muscicapidae, is preoccupied by *Leioptila* Blyth (Journ. Asiat. Soc. Bengal, XVI, pt. 1, 1847, p. 449), a genus of Timaliidae. As *Lioptilus* Cabanis has apparently no synonym, we propose to call it **Lioptilornis** (λεῖος, *laevis*; πτίλον, *penna*; ὄρνις, *avis*), nom. nov., with *Turdus nigricapillus* Vieillot as type. The species to be referred to this group are:

Lioptilornis nigricapillus (Vieillot).
Lioptilornis olivascens (Cassin).
Lioptilornis abyssinicus (Rüppell).
Lioptilornis galinieri (Guerin).

—*Harry C. Oberholser.*

A NEW NAME FOR THE GENUS CURAEUS SCLATER.

The generic name *Curaeus*, applied by Dr. P. L. Sclater (Cat. Amer. Birds, May, 1862, p. 139) to a South American genus of Icteridae, is invalidated by the name *Cureus* Boie (Isis [von Oken], 1831, col. 541) for a genus of Cuculidae. As this group of Icteridae appears to have been given no other name, *Curaeus* Sclater may be replaced by **Notiopsar** (νότιος, *meridionalis*; ψάρ, *sturnus*), nom. nov., with *Turdus curaeus* Molina as type. The only species referable to this genus will, therefore, now stand as *Notiopsar curaeus* (Molina). —*Harry C. Oberholser.*

ANTHRACOCEROS REICHENBACH VERSUS HYDROCISSA BONAPARTE.

The generic name *Anthracoceros* Reichenbach (Avium Syst. Nat., pl. XLIX) has been in common use for a well-known genus of Bucerotidae. It is, however, preoccupied by *Anthracocera* Agassiz (Nomencl. Zool. Ind. Univ., 1846, p. 75), which is an emendation of *Anthrocera* Scopoli (Introd. Hist. Nat., 1777, p. 414), a genus of Lepidoptera. The next available name for the group is *Hydrocissa* Bonaparte (Consp. Gen. Avium., I, June 24, 1850, p. 90), type by subsequent designation (Gray Cat. Gen. and Subgen. Birds, 1855, p. 83), *Buceros monoceros* Shaw = *Buceros coronatus* Boddaert. The species now assigned to this group are as follows:

Hydrocissa coronatus (Boddaert).
Hydrocissa convexus (Temminck).
Hydrocissa malabaricus (Gmelin).
Hydrocissa malayanus (Raffles).
Hydrocissa montani (Oustalet).

—*Harry C. Oberholser.*

NOTE ON THE NAME HYPERMEGETHES REICHENOW.

The name *Hypermegethes* was originally proposed by Dr. A. Reichenow (Journ. f. Ornith., LI, January, 1903, p. 149) as a subgeneric designation for *Hyphantornis grandis* Gray. Dr. Richmond, however, has subsequently shown (Proc. U. S. Nat. Mus., LIII, August 16, 1917, p. 596 that *Hyphantornis* Gray was originally published in 1844 instead of 1849 (Gray, Genera Birds, II, May, 1844, p. 351), and has fixed its type as *Hyphantornis grandis*

Gray. This, of course, makes the generic name *Hyphantornis* applicable not to the group that currently passes under this name, but to the group which Dr. Reichenow called *Hypermegethes;* so if this be recognized as generically distinct from *Ploceus* and *Textor* (olim *Hyphantornis*), its only species will stand as *Hyphantornis grandis* Gray.

—*Harry C. Oberholser.*

NOTE ON THE GENERIC NAMES TEXTOR, ALECTO, AND HYPHANTORNIS.

Messrs. Iredale and Bannerman have recently called attention (Bull. Brit. Ornith. Club, XLI, May 26, 1921, pp. 128-129) to the preoccupation of the generic name *Alecto.* Incidentally they cited from Lichtenstein a use of the generic name *Textor* prior to that of Temminck (Nouv. Rec. Planch. Col., II, livr. 54, February 12, 1825, p. [2] to texte of Genus *Oriolus* Linn. [in text]), and proposed to consider this *Textor* Lichtenstein (Verz. Doubl. Zool. Mus. Berlin, 1823, p. 24) ex Temminck a tentative synonym of *Malimbus* Vieillot. Unfortunately, however, *Textor* here is a nomen nudum. This prior publication of the generic name *Textor,* to which they refer, appeared in a note headed: "*Huic familiae adnumeramus species sequentes, in museo nostro obvias.*" The sixth (and last) paragraph of this note reads as follows: "F. textrix n. Textor Malimbus Temm. *et Africae species complures. Vel ipsa F. Caffra, phalerata, Oryx, ignicolor, quoad rostri formam huc referendae.*" From this it is evident that "Textor Malimbus Temm." is not intended as a synonym or a substitute for "F. textrix n.," which precedes it, but merely as one of the species, of which *F. textrix* and "Africae species complures" are the others. This is still additionally evident from the second sentence of the paragraph of Lichtenstein's above quoted. Furthermore, the specific name *malimbus* apparently here for the first time appears in print, as we are unable to find that Temminck ever used it, and it is here, therefore, a nomen nudum. This being the case, the generic name *Textor* used here in combination with it is likewise invalid from this introduction. In view of this, the generic name *Textor* Temminck, not being preoccupied by Textor Lichtenstein, becomes available for *Hyphantornis* Gray, as already explained (Oberholser, Proc. Biol. Soc. Wash., XXXIV, March 31, 1921, pp. 78–79); and the generic term *Plesiositagra* Iredale and Bannerman (Bull. Brit. Ornith. Club, XLI, May 26, 1921, p. 129) is a synonym.

The correct name to be used for *Textor* auct. is, of course, *Bubalornis* Smith, and the proper name for the family Textoridae is *Bubalornithidae,* as pointed out by Messrs. Iredale and Bannerman; since my use of *Alecto* and Alectuidae was a mere oversight.

The present writer's note on the use of *Hyphantornis* for *Hypermegethes* Reichenow, now published, which is confirmed by Messrs. Iredale and Bannerman (loc. cit. p. 129), was, it may be worth while to mention, in type beyond recall before the number of the Bulletin of the British Ornithologists' Club containing their remarks was received in Washington. It was intended for publication with the writer's previous notes on *Hyphantornis* and *Textor.*

—*Harry C. Oberholser.*

Vol. 34, pp. 139-142 August 17, 1921

PROCEEDINGS

OF THE

BIOLOGICAL SOCIETY OF WASHINGTON

ON A SMALL COLLECTION OF REPTILES FROM ARGENTINA.

BY T. BARBOUR.

For about a year during 1920 and 1921 Mr. James L. Peters conducted the Phillips Expedition to South America, the principal object being to collect birds for the Museum of Comparative Zoology. At Huanuluan, however, in the Gobernacion del Rio Negro, Mr. Peters found time to make a small and very interesting collection of reptiles in a region which apparently has been rather less worked than the territories of Chubut to the south and Neuquen to the northwest. We owe much of our recent knowledge regarding the reptiles of this region to Koslowsky, whose papers appeared in the Revista of the LaPlata Museum.

Paludicola bufonina (Bell).

Peters found this frog abundant and preserved ten examples.

Diplolaemus darwinii Bell.

Peters collected six examples of this handsome lizard. In his report on the Reptiles and Batrachians of the Princeton Patagonian Expedition, Zoology, 3, 2, 1909, p. 221, Stejneger maintains the validity of *D. darwinii* as a species distinct from *D. bibronii*, which seems to be entirely justified. The combination of the genus *Diplolaemus* with *Leiosaurus* proposed by Koslowsky in 1898 (Rev. Mus. La Plata, 8, p. 167) appears much less plausible, although I have not material to do more than suggest that his observations require confirmation.

Phymaturus spurcus, sp. nov.

Type an adult male, M. C. Z. No. 14,791, from Huanuluan, Rio Negro, Argentina. Collected by James L. Peters.

Somewhat intermediate between *P. palluma* (Molina) and *P. patagonicus* Koslowsky. Peters' series of five specimens all agree in having more spinose tails, smaller dorsal granules than *patagonicus* and a perfectly uni-

form coloration, while they differ from *palluma* in having considerably less spinose tails and in not having the mid-dorsal granules very considerably enlarged and flattened as well as lacking the characteristic color pattern.

Description.—Head small, snout short; nostril latero-superior; ear opening large; head scales small, subequal; sub-conical on the temples; sides of neck and throat strongly plicate; body much depressed; dorsal scales minute granular, with a few enlarged granules scattered over the dorsal and lateral surfaces; lateral scales minute, granular; mid-dorsals but very slightly enlarged (less so than in *palluma*) and very slightly flattened; ventrals much larger than dorsals, squarish, smooth, in regular transverse series; limb short, adpressed hind limb reaches to the axilla; digits short and thick; males with a series of 8 (9 or 10) preanal pores, tail once and one-fourth the length of head and body with whorls of spinose scales which are much smaller than those figured in Bell (Voy. Beagle, 3, 1842, Plate 14, fig. 2) for *palluma* (called *flagellifer*) and more spinose than in Koslowsky's figure of *patagonica*, although the spine-like scales are not so very much larger. In *palluma* the color is olive with blackish marbling, the pattern being well defined in several Chilean specimens in the Museum of Comparative Zoology. While Koslowsky's types from Patagonia were all speckled with light markings on the dark background, Mr. Peters' series is all exactly alike and shows a rich mahogany brown on the body, lighter and more yellowish on the tail with no trace of markings whatsoever.

Liolaemus kingii Bell.

Two specimens apparently perfectly typical.

Liolaemus elongatus Koslowsky.

Six specimens of this little known species vary slightly from the types in that the range of variation in the number of rows of scales about the body is extended to 112—the highest number mentioned by Koslowsky being 103. Peters' examples are old adults and are chubby and squat and quite similar in habit to *L. kingii* but more depressed. The name *elongatus*, inapt at best, was evidently suggested by the habit of the young.

Liolaemus magellanicus (Homb. & Jacq.)

Four specimens before me from Huanuluan are perfectly typical *magellanicus* and I have compared them with specimens from Patagonia, identified by Stejneger as *L. lineomaculatus* Boulenger and captured by the Hatcher Expedition. I can not be persuaded, with only this material available for comparison, that these two species really should be combined, although this proposal has been made by Koslowsky (Rev. Mus. La Plata, 8, 1898, p. 173).

Liolaemus boulengeri Koslowsky.

There are five specimens of this elegant form at hand and the finding that they occurred at Huanuluan was to be expected, as the co-types came from both Chubut and Neuquen.

Liolaemus rothi Koslowsky.

It is with great hesitation that I use this name for four lizards which agree but moderately well with Koslowsky's description and figure (Rev. Mus. La Plata, 8, 1898, p. 177, Plate 4). However, there can be no doubt but that these specimens are closely related to *rothi* and that without typical material for comparison it would be impossible to discuss them intelligently in more detail.

Vol. 34, pp. 143–146 August 17, 1921

PROCEEDINGS

OF THE

BIOLOGICAL SOCIETY OF WASHINGTON

TWO NEW CENTRAL AMERICAN SALAMANDERS.

BY EMMETT REID DUNN.

During the preparation of a general Revision of the Free-tongued Salamanders, now completed but the appearance of which will probably be delayed, I studied most of the material accumulated in the various American Museums. Besides this, I spent a summer in the field in Costa Rica. One of these new species, which it seems advisable to place on record now, was taken during that journey, the other I found in material loaned by the Field Museum of Chicago. For the opportunity to examine their interesting series of urodeles and to characterize this new form, I am deeply indebted to the authorities of that institution who have likewise consented to the retention of paratypes by the Museum of Comparative Zoology.

Oedipus rex, sp. nov.

Diagnosis.—A small *Oedipus* with toes scarcely webbed, inner not rudimentary, nostrils small in adult, teeth on maxilla, vomerine series of 9 teeth extending beyond nares, 3–4 costal folds between appressed toes.

Range.—Known from type locality only.

Description.—Field Museum No. 1814, adult male (type), Sierra Santa Elena (near Tecpam), Guatemala (alt. 9,500 feet). 12 costal grooves; 2 costal folds between appressed toes; head width 5¼ in length from snout to vent; head length 3⅓ in length of body; head a blunt oval; eye longer than its distance from tip of snout; snout swollen; a tubercle below nostrils; outline of upper jaw slightly concave as seen from side; angle of jaw back of hind angle of eye; both eyelids fitting under a fold of skin behind; a groove from hind angle of eye to gular fold; a branch from this down behind angle of jaw and across throat. Limbs well developed; fingers 3, 2, 4, 1 in order of length, not much flattened, webbed at base; toes not much flattened, 3, 4, 2, 5, 1 in order of length, webbed at base and between 3 and 4 to next to last joint. Tail longer than head and body, constricted off at base, circular in cross section; anal lips lined with papillae.

Vomerine series not continuous with parasphenoids, about 9 teeth in series,

beginning outside of nares, curving in and back, separated from its fellow by a little more than width of the very small nares, and from parasphenoids by nearly their own length,—latter in two patches beginning at last third of eye sockets. Two premaxillary fangs.

Color.—Pinkish gray dorsally and on upper surfaces of limbs and tail, shading into gray in sides of body and tail, this somewhat marbled with white, beneath light gray, white marbling on throat, light marbling on upper surface of snout.

Total length 89, head 10, body 33, tail 46.

Variation.—A female, same data, differs in having 13 costal grooves and 3 costal folds between the appressed toes, head width 6 in distance from tip of snout to vent, snout less swollen, anal lips smooth, tail longer than head and body, 9 teeth in vomerine series which are separated from parasphenoids by half their length. Color darker, lightest on throat, darkest on mid-dorsal, but rather uniform gray all over.

Total length 90, head 10, body 34, tail 46. A small specimen is similar to the male but has nostrils with greater diameter than the largest specimen.

Total length 22, head 4, body 1.5, tail 7.5. Those described are the maximum and minimum sizes seen.

Habits.—The types were taken from under logs.

Remarks.—This form is not any of those hitherto described from Guatemala. Its nearest relations are with *sulcatus* from Mexico.

Specimens seen 11, all from type locality.

Oedipina alfaroi, sp. nov.

Diagnosis.—Similar to *Oedipina uniformis* in form, but no teeth on maxilla, head pointed instead of rounded, eye smaller; dark brown above, greyish below, instead of black above and below, as in the preceding species.

Range.—Known only from type locality.

Description.—Type M.C.Z. 6938, adult female, Zent, Costa Rica. 20 costal grooves; 14 costal folds between appressed toes; head width 12 in length from snout to vent; head length 7 in length of body; eye shorter than its distance from the nostril; head a pointed oval from above; snout not swollen; outline of upper jaw straight as seen from side; angle of jaw back of hind angle of eye; both eyelids fitting under a fold of skin behind; a groove from eye to gular fold; a groove from this down behind angle of jaw; limbs weak; fingers 3, 2, 4, 1 in order of length, united to tips; toes 3, 4, 2, 5, 1 in order of length, united to tip. Tail imperfect, not constricted at base, circular in crossection; anal lips smooth.

Vomerine teeth about 9 in series, beginning behind outer edge of nares, curving in and back, separated from its fellow by width of the large nares, and from the parasphenoids by the same distance. Latter in a single patch beginning opposite anterior fourth of eye socket. No teeth on maxilla, one premaxillary tooth not piercing lip. Teeth on lower jaw confined to front half, normal in form and number. Color purplish brown above, light grayish below, a white spot behind insertion of leg.

Total length 104, head 7.5, body 53, tail 43.5.

Variation.—Another female, M.C.Z. 6944, same locality, has an uninjured tail which is much longer than head and body, head width 14 in length from snout to vent, head length $7\frac{2}{7}$ in length of body. The vomerines are separated from the parasphenoids by twice the width of the nares. There is one premaxillary tooth and none on the maxilla. The mandible is toothed to below the middle of the eye.

Total length 132, head 7, body 51, tail 74.

Habits.—Not dissimilar to those of *O. uniformis*. They may be found in the same log.

Remarks.—I have compared the original descriptions of *uniformis* and of *vermicularis* and they unquestionably refer to the same animal so that the present form is new. I had a third specimen but it wriggled from my hand and I could not find it again. They are easily distinguished from *uniformis* in the field by the different color.

Specimens seen 2, as follows: Costa Rica; Zent 2.

Named for Señor don Anastasio Alfaro of the Museo Nacional, San José, C. R., a slight recognition of his kind advice and hospitality and also in appreciation of his contributions to our knowledge of his country.

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PROCEEDINGS

OF THE

BIOLOGICAL SOCIETY OF WASHINGTON

AMECYSTIS, A NEW GENUS OF ORDOVICIAN CYSTIDEA.[1]

BY E. O. ULRICH AND EDWIN KIRK.

In a recent publication Raymond[2] described a new species of Cystid under the name *Pleurocystites laevis*. This species he states is chiefly remarkable in that it lacks pectinirhombs and surface sculpture. The absence of pectinirhombs is not an abnormality or due to weathering. The species is referable to a new genus, for which we propose the name **Amecystis** (ἄμη, a shovel), with *Pleurocystis laevis* Raymond[3] as the genotype. Two other species belonging to the genus are known which diverge somewhat from the type species but agree in gross structure and in the absence of rhombs.

Amecystis may best be defined as a *Pleurocystis* lacking pectinirhombs. The evidence is perfectly clear on this point. A large number of specimens in a splendid state of preservation have been examined, and in none is there a trace of rhomb structure. Even in the one species known that has radiating surface ridges, the ridges appear rather as superficial ornamentation than as stereom folds. The arrangement of plates is as in *Pleurocystis*. The anal side is nearly always poorly preserved owing to the fact that it is made up of very small plates and is less rigid than in *Pleurocystis*. The anal pyramid has doubtfully been determined as having the same position as in *Pleurocystis*.

Amecystis laevis (Raymond) or a very closely related species also occurs in the Curdsville limestone of Mercer County,

[1] Published by permission of the Director of the U. S. Geological Survey.

[2] Raymond, P. E., "A contribution to the description of the fauna of the Trenton Group:" Canada Dept. Mines, Geol. Survey Mus. Bull. No. 31, Geol. Ser. No. 38, Feb., 1921.

[3] Op. cit., p. 2, Pl. II, figs. 1–3.

Kentucky. The other two species are from widely separated localities and are found in earlier deposits. One comes from the Black River Rhinidictya beds of Minneapolis, Minnesota, and the other from the Chambersburg limestone near Chambersburg, Pennsylvania.

The Minneapolis species has a very thin and fragile test, is of smaller size, and has a surface covered by small granules. The Chambersburg species is notable in having heavier plates than *Amecystis laevis* and in the possession of well defined linear surface sculpture, though pectinirhombs or porerhombs are not developed.

The absence of pectinirhombs or even porerhombs in *Amecystis* opens an interesting field of speculation as regards Cystid evolution and systematic classification. It is scarcely conceivable that *Amecystis* is a homoplastic derivative of a totally distinct genetic line from *Pleurocystis*. Owing to the essential structural identity of *Amecystis* and *Pleurocystis* other than in the possession of pectinirhombs we can scarcely go further than postulate a common rhombless ancestor for both. Indeed it is possible that forms referable to *Amecystis* were ancestral to *Pleurocystis*. The age relations of the two genera point to such a possible relationship. Although *Amecystis laevis* (Raymond) ranges on into the Trenton, the other species are of Black River age, and it will probably be found that the genus had its greatest development in Chazyan and Black River times, whereas *Pleurocystis* is typical of the Trenton.

The more or less abrupt acquisition of porerhombs and even the highly specialized pectinirhombs by genetic lines in which stereom-folds are poorly developed or absent make the transition from the Amphoridea to the Rhombifera a simple one. However, the assignment of *Pleurocystis* to the Anomalocystidae as made by Haeckel is still unwarranted. The facts observed do suggest that the order Aporita is unnecessary, and that the contained forms might well be referred to the Rhombifera as now defined.

Vol. 34, pp. 149–154 December 21, 1921

PROCEEDINGS

OF THE

BIOLOGICAL SOCIETY OF WASHINGTON

ADDITIONS TO THE ORCHID FLORA OF PANAMA.

BY OAKES AMES.

The new species of orchids from Panama described below formed part of a collection made by Elsworth P. Killip in 1917 and 1918 in the provinces of Panama and Chiriqui.

The type material on which the descriptions are based is preserved in the author's herbarium and duplicate types are to be found in the herbarium of the Rochester Academy of Science.

Camaridium grandiflorum, sp. nov.

Herba caulescens, valida, e basi decumbenti erecta, folia superiora inclusa circa 37 cm. alta. Caulis vaginis distichis omnino obtectus. Vaginae complanatae, arcte imbricantes. Pseudobulbi rari, monophylli, vaginis obtecti, ad caulem appressi, anguste oblongo-cylindracei, glabri, complanati, circa 3.5 cm. alti, plus minusve sulcati. Folia adulta oblongo-ligulata, usque ad 15.9 cm. longa et 2 cm. lata, apice obtuso bilobata, basi complicata, coriacea, valde articulata, nervo medio supra sulcato; folia juniora ovato-elliptica, conduplicata, multo breviora. Pedunculi singuli e bractearum axillis exorientes, erecti et nunc leviter flexuosi, graciles, circa 5.5–8 cm. alti, bracteis nonnullis laxe vaginati. Bracteae inferiores plus minusve 3.4 cm. longae, circa 9 mm. latae, lineari-lanceolatae, acuminatae, scariosae, laxe convoluto-vaginantes, nervosae, nervo medio praecipue parte apicali dorso carinato; bractea superior ovalis, circa 2.7 cm. longa et .9 cm. lata, acuminata, acuta, valde cucullata, ovarium et sepali dorsalis dimidium basalem vaginans. Flos grandis. Perianthium paulo patens, textura subcoriacea. Sepala lateralia 3.5 cm. longa, 9.5 mm. lata, lanceolato-oblonga, multinervosa, sensim acuminata, marginibus anterioribus involutis et in apicem mucronatum extensis. Sepalum dorsale simile, paulo angustius. Petala anguste elliptico-lanceolata, circa 3 cm. longa et 8.5 mm. lata trans medium, marginibus superioribus involutis. Labellum parvum, positu naturali gynostemio parallelum, elevatum, trilobatum, valde conduplicatum et decurvum, circa 1 cm. longum; discus extensus in parte basali tertia tuberculatis numerosis et in medio lamella suborbiculari biloba ornatus; lobi laterales erecti, semiobcordati, obtuse acuti, antrosum

falcati; lobus intermedius valde complicatus, dorso carinatus, extensus late ovatus vel semiorbicularis, apice rotundato mucronatus. Columna parva, crassa, circa 7 mm. longa, arcuata, in pedem gynostemio breviorem extensa. anthera semigloboso-conica, minute papillosa.

This species has much shorter, broader leaves, longer peduncles and larger labellum than *Camaridium pulchrum* Schltr. It is distinguished from *C. ochroleucum* Lindl. by its shorter, broader leaves, larger flowers borne on long peduncles, and by the acute lateral lobes of the labellum. From *C. Wrightii* Schltr. it is differentiated by its larger flowers and by the structure of the labellum.

PANAMA, Province of Chiriqui, in humid forest of the Cordillera, east of the Rio Caldera, *Killip* 3565, February 17–19, 1918. 2,000 meters altitude.

Erythrodes Killipii, sp. nov.

Herba alta, terrestris, e rhizomate cauliformi erecta, circa 62.5 cm. alta. Radices paucae, lanuginosae, e nodis exorientes. Caulis glaber, in sicco plus minusve 5 mm. latus, internodiis inferioribus plus minusve 7 cm. longis, superioribus multo brevioribus. Folia in visu septem, oblique lanceolato-elliptica vel ovato-elliptica, usque ad 9.5 cm. longa et 4.2 cm. lata (folium supremum multo minus), in caulis parte superiore approximata, apice subito acuminata, basi in petiolum cuneato-angustata, textura chartacea, nervis tribus prominentibus. Petiolus alatus, basi in vaginam laxe dilatatam tubularem scariosam transeuns. Pedunculus ad racemum circa 18.6 cm. longus, densius pubescens, in sicco angulatus, vaginis quattuor laxis scariosis ornatus. Racemus circa 17.5 cm. longus, dense multiflorus, rhachide pubescenti. Bracteae inflorescentiae flores conspicue superantes, lanceolatae, longe acuminatae, basi cucullatae, trinerviae, omnino glabrae, marginibus inferioribus irregularibus vel erosulis, marginibus superioribus integris, involutis, usque ad 1.9 cm. longae et 6.4 mm. latae (bractea basalis). Flores in generis mediocres. Sepala petalaque in galeam agglutinata, pubescentia. Sepala oblonga, circa 7 mm. longa et 2.1 mm. lata, acuta, uninervia, basi obliqua. Sepalum dorsale lanceolatum, circa 7 mm. longum et 3.4 mm. latum, obtusum, uninervium, basi cucullatum. Petala cum sepalo impari arcte agglutinata, ligulato-spathulata, sepalis paulo breviora, circa 2.25 mm. lata prope apicem, uninervia, marginibus superioribus minutissime erosis. Labellum in positu naturali arcuato-decurvum, parte apicali deflexa et partis inferioris marginibus valde involutis; lamina expansa ligulata, circa 6 mm. longa, tertia parte apicali leviter constricta et subito in laminam latam reniformem circa 4.1 mm. latam, obtuse apiculatam dilatata, pars basalis circa 2.4 mm. lata, callis binis obscuris percurrentibus. Gynostemium breve, rostello alte et acriter bifido. Calcar ovoideum, circa 3.5 mm. longum. Ovarium dense glanduloso-pubescens.

The habit of this species suggests very much the habit of *Erythrodes procera* (Physurus procerus *Schltr*, in Fedde Repert. Beihefte 7 (1920) 73). In *E. Killipii* the longer floral bracts are entirely glabrous with the margins partly erosulate. In *E. procera* the floral bracts are one-nerved while in *E.*

Killipii they are three-nerved. Other marks of distinction are found in the terminal lobe of the labellum and in the stouter, ovoid spur. This species is represented in herbaria by specimens from Central America that have been confused with the more slender *Erythrodes vesicifera* (Reichb. f.).

PANAMA, Province of Chiriqui, Valley of the Rio Caldera, from El Boquete to the Cordillera, *Killip* 3561, February 1st, 1918. 1,400 to 1,600 meters altitude. (Under the same number there is a specimen in the United States National Herbarium accompanied by a different geographical note. The habitat is given on the label as 'Humid forest near Camp I, Holcomb's Trail, near El Boquete, altitude 1,600–1,800 meters.')

Habenaria patentiloba, sp. nov.

Herba terrestris, erecta, mediocris, circa 36 cm. alta. Radices filiformes, flexuosae, villosae, caule infimo decumbenti in tuberculum semiovoideum, terminanti. Caulis strictus, glaber, vaginis foliorum pro parte obtectus, basi nudus, inferne in sicco circa 4 mm. crassus. Folia disticha, in caulis medio, oblongo-lanceolata, acuminata vel acuta, ad basim amplectentem, vaginantem sensim cuneato-angustata, membranacea, nervo medio supra sulcato et subtus conspicue carinato, plus minusve 12.5 cm. longa, 2.6 cm. lata; folia inferiora mueto minora lanceolato-elliptica; folia superiora oblongo-lanceolata, in bracteas sensim decrescentia. Racemus circa 9.5 cm. longus, laxiflorus, floribus distichis, decem ut videtur. Bracteae inflorescentiae lanceolatae, longe acuminatae, dorso alte carinatae, scariosae, ovaria pedicellata subaequales vel paulo superantes, usque ad 2.5 cm. longae et 9 mm. latae prope basim. Flores glabri, mediocres. Sepala lateralia reflexa, semiorbicularia, valde obliqua, apice obtusa, trinervia nervo medio prominenti, circa 1 cm. longa et 7 mm. lata. Sepalum intermedium multo minus, valdissime cucullatum, expansum orbiculare, apice revoluto irregulariter truncato, circa 6.5 mm. longum. Petala a basi cuneata latissime transversa, in lobos subaequales divaricatissimos sinu levissimo connexos extensa, circa 2.5 mm. alta a basis medio ad sinus medium et 8—9 mm. lata inter loborum apices; lobus posterior lineari-ligulatus, apice rotundato nunc acuto margine irregulari; lobus anticus paulo brevior, triangulari-lanceolatus, ultra medium margine posteriore obtuse unidentatus Labellum prope basim trifidum, omnino usque ad 2.14 cm. longum; lobi laterales parvuli, anguste lineares, late patentes, 3.5—4mm. longi, basi vix 1 mm. lati; lobus intermedius longissimus, anguste linearis, carnosus, marginibus valde revolutis, apice oblique acutus, usque ad 1.9 cm. longus et 2.5 mm. latus trans basim. Calcar quam ovarium pedicellatum longius, gracillimum, parte anteriore clavatum, circa 2.5 cm. longum. Anthera valde cucullata, in lobos rotundatos leviter divisa. Canales graciles adscendentes. Processus stigmatis valde decurvi, carnosissimi, quam canales paulo breviores.

The unusual petals make it difficult to classify this Habenaria species satisfactorily. It would seem to belong to the Quadratae. The form of the labellum is suggested by that of *H. virens* Rich & Gal.

PANAMA, Province of Panama, Orange River Valley, *Killip* 3124, October 7, 1917. 60 meters altitude, dense forest.

Ornithocephalus lanuginosus, sp. nov.

Herba parvula, epiphytica, acaulescens, circa 10 cm. alta. Radices numerosae, glabrae, flexuosae, graciles. Folia equitantia, scalpelliformia, rigida, erecta et patentia, vaginis dense congestis et imbricantibus, articulata, nunc falcatula, oblique acuta, in sicco rugulosa et flavo-viridia, usque ultra 23, plus minusve 4.5 cm. longa, 6–7 mm. lata. Inflorescentiae laxissimae, in visu foliis breviores (sed abruptae), dense lanuginosae, in parte superiore floriferae. Pedunculi vaginis singulis vel duabus perlaxe infundibuliformibus ornati. Bracteae inflorescentiae reflexae, ovatae, ciliatae, dorso medio alte carinatae, carina plus minusve erosa. Flores minuti, perianthio membranaceo. Sepala petalaque similia. Sepala lateralia orbicularia, margine eroso-ciliata, uninervia et dorso medio conspicue carinata, carina irregulariter eroso-ciliata, extus sparsim pilosa, circa 2 mm. longa et lata. Sepalum dorsale simile, a basi late cuneata suborbiculare, acutum, circa 2 mm. longum. Petala oblique suborbicularia, margine erosula, dorso verosimiliter carinata, circa 1.9 mm. longa et lata. Labellum trilobatum, lobi laterales inconspicui, valde recurvati, extensi spathulati, circa 1.35 mm. longi, papillosi; lobus intermedius angustissime linearis, in positu naturali valde antrorsum curvatus, conduplicatus, dorso carinatus, acutus, extensus circa 5 mm. longus; discus medio callo maximo crasso plano omnino obtectus. Columna minuta, rostello perlongo curvato ornata. Ovarium densissime lanuginosum.

In specimens collected by J. F. Cowell (298), March 4, 1905, at Gatun, Panama, the racemes bear smaller flowers than those described above.

Ornithocephalus lanuginosus is related to *O. myrticola* Lindl., and to *O. bryostachyus* Schltr. It differs from *O. myrticola* in its relatively narrower sepals and ovate-lanceolate, simple labellum; from *O. bryostachyus* it differs in its broader leaves and in the shorter labellum with different lobes.

PANAMA, Province of Panama, edge of forest along Panama-Pecora Road, near Tecumen River. *Killip* 3314, December 30, 1917. 75 meters altitude. On trees.

Pleurothallis falcatiloba, sp. nov.

Herba parvula, erecta, epiphytica, circa 10 cm. alta, rhizomate valde abbreviato. Radices numerosissimae, intertextae, glabrae, flexuosae. Caules perbreves, unifoliati, biarticulati, vaginis binis scariosis tubularibus omnino obtecti, plus minusve 1.5 cm. alti. Folia anguste oblongo-oblanceolata, apice late rotundato minute bilobata et apiculata, basi angusta sensim angustata, coriacea, nervo medio plus minusve supra sulcato et subtus carinato, 5–7.1 cm. longa, 7.9 mm. lata ultra medium. Scapi folia paulo excedentes, gracillimi, teretes, 7.5–8.5 cm. alti. Pedunculi ad racemum vaginis perpaucis tubulatis, apice longe acuminatis valde scariosis ornati. Racemi laxiflori, circa 2.1–2.6 cm. alti (sed juniores). Bracteae inflorescentiae vaginis similibus, membranaceae, laxae, infundibuliformes, longe et acriter acuminatae. Flores pro planta grandes; sepala crassiora, ut videtur subparallela. Sepala lateralia dimidio basali connata, circa 11.5 mm. longa, parte apicali dorso carinata, acuminata, carina in mucronem extensa. Sepalum intermedium simile, anguste lineari-lanceo-

latum, longe acuminatum, apice dorso carinatum, trinervium, basi columnae tantum connatum, circa 1.3 cm. longum, prope basim 2 mm. latum. Petala minuta, oblonga, superne paulo dilatata, obtusa, membranacea, uninervia, circa 2.65 mm. longa et 1.2 mm. lata ultra medium. Labellum circuitu ovatum, abrupte trilobatum, circa 4.9 mm. longum et 2.9 mm. latum trans lobos laterales; unguis quadratus; lobi laterales falcato-lineares, antrorsum semilunati et incurvi, obtusi, prope basim papillosi, circa 2 mm. longi; lobus intermedius porrectus, oblongus, parte anteriore oblique rotundatus, acutus, margine irregulari, parte inferiore carinis crassis binis paulo convergentibus ornata, circa 3 mm. longus; unguis et lobi terminalis pars inferior incrassati. Gynostemium circa 4 mm. longum, superne late alatum, ala leviter bilobata in partes semiorbiculares denticulatas, pede crasso brevi ornatum. Pollinia duo, complanato-pyriformia.

This species is very similar to *Pleurothallis bifalcis* Schltr., but it is a more dwarf plant with shorter leaves, almost thrice shorter petals and twice shorter labellum and column. It differs from *P. Wercklei* Schltr. in having far longer sepals, shorter petals and longer labellum. The distinctive characters are the rounded apex of the leaves, the large flower with long sepals and diminutive petals and the unusual linear-falcate lateral lobes of the labellum.

PANAMA, Province of Chiriqui, Valley of the Rio Quebrada, *Killip* 3540. February 8, 1918. 1,700 meters altitude. On trees in deep woods.

Scaphosepalum longirepens, sp. nov.

Herba gracilis, epiphytica. Rhizoma longe repens, teres, multiarticulatum, vaginis tubularibus scariosis numerosis pro parte obtectum, usque ad 17 cm. longum. Radices longae, glabrae, flexuosae, circa 1 mm. crassae, ut videtur simplices. Caulis perbrevis, circa 3 mm. longus. Folia lineari-oblanceolata, plus minusve 6 cm. longa et 8.5 mm. lata super medium (raro multo minora), apice acuta, basi in petiolum gracilem canaliculatum inferne uniarticulatum sensim angustata, subcoriacea, nervo medio supra sulcato, subtus alte carinato. Pedunculus e caulis summo exoriens, cum caule et petioli basi vagina scariosa inclusus, arcuatus vel leviter flexuosus, gracillimus, teres, vaginis parvis inconspicuis tubularibus compluribus obtectus, usque ad racemum 4–6.6 cm. altus. Racemus fractiflexus, plus minusve 6 cm. altus, multiflorus, floribus approximatis distichis. Bracteae inflorescentiae minutae, erectae, scariosae, infundibuliformes. Flores in genere inter minores. Sepala basi cohaerentia et cupulam formantia. Sepala lateralia usque per duas tertias connata, dorso alte et crasse bicarinata, carinis in caudas binas divaricatas extensis, per omnia circa 6 mm. longa. Sepalum dorsale inferne cum sepalis lateralibus connatum, lingulatum, apice rotundatum et obtuse acutum, dorso medio alte carinatum, parte superiore valde incrassata, circa 4.9 mm. longum. Petala minora, oblique elliptico-ovata, acuta, apice dorso crasse carinata, circa 3 mm. longa. Labellum quam petala paulo brevius, circa 2.5 mm. longum, ex ungue quadrato .65 mm. longo in laminam leviter sed distincte trilobatam subito dilatatum; lobi laterales semiorbiculares;

lobus terminalis porrectus, late oblongus, rotundatus, margine minutissime ciliato; discus inferne callis binis latis semilunatis crassis ornatus. Columna in alam latam tridentatam extensa. Anthera pileata, membranacea. Pollinia duo, pyriformia, complanata.

The elongated rhizome and small flowers distinguish this species from its allies. From *Scaphosepalum Pittierii* Schltr. it differs in having long, creeping rhizomes and a dorsal sepal that is not dilated above. The acuminate petals and distinctly trilobed labellum are also important differentiating characters when comparisons with *S. Pittierii* are made.

PANAMA, Province of Chiriqui. Humid forest of the Cordillera, east of the Rio Caldera, *Killip* 3567, February 17–19, 1918. 2,000 meters altitude.

Scaphyglottis laevilabium, sp. nov.

Herba epiphytica, erecta vel patens, circa 10–17 cm. alta, rhizomate valde abbreviato. Radices numerosissimae, densae, ramosae, glabrae, flexuosae. Pseudobulbi circa 3 superpositi (2–4), congesti basi pluriarticulati, anguste fusiformes vel cauliformes, pseudobulbo infimo nunc bi- vel trifurcato, articulis nunc radices ferentibus, in sicco valde longitudinaliter sulcati vel striati, pseudobulbi infimi plus minusve 5 cm. longi, plus minusve 3 mm. crassi (usque ad 7.5 cm. longi et 1 mm. crassi). Folia anguste linearia, apice rotundata, minute bilobata, basi conduplicata, leviter angustata, plus minusve 5 cm. longa, 4.5 mm. lata, tenuiter coriacea, nervo medio supra sulcato, subtus carinato. Flores saepissime duo ut videtur, ex apice pseudobulborum exorientes, ovaria pedicellata vaginis scariosis arcte imbricantibus omnino obtecta. Segmenta perianthii membranacea, patentia. Sepala lateralia linearia vel oblongo-linearia, apice dorso carinato acuta, basi leviter angustata et columnae adnata, circa 7 mm. longa et 1.75 mm. lata. Sepalum dorsale simile, gynostemio altius adnatum, oblongum, parte libera 6 mm. longa et 1.65 mm. lata. Petala multo angustiora, linearia, cum sepalo impari columna alte adnata, abrupte acuta, circa 5.8 mm. longa et .9 mm. lata. Labellum positu naturali ungue convoluto, expansum ex ungue crassiore in laminam laevam sensim dilatatum, in circuitu oblanceolatum vel spathulatum, circa 7 mm. longum, 3 mm. latum trans dimidium anteriorem, prope apicem obscurissime trilobatum, apice late truncato-retusum, marginibus anterioribus erosulis. Gynostemium conspicuum, prope stigma brachiis binis triangularibus ornatum, ad basim sensim paulo dilatatum, basi ipsa caverna praeditum. Anthera semiglobosa. Pollinia ut videtur quattuor.

Related to *Scaphyglottis guatemalensis* Schltr. which is distinguished from it by means of smaller flowers, a carinate labellum and an ebrachiate column. *S. Cogniauxiana* DeWildd. is set apart from *S. laevilabium* by its simple labellum.

PANAMA, Province of Panama. Two miles east of Juan Diaz, *Killip* 3113. October 2, 1917. 60 meters altitude. On branch of tree in dense forest.

Bussey Institution, Harvard University.

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PROCEEDINGS

OF THE

BIOLOGICAL SOCIETY OF WASHINGTON

NEW SPECIES OF CRABS FROM FORMOSA.[1]

BY MARY J. RATHBUN.

The species described below were found among a large collection obtained by the students of the Taihoku (Formosa) Normal School and by Mr. Moichiro Maki, their teacher in natural history. The collection was forwarded to the United States National Museum through the courtesy of Dr. M. Oshima, of the Institute of Science, Government of Formosa.

Uca formosensis, sp. nov.

Holotype.—Adult male, Cat. No. 54472, United States National Museum. Rokko, Taichu, Formosa; collected by students of Normal School, August, 1919.

Measurements.—Male holotype, length of carapace 18.4 mm., greatest width 28.8 mm.

Description.—Front narrow, depressed portion subtriangular, tapering anteriorly. Upper margin of orbit sinuous, nearly transverse, not strongly oblique, entire; a line of granules below inner three-fifths of upper margin; lower margin coarsely turreted except near inner end where it is subentire; no accessory row of granules above margin. Antero-lateral angle acute. Sides of carapace subparallel anteriorly, then sloping well inward. Palm coarsely granulate outside, a furrow below upper marginal row of granules, a depression between palm and fixed finger; lines of granules on inner surface of palm obliquely transverse and subparallel. Fingers broad, flat; prehensile edges hollowed a little in basal half; on outer side a ridge parallel to, and near lower edge of fixed finger; a shallow furrow through middle of dactylus, which fades out before reaching distal end, a furrow near upper edge. Fingers either without a large tooth, or a large tooth at middle of fixed finger and another on dactylus at middle of broad gape. Merus of first three ambulatory legs very broad.

Near *U. longidigitum* (Kingsley)[2] which, however, has side margins anteriorly very oblique, diverging forward; upper border of orbit more

[1] Published by permission of the Smithsonian Institution.

[2] Proc. Acad. Nat. Sci. Philadelphia, 1880, p. 144, pl. 9, fig. 13.

oblique in dorsal view than in *formosensis*, lower border smoothly margined; upper border of palm without definite marginal line; fingers more gaping in distal half than in the new species.

Ilyoplax[1] **formosensis,** sp. nov.

Holotype.—Adult male, Cat. No. 54473, United States National Museum. Washoshu, Taihoku, Formosa; collected by M. Maki, Feb. 25, 1918.

Measurements.—Largest male, length of carapace 5.8 mm., greatest width 8.8 mm., width at antero-lateral angles 8.2 mm., at postero-lateral angles above 8.2 mm., at postero-lateral angles below 8.5 mm.

Description.—Upper orbital margin nearly transverse, sloping backward very little. Carapace rough with distant clusters of fine granules; sides convex; a right-angled tooth at antero-lateral angle; antero-lateral width and superior postero-lateral width equal. Front broadly rounded, slightly angled on each side. Male chelipeds large, margins finely granulate; fingers long, immovable ones lightly deflexed, a broad tooth on dactyl occupies one-third of gape. First and second ambulatory legs very hairy, collecting mud; shallow, ill-defined tympanum on merus of first three legs; on first and third legs it is of moderate size, on the second leg when the mud and hair is removed the tympanum appears to occupy nearly the whole surface of the article. Male abdomen slightly constricted between fourth and fifth segments, the fifth segment distinctly broader than long.

Near *I. tenella* Stimpson,[2] which is distinguished by a soft body and by tympana occupying the entire surfaces of the merus. Otherwise, Stimpson's description of genus and species might apply to the new species.

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[1] *Ilyoplax* Stimpson, Proc. Acad. Nat. Sci. Philadelphia, vol. 10, 1858, p. 98 [44], used for *Tympanomerus* Rathbun, Proc. Biol. Soc. Washington, vol. 11, 1897, p. 164.

[2] Proc. Acad. Nat. Sci. Philadelphia, vol. 10, 1858, p. 98 [44].

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PROCEEDINGS

OF THE

BIOLOGICAL SOCIETY OF WASHINGTON

HERPETOLOGICAL NOVELTIES.

BY T. BARBOUR AND E. R. DUNN.

Most of the new forms described in this paper were collected by the junior author during a journey to Costa Rica in the summer of 1920. A few other new forms are recognized which have been for some time awaiting description.

The journey to Costa Rica was made far more pleasant and profitable than it would otherwise have been by the excellent hospitality and helpfulness shown by the resident officials of the United Fruit Company and by Dr. Anastasio Alfaro of the Museo Nacional in San José. The Doctor kindly allowed us to study and retain some most interesting specimens which had been brought from many parts of the republic. The following localities were chosen for collecting stations:

Zent—about twenty miles inland from Port Limon, 100 feet elevation. Banana and cocoa farms, small pastures and some rain forest.

Monteverde—200 feet. Same general conditions as Zent.

Guapiles—1,000 feet. Second growth forest and large pastures. End of railroad, north of Mt. Turrialba and Mt. Irazú.

Navarro—3,368 feet. Orange farm of United Fruit Company south of Cartago. Mountainous country. Collections were made in the forests up to 6,000 feet.

Volcán Irazú—Collected in the oak forest belt on this mountain at elevation of 8,000–9,000 feet.

Volcán Poas—Collected in the mixed forest at 7,600 feet and in the clearing around the "Hotel de Poas" at about the same elevation.

Orotino—Station of the railroad about 10 miles from the Pacific Ocean. Inner edge of coastal plain 900 feet. Dry woods and farms.

Sta. Cecilia—Banana farm in the Bananito River district, south along the coast below Port Limon. Same general conditions as Zent.

This permitted a short visit to the following environmental complexes: Tropical rain forest of the Atlantic coastal plain—Zent, Monteverde, Guapiles, Sta. Cecelia; subtropical zone on the mountains—Navarro; Temperate zone on the high volcanoes —Irazú, Poas; tropical, no rain forest, Pacific Coastal Plain—Orotino.

Sibynomorphus ruthveni, sp. nov.

Type M. C. Z. No. 15,549 from the Aguacate Mts., Costa Rica.

Body strongly compressed anteriorly, less compressed along the mid body region, strongly compressed again posteriorly; tail diminishing suddenly in diameter just posteriorly to the vent; eye large with vertical pupil; rostral pentagonal, slightly wider than high, almost invisible from above; internasals small, their suture about one third of that between the prefrontals, which extend deeply over the canthal region and enter the orbit extensively; frontal longer than wide, about equal to distance from tip of snout, nearly one third shorter than the length of the suture between the parietals; nasal partially divided with a nostril slightly longer than high; loreal twice as long as high, entering eye; no preocular; two postoculars, the lower slightly the larger; temporals 1+2; seven or eight upper labials, fourth and fifth only entering orbit, sixth greatly enlarged; mental region can not be described owing to injury; but evidently no median genial; first lower labials in contact behind symphysial and a pair of large longitudinal genials, scales in 15 rows without apical pits, median row not sensibly enlarged or 13 rows with rows on each side of median row slightly enlarged, ventrals 165; anal entire; subcaudals 79.

Color in alcohol; banded dark brown and whitish; the brown bands anteriorly thrice as wide as the light bands posteriorly equal and of solid color while the whitish bands are clouded by groups of small streaks and flecks of darker; the dark rings cross the body in a slanting direction so that they tend to alternate on the belly. The head is dark anteriorly and counting this there are twenty-five dark bands about the body and thirteen about the tail.

Total length, 425 mm.; tail, 110 mm.

The following species of *Sibynomorphus* are known from Costa Rica: *S. bicolor* (Günther); *S. annulata* (Günther); *S. articulata* (Cope); *S. argus* (Cope) and *S. pictiventris* (Cope).

This form is about equally allied with *annulata* and *articulata.*

Syrrhophus lutosus, sp. nov.

Type M. C. Z. 8023, from Navarro, Costa Rica; E. R. Dunn collector 1920.

Size small, body depressed; head as broad or slightly broader than the body; as broad as long; snout blunt with very ill defined canthus rostralis;

orbital diameter about equal of distance from eye to nostril; nostril very near tip of snout; interorbital space about equal to width of upper eyelid; vomerine teeth absent; tympanum hidden; fingers 2, 3 & 4, with slight but well defined dilatations; first without disc and shorter than second; toes long, second and fourth equal; no trace of web; with discs more triangular and slightly larger than those of fingers; subarticular tubercles, long, rather well developed; a very indistinct outer, and a long, rather well developed, inner metatarsal tubercle; tibiotarsal articulation reaching to half way from eye to tip of snout; skin roughly plicate on head, sides and back; belly strongly granular.

Color in alcohol (fresh, well preserved specimen not shrunken): Dirty black, a faintly defined middorsal light thread like mid-line; thighs narrowly cross barred black on dark brown. Belly dirty dark brown.

Phyllobates beatriciae, sp. nov.

Type M. C. Z. 8022, taken July 30, 1921, on the wooded hill back of Victoria farm near Zent not far from Puerto Limon, Costa Rica. E. R. Dunn collector.

Snout prominent, longer than the diameter of the orbit; loreal region slightly concave; nostril situated at a point about one third the distance from tip of snout to eye; interorbital space not much broader than upper eyelid; tympanum not covered by a fold, large, over half the diameter of the eye but very indistinct; digital discs feebly developed; two very small and indistinct metatarsal tubercles; a short oblique ridge on the inner aspect of the tarsus; tibiotarsal articulation reaching to beyond eye, almost to nostril; skin of sides smooth, of back feebly granulate, of belly, over central area, with feeble granules and short glandular ridges.

Color in alcohol uniform black above. Lower sides, belly and thighs with fine yellowish marbling.

Distance from snout to vent 20 mm.; greatest width of head, 7 mm.; distance from axilla to tip of longest digit, 14.5; distance from groin to tip of longest toe, 30.5.

This species is named for Miss Beatrice Johnson of Ipswich, Mass., who has aided the development of the M. C. Z. collection of reptiles and amphibians in many ways.

Phyllobates talamancae (Cope).

Dendrobates talamancae Cope, Jour. Acad. Nat. Sci. Phila., Ser. 2, vol. 8, 1875, p. 102, Pl. 23, fig. 6.

Type locality, Old Harbour, eastern coast of Costa Rica; Gabb, collector. (About 20 miles south of Port Limon.)

Redescribed from two specimens taken at Santa Cecilia, Costa Rica, by E. R. Dunn, Sept. 7, 1920.

(*Dendrobates lugubris* Schmidt, Denksch. Acad. Wien, 14, 1858, p. 250, pl. 2, fig. 14, type loc. From leaves and flowers of the evergreen (immergrün) forest, 5000–7000 ft., on the road from Bocas del Toro to the Volcan Chiriquí, v. Warszewicz coll. Types in Mus. Cracow. This is a different species which is fairly well figured and described and is beyond doubt another *Phyllobates*.)

(*Dendrobates truncatus* Cope, of Bull. U. S. Nat. Mus. No 32 is *Phyllobates truncatus* Cope, Proc. Acad. Nat. Sci. Phila., 1860, p. 372. Type loc., Panama. This is apparently neither our sp. nov. nor *talamancae;* beyond this it is hard to say).

Snout rather prominent and truncate; longer than the diameter of the orbit; loreal region very slightly concave; nostril situated at a point slightly less than half the distance of the tip of snout from eye; interorbital space much broader than upper eyelid; tympanum not covered by a fold, very indistinct, large, fully one half the diameter of the eye; digital dilations small; a distinct outer and less distinct inner metatarsal tubercle; a short oblique ridge on the inner aspect of the tarsus; tibiotarsal articulation reaching tympanum, skin of sides and back vermiculate with fine anastomosing glandular folds, (which are not conspicuous until the skin is freed from liquid); skin of belly smooth or with feeble folds.

Color, in alcohol, but fresh and well preserved: Male, dark maroon above, almost velvety black, a yellow line along each side which becomes white above the forelimb and which continues as a white line about the upper lips. A dark band below the yellow band on the sides. Belly and under sides of thighs white. Throat black and under side of thighs smoky with lighter marbling and a conspicuous black anvil-shaped marking. Tibia with a black crossband on hazel ground.

Female: Dorsum rich brown; sides much darker, the lateral band white and not continued entirely along the side; upper lip white; belly and lower sides of thighs white; upper aspect of thighs grayish, with a dusky longitudinal marking and some short bars at right angles to this band; tibia dusky with many darker spots and narrow bars.

Both specimens were taken in the bed of a small brook. This brook was nearly dry and only little pools of water remained along its course; near or in these the specimens were taken. The male had 8 or 10 tadpoles adhering to his back when captured.

Paludicola imitator, sp. nov.

Type M. C. Z. 345, collected by the Thayer Expedition at Lake Cudajaz, (situated north of the main stream of the Amazon between Manaos and Teffé) Brazil.

Vomerine teeth in two small oval groups directly between the choanae; snout rounded, upper lip not prominent, slightly longer than orbital diameter; nostril a very little nearer tip of snout than eye; interorbital space markedly broader than upper eyelid; tympanum, small, oval, upright, about one-third the diameter of the eye; toes moderate, nearly half webbed; subarticular tubercles feebly developed; a small outer and a larger inner metatarsal tubercle; the tibio-tarsal articulation reaches a short distance anterior to the eye; skin smooth with very many round scattered warts each about one-third the size of the tympanum; skin of belly strongly granular.

Color: grayish green, uniform except for a narrow dark streak on the canthus and a wide dark band from eye to axilla; belly white. In habit and marking recalling the common European Hyla.

Eleutherodactylus altamazonicus, sp. nov.

Type M. C. Z. 2028, from the upper Amazon and *probably* collected by the Thayer Expedition at Nauta.

Vomerine teeth in two elongate groups, directed backward, converging slightly, well separated and extending from opposite the centers of the choanae to well behind the openings; snout rather depressed and oval; the orbital diameter equalling the distance between the eye and the nostril; nostril very near tip of snout; interorbital space but slightly broader than upper eyelid; head wider than body; tympanum small, barely distinguishable, about one-fourth the diameter of the eye; fingers short, first not extending beyond second; toes moderate, with no trace of web; discs of fingers and toes moderately well developed; subarticular tubercles large; a large inner and tiny outer metatarsal tubercle; the length of the foot equals the distance from nostril to axilla; the tibio-tarsal articulation reaches to between eye and nostril; skin rough, more granular on sides than on dorsum, belly plicate with a well marked discoidal fold; inner side of thighs strongly granular.

Color: rich mahogany brown, two light spots between the eyes; lips with vertical bars; thighs clouded with dark brown on light; lower surfaces light brown, almost uniform.

It seems at first thought rash to add other names to this already densely overpopulated genus but no other course seems practicable.

Eleutherodactylus noblei, sp. nov.

A determination of the various Eleutherodactyli from Costa Rica has been a task by no means easy of accomplishment. Dunn took the following : *E. bransfordi* (Cope) at Orotino, Guapiles and Zent; *E. ceresinus* (Cope) at Zent; *E. diastemma* (Cope) at Monteverde; *E. fleishmanni* (Boettger) at Sta. Cecilia, Guapiles, La Palma and Cariblanco; *E. lanciformis* (Cope) at Navarro and Guapiles; *E. polyptychus* (Cope) at Monteverde, and Guapiles; *E. rhodopis* (Cope) from Camino del Rio; and *E. rugosus* (Peters) from Monteverde. The types of *lanciformis* have been examined in the U. S. National Museum and they force the conclusion that *E. humeralis* Fowler (Proc. Acad. Nat. Sci. Phila., 1916, p. 395, fig. 2) is a synonym of this form. The new species now described is allied to *lanciformis*. The new type appears also to be represented by two very closely allied variants of the same stock, viz: Dunn's two examples from Guapiles, Costa Rica, and another individual from San Miguel Island in Panama Bay, collected years ago by Mr. W. W. Brown, and which has rested here, a puzzle, ever since. This will probably ultimately prove to represent a distinct race or subspecies, possibly confined to the Pearl Islands in the Bay of Panama. More material is necessary to settle this point.

Type, a large adult M. C. Z. 7827 from Guapiles, Costa Rica. E. R. Dunn. Paratypes, M. C. Z. 7826 from Guapiles and M. C. Z. 8024 from San Miguel Island, Panama Bay.

Vomerine teeth in two triangular groups between and well behind the choanae, but very narrowly separated from them; (in *lanciformis* the groups

are round and more distant from the choanae); snout moderately prominent and acute with rounded canthus rostralis and concave loreal area; orbital diameter slightly less than distance from eye to nostril; nostril near tip of snout; interorbital space much broader than upper eyelid; body wider than head; tympanum large, distinct, vertical diameter equal to two thirds the diameter of the eye; tympanum oval; fingers rather long, first slightly longer than second, third and fourth with large discs; toes rather long with no trace of web, discs less well developed than on third and fourth fingers; subarticular tubercles large and prominent; a very large inner and very small outer metatarsal tubercle; the length of the foot equals the distance from axilla to tip of snout; the tibiotarsal articulation reaches the nostril; (in *lanciformis* to well beyond tip of snout); skin not rough but finely granular; belly smooth with strongly marked discoidal fold; lower surface of thighs granular.

Color: ashy mauve above, with a large)(-shaped dorsal marking; a fine vertebral light line; two dusky stripes situated posteriorly on the sides of the dorsal region, separated by the width of the diapophyses; area from tip of snout to and including the tympanum black; the dark streak exactly limited by the canthus, upper eyelid and fold above the tympanum; limbs very faintly crossbarred; plantar surfaces of feet black. Total length 60 mm. (nose to vent); hind limb 105 mm.

The half-grown paratype from Guapiles is similar in marking but is lighter in general color, more pinkish. The paratype from San Miguel Island is almost uniform reddish and has a very slightly longer leg.

E. lanciformis differs markedly in color, in that the legs are always sharply, almost brilliantly, cross-barred with narrow markings, sharply defined. Small round black spots with a light center are almost invariably present mediad from the tympanum. The longer leg has been mentioned.

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PROCEEDINGS

OF THE

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NOTES ON HORSFIELD'S 'ZOOLOGICAL RESEARCHES IN JAVA.'

BY HARRY C. OBERHOLSER.

Thomas Horsfield's 'Researches in Java'[1] is a well-known book. As the preface states, the "design of the undertaking was to exhibit accurate Figures, accompanied by detailed descriptions, of the most interesting Quadrupeds and Birds collected during my residence in Java."

Most of the new species of birds here fully described and figured had been previously introduced to science in a paper by the same author, entitled 'Systematic Arrangement and Description of Birds from the Island of Java,'[2] but more definite localities for many of them are here added. Furthermore, Horsfield had access to the manuscript, and later evidently to the proof sheets of Sir Stamford Raffles' 'Descriptive Catalogue of a Zoological Collection, made on account of the Honourable East India Company, in the Island of Sumatra and its Vicinity.'[3]

'Zoological Researches in Java' consists of 32 plates of mammals and an equal number of plates of birds, with 7 plates of osteological and structural details of both mammals and birds, a total of 71 plates. It was issued in eight parts, each consisting of four plates of mammals, four plates of birds, with descriptive text, and, in all but part 8, an additional plate of "illustrations." In addition there are 10 supplemental pages containing a "General Catalogue of Javanese Birds, arranged in the

[1]Zoological Researches in Java and the Neighbouring Islands, 1821–1824; pls. I–LXXI [not numbered], and text [not paged].

[2]Transactions Linnean Society London, XIII, pt. I, May, 1821, pp. 133–200.

[3]Transactions Linnean Society London, XIII, pt. I, May, 1821, pp. 239–274; ibid., pt. II, 1822, pp. 277–340.

Museum of the Honourable East India Company;" direction for arranging the plates in binding; and a list of the birds and mammals arranged according to the contents of the parts as issued.

Zoologists are indebted to Dr. Charles W. Richmond for working out the dates of publication of the various parts of this work.[1] The supplemental pages were issued evidently in 1824 with Part 8, or subsequent thereto. The plates are not numbered and the text is unpaged. Each plate of "illustrations" is accompanied by one page of explanations.

On page [9] of the supplemental text, following the list of Javanese birds, is the following statement, with a list of the species figured, the mammals and the birds being catalogued separately:

"The following order is proposed for the arrangement of the Subjects and Plates in the binding of the Volume. To facilitate the reference to the Plates of Illustration, the order in which the Subjects were given in the successive Numbers, is added. The Plates of Illustration should be bound, in the order of publication, at the end of the Volume."

The plates in this work are commonly cited by number, and ostensibly according to the above-mentioned arrangement for binding suggested in the supplementary pages, which would appear to be the logical sequence rather than the order of publication given (without, however, the plates of "illustrations") on page [10] of the supplement. The mammals, which are placed first and by which plates 1 to 32 are occupied, have been by authors correctly cited by plate numbers, but most of the birds have been commonly quoted wrong. This has arisen from the fact that on each of two of the bird plates there are figures of two species, and that two of the plates represent but one species. The four species on the two plates (*Muscicapa banyumas* and *Muscicapa hirundinacea* on plate 38, and *Timalia pileata* and *Timalia gularis* on plate 42) are given in the list proposed for arrangement of the plates in binding as though they occupied four plates, whereas for the two plates of *Irena puella* the species is entered only once. This has resulted in the citation of *Muscicapa hirundinacea* commonly as plate 39, whereas it appears on plate 38; and all the numbers following this are thus also out of order, as, for instance, *Anas arcuata*,

[1] *Cf.* Mathews, Birds of Australia, VII, pt. 5, July 10, 1919, p. 475.

which is usually cited as plate 65. whereas there are only 64 plates of mammals and birds in the book! As an aid to the citation of these plates by number the following list of plates is given with the correct plate number for each.

Mammals.

Plate 1. Simia syndactyla.
2. Semnopithecus maurus.
3. Semnopithecus pyrrhus.
4. Tarsius bancanus.
5. Cheiromeles torquatus.
6. Nyctinomus tenuis
7. Rhinolophus larvatus.
8. Rhinolophus nobilis.
9. Vespertilio temminckii.
10. Pteropus javanicus.
11. Pteropus rostratus.
12. Tupaia javanica.
13. Tupaia tana.
14. Ursus malayanus.
15. Gulo orientalis.
16. Mydaus meliceps.
17. Viverra musanga.
18. Viverra rasse.
19. Mangusta javanica.
20. Lutra leptonyx.
21. Felis javanensis.
22. Felis sumatrana.
23. Felis gracilis.
24. Mus setifer.
25. Sciurus insignis.
26. Sciurus plantani.
27. Sciurus bicolor.
28. Pteromys genibarbis.
29. Pteromys lepidus.
30. Rhinoceros sondaicus.
31. Tapirus malayanus.
32. Cervus muntjak.

Birds.

Plate 33. Falco ichthyaetus.
34. Falco caerulescens.
35. Falco limnaeetus.
36. Strix badia.
37. Podargus javanensis.
38. { Muscicapa banyumas.
{ Muscicapa hirundinacea.
39. Muscicapa indigo.
40. Turdus varius.
41. Turdus cyaneus.
42. { Timalia pileata.
{ Timalia gularis.
43. Iora scapularis.
44. Oriolus xanthonotus.
45. Irena puella, male.
46. Irena puella, female.
47. Motacilla speciosa.
48. Brachypterix montana.
49. Phrenotrix temia.
50. Pomatorhinus montanus.
51. Prinia familiaris.
52. Calyptomena viridis.
53. Eurylaimus javanicus.
54. Alcedo biru.
55. Dacelo pulchella.
56. Phoenicophaus javanicus.
57. Cuculus lugubris.
58. Cuculus xanthorhyncus.
59. Centropus philippensis.
60. Perdix personata.
61. Ardea speciosa.
62. Scolopax saturata.
63. Parra superciliosa.
64. Anas arcuata.

65. Illustrations to the first number.
66. Illustrations to the second number.
67. Illustrations to the third number.
68. Illustrations to the fourth number.
69. Illustrations to the fifth number.
70. Illustrations to the sixth number.
71. Illustrations to the seventh number.

Further examination of this work reveals interesting details regarding some of the names of the species treated. For instance, the genus *Calyptomena* and the species *Calyptomena viridis*, plate 52 and text, were published in June, 1822, and quoted from "Sir T. S. Raffles Cat. of a Zool. Coll. made in Sumatra, Tr. Linn. Soc. XIII, p. 295, 1822." This new genus and species are in the *second* part of Raffles' paper, which appeared in Part II of the Transactions of the Linnean Society of London, volume XIII, which, so Dr. Richmond informs me, did not appear before November, 1822. Horsfield must thus have had access to the proof sheets of Raffles' paper, and his citation and prior publication make it therefore necessary to credit him with both the generic name *Calyptomena* and the specific name *Calyptomena viridis*. Fortunately this involves no change of name, but merely of authority.

The case, however, is somewhat different with *Anas arcuata*, published here on plate 64. This name has been in common use for a species of Tree Duck from Java and other islands of the East Indies. It is, however, as is readily seen by reference to page [2] of the text to this plate, merely a substitute name for *Anas javanica* Horsfield, introduced as follows: "for the name of Anas javanica, originally applied to it, I have substituted the name by which, according to the information communicated to me by M. Temminck, it is distinguished by M. Cuvier, in the Museum of Paris, in the specimens presented by M. Leschenault." It, therefore, becomes necessary to synonymize *Anas arcuata* Horsfield with *Dendrocygna javanica* (Horsfield), and to seek another name for the bird commonly called *Dendrocygna arcuata*. Since *Anas badia* Muller[1] is a nomen nudum, the earliest name for the species becomes *Dendrocygna vagans* Fraser.[2]

The case of the generic name *Entomothera* Horsfield, here first proposed in the text to plate 54, has already been discussed by the writer in a previous publication.[3] Still another species will be treated in another connection.

[1] Verhandel. Natur. Gesch. Nederland. oversee. besitt. Land-en Volkenk., 1839–1844, p. 159.

[2] *Dendrocygna vagans* Fraser, Zoologica Typica, 1849, pl. 68 and text ("Manila, Philippine Islands") (Eyton MS.).

[3] Proc. U. S. Nat. Mus., XLVIII, May 18, 1915, p. 642.

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PROCEEDINGS

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ADDITIONAL NOTES ON FUNGOUS INSECTS.

BY HARRY B. WEISS AND ERDMAN WEST.

The following notes deal mainly with fungous insect records which have accumulated since the publication of former papers[1] along this line. In this connection it is of interest to note that W. M. Davidson records *Psyllobora taedata* LeConte,[2] a coccinellid as feeding during its adult and larval stages on rose and apple powdery mildew, *Sphaerotheca pannosa* Lev., and *Podosphaera oxyacanthae* De Bary All through their larval existence, the insects under observation fed on the fungi, cutting semicircular swaths through the mycelial filaments.

Buller in his paper on "The Red Squirrel of North America as a Mycophagist"[3] states that this animal "not only feeds on the seeds of fir-cones, hazel-nuts, etc., but is also an habitual mycophagist. In the late autumn it often collects fleshy fungi in large numbers for its winter supply of food, and it stores these fungi sometimes en masse in holes in tree trunks, old birds' nests, etc., and sometimes separately on the branches of certain trees." The fungi mentioned by Prof. Buller are members of the genera *Armillaria*, *Russula*, *Lactarius* and *Boletus*.

Parshley in his "Essay on the American Species of Aradus"[4] mentions the following Hemiptera which appear to be associated with fungi,—*Aradus proboscideus* Walk., *Aradus debilis* Uhl., about *Cryptoporus* on *Pinus*, and *Aradus similis* Say on *Polyporus* on *Betula*.

Under date of July 26, 1921, Mr. Ryoichi Takahashi writes that he collected eighteen species of Coleoptera on *Pleurotus* sp.,

[1]Proc. Biol. Soc. Wash., vol. 33, pp. 1–20; vol. 34, pp. 59–62; vol. 34, pp. 85–88.
[2]Ent. News, vol. xxxii, p. 83.
[3]Trans. Brit. Mycol. Soc., vol. vi, part iv, pp. 355–362.
[4]Trans. Amer. Ent. Soc., xlvii, p. 14.

growing on the stem of *Ulmus* sp., at Sapporo, Hokkaido, Japan. These are as follows: EROTYLIDAE, *Cyrtotriplax nipponensis* Lewis, *Triplax ainoicus* Lewis, *Eudaemonium tuberculifrons* Lewis; MELANDRYIDAE, *Penthe japonica* Mars; TENEBRIONIDAE, *Epiphalevia atriceps* Lewis, *Plesiophthalmus nigrocyaneus* Motsch., *Helops strigipennis* Mars., *Stenis insomnis* Lewis, *Lyprops* sp., NITIDULIDAE, *Strongylus ater* Hbst.; HISTERIDAE, *Hister concolor* Lewis, *Hister cadaverinus* Hoff.; SCAPHIDIIDAE, *Scaphisoma* sp.; STAPHYLINIDAE, *Philonthus cyanipennis* F., *Oxyporus nigra* Sharp, *Bolitobius simplex* Sharp, *Conurus* sp.; MYCETOPHAGIDAE, *Mycetophaga helleriana* Reitt. Evidently *Pleurotus* is a universal favorite with the Coleoptera, as in the United States we have found more species associated with *Pleurotus ostreatus* than any other member of the *Agaricaceae*.

Order Coleoptera.

Family **Silphidae.**

Leiodes basalis Leconte. On slime mould, Monmouth Junction, N. J., June 2.

Family **Staphylinidae.**

Omalium rivulare (Payk.). From *Pleurotus ostreatus*, Cincinnati, Ohio. April 23.

Philonthus cyanipennis F. Feeding on *Hygrophorus* sp., Monmouth Jc., N. J., August 6.

Philonthus blandus (Grav.). Feeding on *Russula crustosa*, Monmouth Jc., N. J., August 6.

Ontholestes cingulatus (Grav.). On *Russula crustosa*, Monmouth Jc., N. J., August 6. Predaceous.

Tachinus fimbriatus Grav. On *Collybia platyphylla*, Monmouth Jc., N. J., June 11.

Family **Nitidulidae.**

Stelidota geminata (Say). Feeding on *Russula crustosa*, Monmouth Jc., N. J., August 6.

Stelidota octomaculata (Say). On *Boletus* sp., Monmouth Jc., N. J., July 21.

Family **Erotylidae.**

Megalodacne fasciata Fab. Larvae feeding in *Polpyorus lucidus*, Union, N. J., Sept. 16. Presence is detected by large amount of frass, excrement, etc., thrown out on top of fungus.

Family **Tenebrionidae.**

Bolitotherus cornutus (Panz.). Feeding on lower surface of *Polyporus betulinus*, Springfield, Mass. (G. W. Dimmock.) Egg capsules noted on lower surface of *Polyporus lucidus*, Union, N. J., Sept. 16.

Hoplocephala bicornis Oliv. Feeding in *Trametes suaveolens*, Stockton, N. J., April 8.

Family **Anobiidae.**

Dorcatoma dresdensis Hbst. Bred from *Fomes applanatus*, Valley Falls, N. Y., May 3, (W. A. Hoffman).

Eutylistus intermedius Lec. Bred from *Fomes applanatus*, Valley Falls, N. Y., May 5, (W. A. Hoffman).

Family **Cisidae.**

Cis cylindricus Dury. Breeding in *Trametes peckii*, Los Gatos, Cal., April, (Hartman). Breeding in *Polyporus versicolor*, Palo Alto, Cal., March, (Hartman).

Cis fuscipes Mell. Feeding in *Trametes suaveolens*, Stockton, N. J., April 8.

Cis creberrima Mell. From *Pleurotus ostreatus*, Cincinnati, Ohio, April 23, (Dury).

Cis vitula Mann. Breeding in *Trametes peckii*, Los Gatos, Cal., April, (Hartman). Breeding in *Polyporus versicolor*, Palo Alto, Cal., March 11, (Hartman).

Cis dichrous Lec. Breeding in *Trametes peckii*, Los Gatos, Cal., April (Hartman).

Ennearthron thoracicorne Ziegl. Breeding in *Polyporus versicolor*, Trenton, N. J., July 1.

Ceracis sallei Mell. Bred from *Fomes applanatus*, Valley Falls, N. Y., May 7, (W. A. Hoffman).

Order Diptera.

Family **Mycetophilidae.**

Lintner (10th Rept. Inj. and other Ins. N. Y., 1894; 48th Rept. N. Y. St. Mus. p. 392) mentions six species of *Mycetophilidae* as feeding on *Boletus* and *Agaricus* in Europe.

Family **Itonididae.**

Winnertzia fungicola Felt. Reared from *Lenzites saepiaria*, Plainfield, N. J., March 31.

Family **Phoridae.**

Phora agarici Lintner. Reared from *Agaricus subrufescens* Peck., Glen Cove, N. Y., (Lintner, 10th Rept. 1894, pp. 400–401).

Lintner also mentions five species of *Phora* recorded as being reared from *Agaricus* and *Lycoperdon* in Europe.

Family **Tipulidae.**

Limnobia cinctipes Say. Larvae in *Fomes* sp., Sept. 15, Gloversville, N. Y., (Alexander, Mem. 38, Cornell Univ. Agr. Exp. Sta., p. 811).

Limnobia triocellata O. S. Larvae in *Fomes* sp., Gloversville, N. Y., Sept. 15 (Alexander, Mem. 38). Larvae in *Hypomyces lactifluorum* (Schw.),

Armillaria sp., and *Clitocybe* sp., Great Falls, Va., Sept. 8, Oct. 9, (C. H. Popenoe). (Alexander Mem. 38.) Larvae in *Boletus felleus*, Bradley Hills, Md., (Alexander, Mem. 38).

Ula elegans O. S. Larva in *Fomes* sp., Gloversville, N. Y., Sept. 15 (Alexander, Mem. 38). Alexander also mentions two European species of *Limnobia* and one European species of *Ula* as occurring in polypores and agarics in Europe.

Order Thysanura.

Papirius pini Folsom. Feeding on spores of *Amanatopsis vaginata*, *Lactarius* sp., and *Russula* sp., Monmouth Jc., N. J., July 26.

Achorutes armatus Nic. Feeding on spores of *Russula crustosa*, Monmouth Jc., N. J., August 6.

Order Thysanoptera.

Trichothrips ulmi Fab. Found during summer and winter in many parts of New Jersey, under bark of decayed trees and in and on various polypores such as *Polyporus versicolor*, *P. gilvus*, *P. betulinus*, *P. hirsutus*, *Lenzites betulina* and *Fomes applanatus*. At Monmouth Junction, N. J., July 21, various stages were observed feeding on the ends of the tubes of *Fomes lobatus*. They were feeding in groups and had kept the tubes from growing. The surrounding tubes which had not been eaten grew normally and this resulted in slight depressions wherever the insects had congregated and fed for any length of time. At the same place on July 21, specimens were observed feeding on the mycelial filaments on the upper surface of young sporophores of *Stereum fasciatum*.

Acarina.

Family **Oribatidae.**

Galumna depressa Banks. In *Hydnum* sp., Monmouth Jc., N. J., July 21.

Carabodes nigra Banks. In *Hydnum* sp., Monmouth Jc., N. J., July 21.

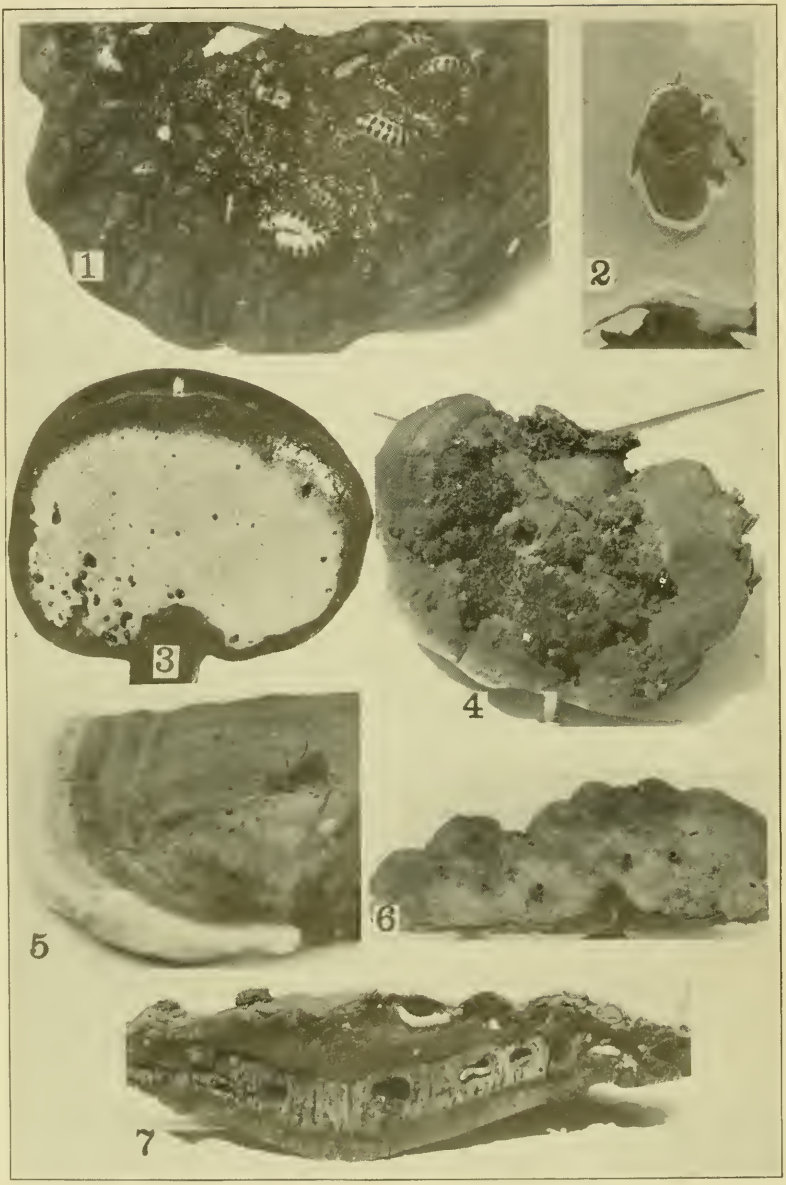
Family **Tyroglyphidae.**

Tyroglyphus lintneri Osborn. Attacking mushrooms, Jamesport, L. I., N. Y. (Lintner, 48th Rept. N. Y. St. Mus. p. 392). In this report mention is made of *Rhizoglyphus rostroserratus* being destructive to *Agaricus campestris* grown in the vicinity of Paris, France.

Tyroglyphus heteromorphus Felt. Observed feeding on a black smutty fungus which developed upon decaying carnation roots. Black spores were observed within their semitransparent bodies (Felt, 11th Rept. N. Y., 1896, p. 254).

Dr. Nathan Banks writes that there are a great many species of *Oribatidae* and a number live in fungi, the *Carabodes* usually in hard fungi.

We are indebted to Dr. Nathan Banks for identifying the *Oribatidae*, to Mr. C. A. Frost for miscellaneous indentifications in the Coleoptera, to Mr. Chas. Dury for his help with the *Cisidae*, to Mr. Chas. Macnamara for determining the springtails and to Mr. A. C. Morgan who identified *Trichothrips ulmi* Fabr.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EXPLANATION OF FIGURES.

Fig. 1. *Polyporus lucidus* with upper surface partly removed showing larvae of *Megalodacne fasciata* Fab.

Fig. 2. Cicada pupal skin embedded in lower surface of *Fomes applanatus*.

Fig. 3. Lower surface of *Polyporus lucidus* showing oval egg capsules of *Bolitotherus cornutus* (Panz.) at lower left-hand corner, (large ovals are egg capsules).

Fig. 4. Excrement thrown out on upper surface of *Polyporus lucidus* by larvae of *Megalodacne fasciata* Fab.

Fig. 5. Section of *Fomes applanatus* showing a specimen of *Bolitotherus cornutus* embedded in upper surface. The beetle was alive when observed and the fungus had covered almost its entire dorsal surface.

Fig. 6. Lower surface of *Polyporus gilvus* showing cone-shaped structures built by *Brachycis brevicollis* Casey.

Fig. 7. Section through *Fomes applanatus* showing work and larvae of *Bolitotherus cornutus*.

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PROCEEDINGS

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STUDIES IN THE TYRANNIDÆ.

I. A Revision of the Genus Pipromorpha.

BY W. E. CLYDE TODD.

In arranging the series of *Pipromorpha* in the collection of the Carnegie Museum a few years ago the writer noticed certain suspicious-looking differences exhibited by specimens from Bolivia. It was found that the examples from this country fell into two series, in one of which the wings were perfectly plain, while in the other the inner secondaries were conspicuously edged terminally with yellowish or buffy, and the middle and greater wing-coverts tipped with the same color, forming two bands across the wing. These differences were correlated with others less noticeable, but apparently constant. Dr. Harry C. Oberholser, to whom some of these specimens were submitted, opined that the differences in question were due to age, but when confronted with further evidence in the shape of additional material, showing that the characters held for young birds as well as adults, he saw fit to revise his opinion. Meanwhile good series of *Pipromorpha* from French Guiana and the lower Amazon had come to hand, in which precisely the same differences were observable. The question at once arose as to which of these two forms Lichtenstein's name *Muscicapa oleaginea* applied —a question which through the kindness of Dr. Ernst Hartert, who examined the type-specimen in the Berlin Museum, we have been able to definitely settle. While this investigation was in progress a paper by Mr. Charles Chubb appeared, in which he described and named no less than six races of *Pipromorpha oleaginea*, but apparently without recognizing the significance of the characters to which we have called attention. In order to clear up the resultant confusion a revision of the entire generic group

thus became imperative, and the results of the study are presented herewith. In undertaking it we have examined no less than four hundred and sixty specimens, of which one hundred and eighty-three are in the collection of the Carnegie Museum. The remainder were loaned for the purpose by the authorities of the following institutions: the United States National Museum, the American Museum of Natural History, the Museum of the Brooklyn Institute, the Academy of Natural Sciences of Philadelphia, the Museum of Comparative Zoology, the Gœldi Museum of Pará, Brazil, the Museum Paulista of São Paulo, Brazil, and the National Museum of Buenos Aires, Argentina. To the several parties in charge of the collections in these museums the writer takes this opportunity of again returning his thanks for their uniform courtesy. His acknowledgments are also due to Dr. Ernst Hartert, not only for examining Lichtenstein's type-specimen in Berlin, but also for furnishing certain data on specimens in the Tring Museum. As in other systematic papers by the present writer, all references have been personally verified. Measurements are in millimeters, that for the bill being of the exposed culmen, and unless otherwise stated are based on a series of ten specimens of each sex. The names of colors correspond as a rule to those in Mr. Ridgway's "Color Standards and Color Nomenclature."

Genus **Pipromorpha** Gray.

Pipromorpha Bonaparte, Ann. Sci. Nat., Zool., (4), I, 1854, 134 (ex Schiff, MS.; no type or included species designated!).—Gray, Cat. Gen. and Subgen. Birds, 1855, 146 (*Muscicapa oleaginea* Lichtenstein designated as type).—Cabanis and Heine, Mus. Heineanum, II, 1859, 55 (ref. orig. publ.; list of species).—Gray, Hand-List Birds, I, 1869, 355 (list of species).—Giebel, Thes. Orn., III, 1877, 203 (list of species).—Waterhouse, Ind. Gen. Avium, 1889, 173 (ref. orig. publ.).—Ridgway, Bull. U. S. Nat. Mus., No. 50, IV, 1907, 345, 452 (diag.; key to forms).

The earliest known species of the group was *Muscicapa oleaginea*, described by Lichtenstein in 1823. A second species, *Mionectes rufiventris*, was described from southern Brazil by Cabanis in 1845, and associated with the other. In 1854 Bonaparte made use of the term *Pipromorpha* in a nominal list of genera, but without any diagnosis or indication of the type or included species. *Pipromorpha* is thus a *nomen nudum* at this place, and must date from G. R. Gray, 1855, who designated its type as *Muscicapa oleaginea* Lichtenstein. By most authors, however, it was merged with *Mionectes*, until the appearance of the fourth part of Mr. Ridgway's

great work on 'The Birds of North and Middle America' in 1907 led to its more general recognition. This author assigned to it four species, but one of these is almost certainly a synonym. In the present review we recognize four species, including eleven subspecies, two of which are described as new.

The species of this group agree in having a small, slender bill, a little wider than high at the base, with weak rictal bristles, and oval nostrils, with an inner shelf or flap apparent. The culmen is prominently ridged, and the tip distinctly decurved. The wings are rather long for this family, with the wing-tip about equalling the exposed culmen. The seventh, eighth, and ninth primaries are longest, and the outer primaries in many individuals are more or less narrowed terminally, or even distinctly emarginate (but never "scooped" as in *Mionectes*), the precise character and extent of this modification varying greatly. The tail is even, and approximately three-fourths the length of the wing. The feet are weak, but the claw of the hind toe is relatively prominent. The pattern of coloration is olive green above and deep buffy or ochraceous below, the head all around being gray in one species.

So far as we can discover there is only one character of value by which to distinguish *Pipromorpha* from *Mionectes*, namely, the different shape of the ninth primary. Mr. Ridgway says that in *Pipromorpha* this feather is "normal," but as a matter of fact three or four of the outer primaries are so often narrowed or sharply emarginated terminally that it is very misleading to describe it in this way. Probably the individuals showing these peculiarities are older birds, but at any rate sex has certainly nothing to do with the matter. Whether under the circumstances *Pipromorpha* should still be kept separate from *Mionectes* is a question which we need not discuss at present.

Pipromorpha is a group characteristic of the forest region in the Tropical Zone, and enjoys an extensive range in the American Tropics, from southern Brazil and northern Argentina north to eastern Mexico, a distinct species having been developed at either extremity of this range. It is remarkable for including two other species, perfectly distinct, but yet so closely related that up to the present they have passed for one form, living side by side throughout an immense area in Bolivia, Brazil, and Guiana. When more is known about the life-histories of these two forms we may find that they occupy different habitats, but the problem of their origin and present distribution is not easy to solve. Apparent gaps in the range of the group as for instance that existing in northern Venezuela, open up other interesting questions. Seasonal and individual variation is considerable, and introduces complications into any attempt to discriminate the races into which the several species (with one exception) seem to divide. In the key which follows we endeavor to arrange the various forms into what seems to be the most natural and orderly sequence. The color characters upon which the key is based are necessarily not absolute, but rather comparative; they are those exhibited by adult birds in fresh plumage.

Key to the Species and Subspecies of Pipromorpha.

A. Tertiaries (and wing-coverts) without pale terminal margins.
  a. Head grayish all around..... *Pipromorpha rufiventris.*
  a′. Head greenish above (*Pipromorpha macconnelli*).
    b. Posterior under parts paler, more buffy.
      c. Below brighter, more rufescent.
        Pipromorpha macconnelli **amazona.**
      c′. Below duller, more buffy.
        Pipromorpha macconnelli macconnelli.
    b′. Posterior under parts brighter, yellow ocher.
      Pipromorpha macconnelli roraimæ.
A′. Tertiaries with conspicuous paler terminal margins.
  a. Wing-coverts tipped with buffy; no grayish shade on throat (*Pipromorpha oleaginea*).
    b. Throat shaded with ochraceous, almost uniform with rest of under surface.....*Pipromorpha oleaginea oleaginea.*
    b′. Throat more or less shaded with greenish, contrasting with rest of under surface.
      c. Below richer, more rufescent.
        d. Coloration deeper; abdomen yellow ocher; breast citrine
          Pipromorpha oleaginea chloronota.
        d′. Coloration paler; abdomen nearer antimony yellow; breast more buffy.
          e. Darker (especially the upper tail-coverts and tail)
            Pipromorpha oleaginea pallidiventris.
          e′. Paler (especially the upper tail-coverts and tail)
            Pipromorpha oleaginea parca.
      c′. Below paler, more buffy.....*Pipromorpha oleaginea* **pacifica.**
  a′. Wing-coverts without buffy tips; chin and upper throat shaded with grayish (*Pipromorpha assimilis*).
    b. Darker and duller.....*Pipromorpha assimilis dyscola.*
    b′. Lighter and brighter.....*Pipromorpha assimilis assimilis.*

Pipromorpha rufiventris (Cabanis).

Mionectes rufiventris Cabanis, in Tschudi. Fauna Peruana, Aves, 1845, 148, note (Brazil; orig. descr.; type in coll. Berlin Mus.; ex *Muscicapa rufiventris* Lichtenstein, MS.).—Cabanis, Arch. f. Naturg., 1847, 251 (ref. orig. descr.).—Burmeister, Syst. Ueb. Thiere Bras., II, 1856, 482 (southern Brazil; descr.).—(?)Burmeister, Reise La Plata-Staaten, II, 1861, 453 (Tucumán, Argentina; references).—von Pelzeln, Orn. Bras., ii, 1869, 104 (Rio Janeiro, Registo do Sai, Ypanema, and Curytiba, Brazil).— von Pelzeln, Nunquam Otiosus, II, 1872, 292 (Neu Freiburg, Brazil).—Sclater and Salvin, Nom. Avium Neotrop., 1873, 47 (range). —Giebel, Thes. Orn., II, 1875, 596 (ref. orig. descr.).—von Berlepsch and von Ihering, Zeits. ges. Orn., II, 1885, 131 (Taquara do Mundo Novo, Brazil).—Sclater, Cat. Birds Brit. Mus., XIV, 1888, 114 (Curytiba and Pelotas, Brazil; descr.; references).—Salvin and Godman,

Biol. Centr.-Am., Aves, II, 1888, 23, in text (diag.; range).—Gœldi, Aves do Brasil, 1894, 328 (Organ Mts., Brazil).—Kœnigswald, Journ. f. Orn., XLIV, 1896, 357 (São Paulo, Brazil, ex Burmeister and von Pelzeln).—von Ihering, Rev. Mus. Paulista, III, 1898, 190 (Iguape, Tieté, and Ypiranga, Brazil; Brazilian references and range; diag.).—von Ihering, Proc. Zool. Soc. London, 1899, 513 (local range in Brazil).—von Ihering, Rev. Mus. Paulista, IV, 1900, 155 (Cantagallo and Nova Friburgo, Brazil).—Sharpe, Hand-List Birds, III, 1901, 114 (range).—Dubois, Syn. Avium, I, 1902, 237 (references; range).—von Ihering, Rev. Mus. Paulista, V, 1902, 313 (São Paulo, Brazil).—von Ihering, Auk, XXI, 1904, 314, in text (Brazil; nest).—Hagmann, Bol. Mus. Gœldi, IV, 1904, 243 (Burmeister's reference), 284 (von Pelzeln's reference).—von Ihering, Rev. Mus. Paulista, VI, 1904, 325 (Paraguay, ex Bertoni).—von Ihering, Aves do Brazil, 1907, 277 (Estado do São Paulo, Ypiranga, Itatiba, Tieté, Iguape, and Ubatuba, Brazil; range).—Hartert and Venturi, Nov. Zool., XVI, 1909, 200 (Iguazu, Misiones, Argentina).—Chubb, Ibis, 1910, 581 (Sapucay, Paraguay, crit.).—Brabourne and Chubb, Birds S. Am., I, 1912, 284 (ref. orig. descr.; range).—Dabbene, Physis, I, 1914, 342 (Santa Ana, Argentina).—Hellmayr, Verh. Orn. Ges. Bayern, XII, 1915, 134 (Espirito Santo, Brazil; crit.).

Elania rufiventris Gray, Gen. Birds, III, 1849, Appendix, 11 (in list of species).

Pipromorpha rufiventris Cabanis and Heine, Mus. Heineanum, II, 1859, 56 (Brazil; references).—Cabanis, Journ. f. Orn., XXII, 1874, 88 (Cantagallo, Brazil).—Giebel, Thes. Orn., III, 1877, 203 (syn.).—Heine and Reichenow, Nom. Mus. Heineani Orn., 1883, 141 (Brazil).—Ridgway, Bull. U. S. Nat. Mus., No. 50, IV, 1907, 454 (diag.; range; references).—Dabbene, An. Mus. Nac. Buenos Aires, (3), XI, 1910, 332 (Misiones, Argentina; local range).

Elainia rufiventris Gray, Hand-List Birds, I, 1869, 355 (range).

Hemitriscus (sic) *barbarenæ* Bertoni, Aves Nuevas del Paraguay, 1901, 124 (Puerto Bertoni. lat. 25° 47′, Paraguay; orig. descr.; type in coll. —(?); habits.

Hemitriccus barbarenæ Richmond, Auk, XIX, 1902, 416 (ref. orig. descr.).—Lynch-Arribalzaga, An. Mus. Nac. Buenos Aires, VII, 1902, 365, 387 (crit.).

Description.—Adult: back plain olive green; wings and tail dull brown, externally dark citrine; pileum and hindneck neutral gray, more or less washed with olive green; sides of head neutral gray without greenish tinge; throat also neutral gray, sometimes with a buffy or rufescent wash, passing into rich yellow ocher on the rest of the lower parts and under wing-coverts, becoming brighter and purer on the crissum: "iris brown; feet plumbeous;" bill brown above, pale below. (Young not seen).

Measurements.—Male (five specimens): wing, 67–72 (70); tail, 53–57 (55); bill, 11–12.5 (11.7); tarsus, 16–17 (16.5). (No female specimens examined.)

Range.—Southern Brazil, from Rio Janeiro to Rio Grande do Sul, and thence westward through northeastern Argentina (Misiones) to the Parana River in Paraguay.

Remarks.—This is a very distinct species, differing from the others of this group in its gray head. The variation in the color of the under surface is comparable to that shown by certain of the other forms. The outer primary also varies in the amount of narrowing; it is well marked in only one of the specimens examined.

So far as known the range of this species does not impinge upon that of any other form of this group. It was described by Cabanis in 1845 from a specimen in the Berlin Museum without exact locality, but remained otherwise unknown until a record of the eight specimens obtained by Natterer in southern Brazil was published by von Pelzeln in 1869. In more recent years von Ihering and other workers in this field have done much to make the bird better known, while it has been traced westward as far at least as the Rio Parana in Paraguay. Burmeister's record for Tucumán, however, we think is open to question. Save for the unfortunate lapse by Señor Bertoni noted above, the species has escaped synonyms. It is still rare in collections, however, and very little appears to have been put on record concerning its habits and characteristics in life.

Specimens examined.—Brazil: Ubatuba, São Paulo, 2; Fazenda Cayoa, 1; unspecified, 3. Argentina: Puerto Segundo, Misiones, 1; Iguazu, Misiones, 1. Total, 8.

Pipromorpha macconnelli macconnelli Chubb.

Mionectes oleagineus (not *Muscicapa oleaginea* Lichtenstein) Salvin, Ibis, 1885, 293, part (Bartica Grove and Camacusa, British Guiana).

[*Mionectes oleagineus*] b. Subsp. *typica* Sclater, Cat. Birds Brit. Mus., XIV, 1888, 113, part (Bartica Grove and Camacusa, British Guiana).

Pipromorpha oleaginea macconnelli Chubb, Ann. and Mag. Nat. Hist., (9), IV, 1919, 303 (Kamakabra River, British Guiana; orig. descr.; type in MacConnell Coll.).

Description.—Above plain olive green, wings and tail dusky brownish, externally citrine, without trace of paler wing-bars or of terminal spots on the tertiaries; sides of head and neck olive green like the back, passing into dull citrine on the throat and breast, and this into rich buff on the abdomen, the crissum and under wing-coverts still deeper buff (near orange buff); inner margins of remiges also rich buff; bill and feet dark (in skin), except the basal half of the lower mandible.

Measurements.—Male: wing, 62–68 (66.5); tail, 46–51 (48.5); bill, 9.5–11.5 (10.7); tarsus, 14.5–16.5 (15.5). Female (seven specimens): wing 59–63 (61); tail, 44–48 (46); bill, 10–11.5 (11); tarsus, 14.5–16 (15).

Range.—British Guiana (except more elevated parts) to French Guiana and adjacent northern Brazil.

Remarks.—The above name, based on a bird from the lowlands of British Guiana, which is described as "darker on the upper parts than any of the

other forms," evidently applies as well to the large series from French Guiana examined in this connection. This series represents a form which is obviously specifically distinct from the form with buffy wing-bands, with which it occurs associated, and the name *macconnelli* of Chubb, being the first applied to the plain-winged bird, will thus become the specific appellation of the group. Our series is very uniform, although specimens taken in the fall months are perhaps a trifle darker than those shot in May and June. From one to three outer primaries are narrowed terminally in a majority of the specimens. There is no difficulty whatever in distinguishing the series as a whole, or any individual example, from the form of *P. oleaginea* inhabiting the same region.

Specimens examined.—French Guiana: Tamanoir, 24; Mana, 1; Pied Saut, 14. Brazil: Upper Rocana, 1. Total, 40.

Pipromorpha macconnelli roraimæ Chubb.

Mionectes oleagineus (not *Muscicapa oleaginea* Lichtenstein) Salvin, Ibis, 1885, 293, part (Mount Roraima and Merumé Mountains, British Guiana; crit.).

[*Mionectes oleagineus*] b. Subsp. *typica* Sclater, Cat. Birds Brit. Mus., XIV, 1888, 113, part (Mount Roraima and Merumé Mountains, British Guiana).

Pipromorpha oleaginea roraimæ Chubb, Ann. and Mag. Nat. Hist., (9), IV, 1919, 303 (Mount Roraima [type-locality] and Merumé Mountains, British Guiana; orig. descr.; type in coll. Brit. Mus.).

Subspecific characters.—Similar to *Pipromorpha macconnelli macconnelli*, but more richly colored throughout, the wings and tail edged with dull orange citrine, and the upper tail-coverts, throat, and upper breast strongly shaded with this same color, passing into bright yellow ocher on the posterior under parts, axillars, and under wing-coverts.

Measurements.—Male (four specimens): wing, 61–64 (63); tail, 43–48 (45); bill, 11–12 (11.6); tarsus, 15–17 (16).

Range.—Known only from Mount Roraima and the Merumé Mountains, British Guiana.

Remarks.—Judging from the available material, the present form is a strongly characterized one, being decidedly more richly colored than true *macconnelli*, the under parts especially, which are fully as deep as in *P. rufiventris*. So far as known, it is confined to the highlands of British Guiana, from 3500 feet upwards, the type coming from Mount Roraima. While there are specimens extant of both this form and *P. oleaginea chloronota* collected by Whitely from the Merumé Mountains, Mr. Chubb's description was certainly based on a bird of the plain-winged type.

Specimens examined.—British Guiana: Mount Roraima, 3; Merumé Mountains, 1. Total, 4.

Pipromorpha macconnelli amazona, subsp. nov.

Mionectes oleagineus (not *Muscicapa oleaginea* Lichtenstein) Gœldi, Album de Aves Amazonicas, III, 1900, pl. 35, fig. 1 (Lower Amazon,

Brazil).—Snethlage, Journ. f. Orn., LVI, 1908, 526, part (Arumatheua, Rio Tocantins; Brazil); LXI, 1913, 524, part (lower Amazon, Brazil; local range).—Snethlage, Bol. Mus. Gœldi, VIII, 1914, 413 part (localities in lower Amazonia, Brazil; descr.).

Mionectes oleagineus oleagineus Hellmayr, Nov. Zool., XIII, 1906, 360, part ([San Antonio do] Prata, Pará district, Brazil).—Hellmayr, Abhand. K. Bayerischen Akad. Wiss., Math.-phys. Kl., XXVI, 1912, 22, part (Peixe-Boi, Mexiana Island, Brazil), 89 (localities in Pará district), 106, 119 (Mexiana Island).

Type, No. 51,396, Collection Carnegie Museum, adult male; Buenavista, Santa Cruz de la Sierra, Bolivia, June 21, 1915; José Steinbach.

Subspecific characters.—Similar to *Pipromorpha macconnelli macconnelli*, but under parts brighter, more rufescent, the abdomen buffy light orange yellow, brightening into warm orange buff in the crissum.

Measurements.—Male: wing, 64–69 (66.3); tail, 45–52 (48.5); bill, 11–12.5 (11.5); tarsus, 15–17 (15.6). Female: wing, 59–62 (60.5); tail, 42–46 (44.5); bill, 9.5–11.5 (10.8); tarsus, 14–16.5 (15).

Range.—Valley of the Lower Amazon, west and south to central Bolivia, but exact limits of range unknown.

Remarks.—This form also differs from typical *macconnelli* in its richer coloration, but the variation is in a different direction from that it takes in *roraimæ*, as above indicated. Individual variation is also in evidence, some specimens being obviously darker green above (or even with a brownish tinge), and duller below than others from the same locality, the latter appearing to be in fresher plumage. Bolivian skins are slightly paler and more uniform below, but after careful examination of the series as a whole we are satisfied that no formal separation between Bolivian and lower Amazonian specimens is admissible.

Authors have uniformly failed to discriminate this form from *P. oleaginea chloronota*, the two species occurring together throughout the range of the present bird, apparently equally common. In a series of forty-three specimens of *Pipromorpha* from various localities in lower Amazonia, forwarded for study by the Gœldi Museum, there are twenty-five examples of *P. oleaginea chloronota* and eighteen of *P. macconnelli amazona*, and the series from this region in the Carnegie Museum collected by Mr. Samuel M. Klages divide up in a very similar ratio. Both forms are represented in the specimens from San Antonio do Prata in the Tring Museum, as we are informed by Dr. Hartert, but without such further information it is of course impossible to place with any certainty many of the published records from this general region, or to define the range of the present form with precision.

Specimens examined.—Brazil: Benevides, 9; Colonia do Mojuy, 1; Villa Braga, 12; Miriti-tuba, 3; Aveiros, 2; Cameta, Rio Tocantins, 2; San Antonio do Prata, 2; Ananindeua, 1; Providencia, 1; Ourém, 1; Peixe-Boi, 2; Santa Helena, Rio Jamauchim, 1; Conceição, 2; Arumatheua, 2. Bolivia: Buenavista, 4; Rio Surutu, 1; Cerro Hosane, 1. Total, 47.

Pipromorpha oleaginea (Lichtenstein).

The following references are of such general, indefinite, or uncertain application that it has not been possible to allocate them subspecifically.

Muscicapa chloronotis Lesson, Traité d'Orn., 1831, 392 (Brazil [Delalande]; *nomen nudum*).

Mionectes oleagineus Cabanis, in Tschudi, Fauna Peruana, Aves, 1845, 148, note (Cayenne, French Guiana; Brazil; descr.).—Cabanis, Arch. f. Naturg., 1847, 251 (in list of species; references).—Cabanis, in Schomburgk, Reisen in Britisch-Guiana, III, 1848, 702 (Cayenne, French Guiana; Brazil).—Sclater, Proc. Zool. Soc. London, 1859, 45 (range).—Sclater, Cat. Am. Birds, 1862, 213, part ("Bogotá," Colombia).—Sclater and Salvin, Nom. Avium Neotrop., 1873, 47, part (range).—Giebel, Thes. Orn., II, 1875, 596 (syn.).—Garrod, Proc. Zool. Soc. London, 1876, 517 (artery).—Salvin, Cat. Strickland Coll., 1882, 306 (references).—Salvin and Godman, Biol. Centr.-Am., Aves, II, 1888, 22, part (South American range and references).—von Berlepsch, Zeits. ges. Orn., IV, 1888, 184 ("Bogotá," Colombia).—Sclater, Cat. Birds Brit. Mus., XIV, 1888, 112, part (descr.; references).—Bangs, Proc. New England Zool. Club, II, 1900, 21, in text (crit.).—Bangs, Auk, XVIII, 1901, 362, in text (crit.).—Dubois, Syn. Avium, I, 1902, 237 (references; range).—Brabourne and Chubb, Birds S. Am., I, 1912, 284 (ref. orig. descr.; range).

Elainia oleaginea Gray, Hand-list Birds, I, 1869, 355 (syn.; range).

Pipromorpha oleaginea Giebel, Thes. Orn., III, 1877, 203 (syn.).

Mionectes oleaginus Sharpe, Hand-List Birds, III, 1901, 114 (range).

Myionectes [lapsus] *oleaginus* von Ihering, Rev. Mus. Paulista, VI, 1904, 369 (range).

Pipromorphia oleaginea oleaginea Ridgway, Bull. U. S. Nat. Mus., No. 50, IV, 1907, 454 (diag.; range; references; crit.) 457, note (meas.).

Pipromorpha oleaginea is a plastic species, dividing into no less than five recognizable races. It may invariably be distinguished from *P. macconnelli*, with which it is associated throughout a large section of its range, by the color of its wings, in which the middle and greater wing-coverts are tipped with buffy or yellowish, and the inner secondaries broadly margined with the same color. In worn plumage this edging is more or less reduced, but is always evident upon close inspection. *P. oleaginea* also averages a little smaller, sex for sex.

Pipromorpha oleaginea oleaginea (Lichtenstein).

Muscicapa oleaginea Lichtenstein, Verz. Doubl., 1823, 55 (Bahia, Brazil; orig. descr.; type in coll. Berlin Mus.).

Elania oleaginea Hartlaub, Syst. Verz. Nat. Samm. Ges. Mus. [Bremen], 1844, 53 (Brazil; ref. orig. descr.).—Gray, Gen. Birds, I, 1846, 250 (ref. orig. descr.).

Mionectes oleagina Bonaparte, Consp. Avium, I, 1850, 187 (ref. orig. descr.; range).

Mionectes oleagineus von Berlepsch, Journ. f. Orn., XXXII, 1884, 299, part (Bahia, Brazil).—Salvin, Ibis, 1885, 293, part (Bahia, Brazil). —von Berlepsch, Nov. Zool., XV, 1908, 136, part (Bahia, Brazil).

[*Mionectes oleagineus*] b. Subsp. *typica* Sclater, Cat. Birds Brit. Mus., XIV, 1888, 113, part (Bahia, Brazil).

Mionectes oleagineus oleagineus Hellmayr, Nov. Zool., XIII, 1906, 360, part (Bahia, Brazil); XVII, 1910, 292, part (Bahia, Brazil).

Description.—Above plain dull olive green; wings dusky brown, externally citrine (except toward tip), the greater and middle coverts tipped with buffy ochraceous, forming two wing-bars; inner secondaries with buffy or buffy ochraceous external edgings towards their tips; tail dull grayish brown, washed with citrine externally; sides of head and neck dull olive green like the back; entire under parts yellow ocher, nearer old gold on the upper throat, with little or no olivaceous shading.

Measurements.—Six adults, unsexed: wing, 59–64 (62); tail, 45–51 (48); bill, 9.5–10.5 (10); tarsus, 13.5–15.5 (14.5).

Range.—Known only from the vicinity of Bahia, eastern Brazil.

Remarks.—This, the typical race, appears to be known only from so-called Bahia trade-skins, although it undoubtedly has a wide range in eastern Brazil. It was described by Lichtenstein almost one hundred years ago from such a specimen, which is still extant in the Berlin Museum. No mention is made in the description of any wing-bars or colored tips to the secondaries, but Dr. Ernst Hartert, who recently examined the type at the writer's request, found it to agree closely with a colored sketch representing a supposed Bahia specimen possessing these characters. This form is characterized by the generally deep and uniform coloration of the under surface, with very little olivaceous shading on the throat and breast.

Specimens examined.—Brazil: "Bahia," 6.

Pipromorpha oleaginea chloronota (D'Orbigny and Lafresnaye).

Muscicapa chloronotus D'Orbigny and Lafresnaye, Synopsis Avium, in Guerin's Mag. de Zool., 1837, ii, 51 (Yuracares, Bolivia; orig. descr.; ex *Muscicapa chloronotis* Lesson, 1831 [nomen nudum]; type in coll. Paris Mus.[?]).

Muscicapara oleaginea (not *Muscicapa oleaginea* Lichtenstein) D'Orbigny, Voy. Am. Mér., Oiseaux, 1839, 323 (Yuracares, Bolivia; descr.).

Mionectes oleagineus Sclater, Proc. Zool. Soc. London, 1858, 71 (Rio Napo, Ecuador).—(?)Sclater, Cat. Am. Birds, 1862, 213, part (Cayenne, French Guiana; "Bogotá," Colombia).—Sclater and Salvin, Proc. Zool. Soc. London, 1866, 188 (upper Ucayali, Peru); 1867, 577 (Pará and Guia, Brazil), 751 (Xeberos and Chyavetas, Peru), 978 (Pebas, Peru).— von Pelzeln, Orn. Brasiliens, ii, 1869, 104 (Engenho do [Capa] Gama, Borba, Marabitanas, Barcellos, and Barra [do Rio Negro], Brazil).— Layard, Ibis, 1873, 382 (Pará, Brazil).—Sclater and Salvin, Proc. Zool. Soc. London, 1873, 278 (Peruvian localities and references); 1879, 613 (Yuracares, Bolivia, ex D'Orbigny).—Taczanowski, Proc. Zool. Soc. London, 1882, 19 (Yurimaguas, Peru).—Taczanowski, Orn. Perou,

II, 1884, 245 (Xeberos, Chyavetas, Pebas, and Yurimaguas, Peru; descr.; references; crit.).—Riker and Chapman, Auk, VII, 1890, 270 (Santarem, Brazil).—Gœldi, Bol. Mus. Paraense, I, 1896, 346 (Pará and Guia, Brazil [ex von Pelzeln]), 353 (Pará, Brazil [ex Layard]).—von Berlepsch and Hartert, Nov. Zool., IX, 1902, 41 (Nericagua, Suapure, La Pricion, Nicare, and La Union, Venezuela).—Gœldi, Bol. Mus. Paraense, III, 1902, 291 (Pará, Pebas, Borba, and Guia, "Amazonia" [ex Sclater]).—Gœldi, Ibis, 1903, 486, in text, 499 (Poço Real, Rio Capim, Brazil).—Hagmann, Bol. Mus. Gœldi, IV, 1904, 243 (Burmeister's reference), 284 (von Pelzeln's reference).—Menegaux, Bull. Mus. d'Hist. Nat., 1908, 11 (French Guiana).—(?)von Berlepsch, Nov. Zool., XV, 1908, 136 (Roche-Marie and Ipousin, French Guiana; crit.).—Snethlage, Journ. f. Orn., LVI, 1908, 526, part (Arumatheua, Rio Tocantins, Brazil).—(?) Penard, Vogels van Guyana, II, 1910, 222 (Guiana; descr.; habits).—Snethlage, Journ. f. Orn., LXI, 1913, 524, part (lower Amazon, Brazil; local range).—Snethlage, Bol. Mus. Gœldi, VIII, 1914, 413, part (localities in lower Amazonia).

Pipromorpha oleaginea (?)Cabanis and Heine, Mus. Heineanum, II, 1859, 55, part (Peru, Surinam, and Cayenne).—(?)Heine and Reichenow, Nom. Mus. Heineani Orn., 1883, 141, part (Peru, Surinam, and Cayenne).

[*Mionectes oleagineus*] b. Subsp. *typica* Sclater, Cat. Birds Brit. Mus., XIV, 1888, 113, part (Sarayacu, Ecuador; Pebas and Chamicuros, Peru; Pará, Guia, and Borba, Brazil).

Mionectes oleaginus von Ihering, Rev. Mus. Paulista, VI, 1904, 434, excl. extralimital localities, part (Rio Juruá, Brazil).— von Ihering, Aves do Brazil, 1907, 276, part (Rio Juruá, Brazil; range).

Mionectes oleagineus oleagineus Hellmayr, Nov. Zool., XIV, 1907, 47 (Teffé, Rio Solimoes, Brazil), 356 (Humaytha, Rio Madeira, Brazil); XVII, 1910, 292 (Calama and Jamarysinho, Brazil).—Beebe, Zoologica, II, 1916, 64, 89 (Pará, Brazil; habits).

Mionectes oleagineus pallidiventris (not of Hellmayr) Stone, Proc. Acad. Nat. Sci. Philadelphia, 1913, 203 (Cariaquito, Venezuela).

Pipromorpha oleaginea oleaginea Cherrie, Mus. Brooklyn Inst. Sci. Bull., II, 1916, 226 (Nericagua, La Union, and Suapure, Venezuela).—Chapman, Bull. Am. Mus. Nat. Hist., XXXVI, 1917, 449 (Villavicencio and Florencia, Colombia; Suapure, Venezuela; crit.).—Bangs and Penard, Bull. Mus. Comp. Zool., LXII, 1918, 76 (Paramaribo and Lelydorp, Dutch Guiana).

Pipromorpha oleaginea wallacei Chubb, Ann. and Mag. Nat. Hist., (9), IV, 1919, 301 (Pará [type-locality] and Rio Negro, Brazil; orig. descr.; type in coll. Brit. Mus.).

Pipromorpha oleaginea hauxwelli Chubb, Ann. and Mag. Nat. Hist., (9), IV, 1919, 301 (Pebas, Peru; orig. descr.; type in coll. Brit. Mus.).

Pipromorpha oleaginea chapmani Chubb, Ann. and Mag. Nat. Hist., (9), IV, 1919, 302 ("Villavicencio to Medina," Colombia; orig. descr.; type in coll. Brit. Mus.).

Subspecific characters.—Similar to *Pipromorpha oleaginea oleaginea*, but

throat more or less shaded with olivaceous, in contrast with the rest of the under surface.

Measurements.—Male: wing, 58–65 (62); tail, 45–50 (47); bill, 9.5–11.5 (10); tarsus, 13.5–16 (14.7). Female: wing, 56–59 (57.5); tail, 42–47 (44); bill, 10–11 (10.5); tarsus, 13–15.5 (14.5).

Range.—Northern Brazil ("Amazonia") to Guiana and Venezuela (south of the Orinoco), west to the Andes, and south into central Bolivia.

Remarks.—This form is to be distinguished by its rich, deep coloration below, in which respect it often goes beyond true *oleaginea*, the abdomen being rich yellow ocher, but the throat and breast are more strongly shaded with olivascent, so that the under parts are more distinctly bicolor. The range of variation is considerable, however, but inasmuch as it obtains in specimens from the same locality it is certainly only individual or seasonal, rather than geographical. Specimens from Villavicencio, Colombia (the type-locality of *chapmani* Chubb) are indistinguishable, so far as we can see, from others from Pebas, Peru (the type-locality of *hauxwelli* of the same author), and these are collectively not satisfactorily separable from a series from Villa Braga on the Tapajoz River in Brazil, and from some others coming from the Pará district. Mr. Chubb's description of *wallacei* indicates that it too was based on a bird of this type, the wing being given as only 61 mm. in length Furthermore, two specimens from Dutch Guiana and one from British Guiana, as well as one from Cariaquito, Venezuela, are fully as richly colored below as specimens from the Caura River, all certainly referable to one and the same form. A series from French Guiana, on the other hand, are somewhat paler, and might readily be referred to *pallidiventris*, were it not for the discontinuous distribution which would be involved thereby. In short, after examining an unusually fine series of specimens, and after making due allowance for such individual and seasonal variation as exists, we can not see our way clear to recognizing more than one form for the vast region drained by the Amazon River, and extending northward into Guiana and Venezuela. For this we accept the name *chloronota* of D'Orbigny and Lafresnaye, described from eastern Bolivia, whence we have a good suite of specimens. There can be no doubt of the application of this name, since the description clearly indicates a bird with ochraceous wing-bars. The allocation of some of the above references to the present form, however, is not so certain, since without actual examination of the specimens upon which they were based it is impossible to say whether they really belong here or to the form with plain wings.

Specimens examined.—Colombia: "Bogotá," 3; Florencia, 2; Villavicencio, 2. Venezuela: Suapure, 1; Cariaquito, 1; Rio Mocho, 1; El Llagual, 2; unspecified, 1. British Guiana: Merumé Mountains, 1. Dutch Guiana: Paramaribo, 2; Lelydorp, 1. French Guiana: Cayenne, 3; Mana, 1; Pied Saut, 8. Peru: Pebas, 1. Bolivia: Santa Cruz de la Sierra, 1; Rio Yapacani, 6; Buenavista, 1; Rio Surutu, 1; Mouth of Rio San Antonio, Rio Espirito Santo, 1. Brazil: Benevides, 5; Utinga (near Pará), 6; Pará, 1; Santarem, 5; Diamantina (near Santarem), 1; Boim, Rio Tapajoz, 1; Conceiçao, Rio Uaju, 2; Arumatheua, Rio Tocantins, 2;

Ananindeua, 4; Avojutuba, Rio Negro, 1; Manacapuru, Rio Solimoes, 2; Tamucury, 1; Providencia, 1; Santa Helena, Rio Jamauchim, 1; Colonia do Veado, 2; Faro, Rio Jamundá, 1; Colonia do Mojuy, 1; Villa Braga, 6; Apacy, 1. Total, 88.

Pipromorpha oleaginea pallidiventris (Hellmayr).

Mionectes oleagineus (not *Muscicapa oleaginea* Lichtenstein) Sclater, Cat. Am. Birds, 1862, 213, part (Tobago).—Taylor, Ibis, 1864, 85 (Trinidad).—Chapman, Bull. Am. Mus. Nat. Hist., IV, 1892, 54 (El Pilar, Venezuela); VI, 1894, 38 (Trinidad).—Phelps, Auk, XIV, 1897, 365 (San Antonio, Venezuela).

Elania oleaginea Leotaud, Ois. Trinidad, 1866, 235 (Trinidad; descr.; habits).

Myionectes [lapsus] *oleaginus* Dalmas, Mém. Soc. Zool. France, XIII, 1900, 138 (Tobago).

Mionectes oleagineus pallidiventris Hellmayr, Nov. Zool., XIII, 1906, 22 (San Antonio, Bermudez, Venezuela [type-locality]; Caparo and Valencia, Trinidad; Castare, Tobago; orig. descr.; type in coll. Tring Mus.).—Cherrie, Mus. Brooklyn Inst. Sci. Bull., I, 1906, 189 (Heights of Aripo, Trinidad).

Pipromorpha oleagineus [sic] *pallidiventris* Cherrie, Mus. Brooklyn Inst. Sci. Bull., I, 1908, 361 (Carenage, Trinidad).

Mionectes pallidiventris Brabourne and Chubb, Birds S. Am., I, 1912, 284 (ref. orig. descr.; range).

Pipromorpha oleaginea tobagoensis Chubb, Ann and Mag. Nat. Hist., (9), IV, 1919, 302 (Tobago; orig. descr.; type in coll. Brit. Mus.).

Subspecific characters.—Similar to *Pipromorpha oleaginea chloronota*, but averaging paler, more buffy, less ochraceous below, with less olivaceous shading on the throat and breast; upper parts also averaging paler.

Measurements.—Male (six specimens): wing, 59–66 (63); tail, 43–53 (48); bill, 10–12 (11); tarsus, 15.5–16.5 (16). Female (six specimens): wing, 57–60 (59); tail, 43–47 (45); bill, 10–11 (10.5); tarsus, 14–15.5 (15).

Range.—Northeastern Venezuela to the islands of Trinidad and Tobago.

Remarks.—Birds from the type-locality of this race agree well with Trinidad skins, as remarked by Mr. Hellmayr, who discriminated the form in 1906. Typical specimens are easily separated from the Amazon Valley birds (*chloronota*) by their generally paler, duller coloration, in which respect they approach the form from northern Colombia (*parca*), being in fact intermediate between the two. The only Tobago specimen we have examined does not seem to present any special peculiarities, and we therefore follow Mr. Hellmayr in considering birds from that island the same as those from Trinidad. We would accordingly restrict *pallidiventris* to the arid coast region of northeastern Venezuela, extending thence to Trinidad and Tobago.

Specimens examined.—Venezuela: El Pilar, 2; San Antonio, 3. Trinidad: Carenage, 5; Heights of Aripo, 1; Heights of Orepouche, 2; Poole, 1; Princestown, 4; unspecified, 1. Tobago, 1. Total, 19.

Pipromorpha oleaginea parca (Bangs).

Mionectes assimilis? (not of Sclater) Lawrence, Ann. Lyc. Nat. Hist. N. Y., VII, 1861, 328 (Panama Railway, Panama; crit.).

Mionectes oleagineus (not *Muscicapa oleaginea* Lichtenstein) Sclater and Salvin, Proc. Zool. Soc. London, 1864, 358 (Lion Hill, Panama; crit.); 1879, 512 (Remedios, Antioquia, Colombia).—von Berlepsch, Journ f. Orn., XXXII, 1884, 299 (Bucaramanga, Colombia).—Salvin and Godman, Biol. Centr.-Am., Aves, II, 1888, 22, part (Lion Hill, Panama; extralimital range, part).—Bangs, Proc. Biol. Soc. Washington, XII, 1898, 136 ("Santa Marta," Colombia).—Allen, Bull. Am. Mus. Nat. Hist., XIII, 1900, 149 (Bonda, Minca, and Cacagualito, Colombia).—Bangs, Auk, XVIII, 1901, 28 (San Miguel Island, Panama; crit.).

[*Mionectes oleagineus*] a. Subsp. *assimilis* Sclater, Cat. Birds Brit. Mus., XIV, 1888, 113, part (Panama).

Mionectes oleagineus parcus Bangs, Proc. New England Zool. Club, II, 1900, 20 (Loma del Leon [Lion Hill], Panama; orig. descr.; type now in coll. Mus. Comp. Zool.).—Bangs, Auk, XVIII, 1901, 362, in text (crit.). Hellmayr, Nov. Zool., XIII, 1906, 22, in text (crit.).

Mionectes parcus Sharpe, Hand-List Birds, III, 1901, 114 (ref. orig. descr.; range).

Mionectes oleaginus oleaginus Thayer and Bangs, Bull. Mus. Comp. Zool., XLVI, 1905, 151 (San Miguel Island, Panama; crit.).

Pipromorpha oleaginea parca Ridgway, Bull. U. S. Nat. Mus., No. 50, IV, 1907, 454 (diag.), 457 (descr.; range; references; meas.; crit.).—Chapman, Bull. Am. Mus. Nat. Hist., XXXVI, 1917, 449 (Puerto Valdivia, Honda, Chicoral, Andalucia, and "Santa Marta," Colombia; Colombian references; crit.).—Stone, Proc. Acad. Nat. Sci. Philadelphia, 1918. 264 (Gatun, Panama; descr. nest and eggs).—Rendahl, Arkiv för Zoologi, XIII, No. 4, 1920, 34 (Viveros, Pearl Islands; crit.).

Subspecific characters.—Differs from *Pipromorpha oleaginea pallidiventris* in its paler coloration throughout, this particularly evident in the lighter tone of the upper tail-coverts and tail. The posterior under parts may be described as deep buff yellow, which gradually passes into yellowish citrine on the throat.

Measurements.—Male: wing, 60–64 (62); tail, 45–48 (46.5); bill, 10–11 (10.5); tarsus, 13.5–15.5 (14.5). Female: wing, 56–61 (59); tail, 41–47 (44); bill, 9.5–11 (10); tarsus, 12.5–14.5 (13.5).

Range.—Tropical Zone of northern Colombia, including the Santa Marta region, and the valleys of the Magdalena, Cauca, and Atrato Rivers, to and including the Isthmus of Panama and the Pearl Islands.

Remarks.—Lawrence remarked the peculiarties of Panama specimens of this group as far back as 1861, but later authors discounted the significance of their characters, and it was not until 1900 that Mr. Bangs came to the conclusion that they were referable to a hitherto unrecognized race of "*Mionectes*" *oleagineus*, which he proceeded to describe forthwith. At that time he considered that the bird of the Pearl Islands was nearer true

oleaginea as he understood that form, but Mr. Ridgway referred both these and Santa Marta examples to the new race without hesitation, and we agree in this conclusion. It is true that specimens from interior and western Colombia differ from the Santa Marta series in being slightly darker, both above and below, verging thus toward *pallidiventris*, with which, however, the present form can not directly intergrade, since there is a long stretch of country in northern Venezuela from which no form of the group is at present known.

A single specimen from La Colorada, Colombia, east of the Eastern Andes, is referred here provisionally, but a series from this locality might tell a different story. The present race is also sufficiently well contrasted with the dull-colored Ecuador form.

In juvenal dress (illustrated by No. 97,812, Collection American Museum of Natural History, Cacagualito, Colombia, May 12) the colors are all duller, and the under parts more rufescent. In fresh plumage the colors tend to be a little deeper in tone. Out of ninety-eight specimens examined in this connection, only fourteen have the outer primaries sufficiently narrowed at the tips to be noticeable.

Dr. Stone describes a nest found by the late Mr. L. L. Jewel in the Canal Zone as "a long pear-shaped structure with entrance on the side, made of green moss and fine grasses. Eggs three, pure white, .58 x .78, .57 x .76, and .56 x .75 in."

Specimens examined.—Panama: Loma del Leon (Lion Hill), 3; Gatun, 11; Rio Caño Quebrada, 1; San Miguel Island, 4; unspecified, 3. Colombia: Bonda, 22; Buritaca, 4; Cacagualito, 3; Mamatoco, 1; Minca, 6; La Tigrera, 2; Las Vegas, 2; Don Diego, 11; La Colorada, 1; Jaraquiel, 1; Aguachica, 1; El Tambor, 5; Murindo, 6; Quibdo, 1; "Santa Marta," 4; Andalucia, 1; Honda, 1; Chicoral, 1; Puerto Valdivia, 2; Jimenez, 2. Total, 99.

Pipromorpha oleaginea pacifica, subsp. nov.

Mionectes oleagineus (not *Muscicapa oleaginea* Lichtenstein) Sclater, Proc. Zool. Soc. London, 1860, 283 (Babahoyo, Ecuador).—von Berlepsch and Taczanowski, Proc. Zool. Soc. London, 1883, 553 (Chimbo, Ecuador; crit.); 1885, 68 (Chimbo, Mapoto, and Machay, Ecuador).—Salvadori and Festa, Bol. Mus. Zool. ed Anat. Comp. Torino, XIV, No. 362, 1899, 7 (Vinces, Ecuador).—Hartert, Nov. Zool., IX, 1902, 607 (Carondelet, Ecuador; crit.).

Type, No. 59,495, Collection Academy of Natural Sciences of Philadelphia, adult female; Bucay, Guayas, Ecuador, June 22, 1911; Samuel N. Rhoads.

Subspecific characters.—Similar in general to *Pipromorpha oleaginea parca*, but under parts paler, more yellowish, less buffy.

Measurements.—Male (one specimen): wing, 59; tail, 47; bill, 10.5; tarsus, 15.5. Female (two specimens): wing, 58–60; tail, 42–45; bill, 10.5; tarsus, 14–15.5.

Range.—Tropical Zone of Western Ecuador.

Remarks.—In the respects just pointed out these three specimens differ

constantly and sufficiently from western Colombia skins to necessitate their separation under the above name. Both von Berlepsch and more recently Dr. Hartert have noted the peculiarities of specimens from this region, remarking that they resemble Central American birds (*assimilis*), which is correct.

Specimens examined.—Ecuador: Bucay, Guayas, 3.

Pipromorpha assimilis dyscola (Bangs).

Mionectes oleagineus (not *Muscicapa oleaginea* Lichtenstein) Salvin, Proc. Zool. Soc. London, 1867, 147 (Santa Fé, Veragua).—Lawrence, Ann. Lyc. Nat. Hist. N. Y., IX, 1868, 89 (Veragua; range), 111 (Costa Rica, fide Salvin).—Salvin, Ibis, 1869, 315, in text, 318 (Costa Rica; crit.).—von Frantzius, Journ. f. Orn., XVII, 1869, 307, part (Costa Rica).—Salvin, Proc. Zool. Soc. London, 1870, 196 (Calovevora, Boquete de Chitra, and Bugaba, Veragua).—Sclater and Salvin, Nom. Avium Neotrop., 1873, 47, part (range).—Boucard, Proc. Zool. Soc. London, 1878, 63 (San Mateo, Costa Rica).—Zeledon, Cat. Aves Costa Rica, 1882, 14 (Costa Rica).—Salvin and Godman, Biol. Centr.-Am., Aves, II, 1888, 22, part and I, 1904, xxii, part (Costa Rican [part] and Panama [part] references and localities; crit.).—Underwood, Ibis, 1896, 438 (Volcano Miravalles, Costa Rica).—Underwood, Avifauna Costarriquena, 1899, 7, part (Costa Rica).

Mionectes assimilis (not of Sclater) Lawrence, Ann. Lyc. Nat. Hist. N. Y., IX, 1868, 111 (Angostura, Guiatil, and "Payua" [Pacuare], Costa Rica).—von Frantzius, Journ. f. Orn., XVII, 1869, 307, part (Costa Rica).—Zeledon, Cat. Aves Costa-Rica, 1882, 14, part (Costa Rica).—Zeledon, Proc. U. S. Nat. Mus., VIII, 1885, 108, part (Costa Rica).—Zeledon, An. Mus. Nac. Costa Rica, I, 1887, 116 (Pozo Azul de Pirris, Las Trojas, and Monte Redondo, Costa Rica).—Cherrie, Expl. Zool. en Costa Rica, 1891–2, 1893, 31 (Palmar, Lagarto, Boruca, and Terraba, Costa Rica).—Sharpe, Hand-List Birds, III, 1901, 114, part (range).

[*Mionectes oleagineus*] a. Subsp. *assimilis* Sclater, Cat. Birds Brit. Mus., XIV, 1888, 113, part (Costa Rican [part] and Veraguan localities and references).

Mionectes oleaginosus (lapsus) Cherrie, Expl. Zool. Rio Naranjo, 1893, 15 (Pozo del Pital, Costa Rica; nesting).

Mionectes assimilis dyscolus Bangs, Auk, XVIII, 1901, 362 (Divala, Panama; orig. descr.; type now in coll. Mus. Comp. Zool.; crit.).—von Berlepsch, Ornis, XIV, 1907, 493 (ref. orig. descr.).

Pipromorpha assimilis dyscola Ridgway, Bull. U. S. Nat. Mus., No. 50, IV, 1907, 453 (diag.), 455, part (diag.; range; references; meas.; excl. localities in Nicaragua and eastern Costa Rica).—Bangs, Auk, XXIV, 1907, 300 (Boruca, Paso Real, Pozo del Rio Grande, and Barranca, Costa Rica).—Bangs, Proc. Biol. Soc. Washington, XXII, 1909, 33 (Boruca, Pozo Azul, and Buenos Aires, Costa Rica; crit.).—Carriker, Ann. Carnegie Mus., VI, 1910, 712 (Costa Rican localities and references; habits; crit.).

Subspecific characters.—Similar to *Pipromorpha assimilis assimilis*, but slightly smaller (except the bill); upper parts averaging slightly brighter green; and under parts darker and more uniform; the throat with less grayish and more greenish tinge, the posterior under parts duller, less buffy—olive lake tinged medially with mustard yellow.

Measurements.—Male: wing, 60–66 (63); tail, 46–53 (48.5); bill, 11.5–13 (12.2); tarsus, 14–16 (14.8). Female: wing, 57–63 (59); tail, 41–49 (44); bill, 11.5–13 (12.3); tarsus, 13.5–15.5 (14.7).

Range.—Pacific slope of Costa Rica to western Panama, in the Tropical Zone.

Remarks.—It is interesting to find that the authors who first had to do with specimens of this group from western Panama (or Veragua, as it was then called) were all careful to refer them to the South American form, and not to that of southern Mexico, which Sclater had already discriminated in 1857. In 1888 we find Salvin and Godman arguing against the recognition of a northern race, *assimilis*, on the ground of intergradation. There was thus good reason for suspecting the existence of more than one form north of Panama, and Mr. Bangs in 1901, with a good series of specimens at his command, was enabled to point out characters for separating them. We fully agree with this author in according specific rank to *P. assimilis*, since there is no evidence of intergradation between its southern race, *P. assimilis dyscola*, on the one hand and *P. oleaginea parca* on the other. Later Mr. Bangs undertook to show that *dyscola* was the form occupying the Pacific slope of Costa Rica, while the Carribbean slope was occupied by *assimilis*, more or less typical, and after examining the same material we indorse this conclusion also. A specimen from Miravalles (No. 27,219, Collection Carnegie Museum) appears to be intermediate, indicating that intergradation takes place in this region.

Twenty out of seventy-three specimens have the outer primary perceptibly but not decidedly emarginate at the tip. No. 17,817, Collection E. A. and O. Bangs, Boruca, Costa Rica, June 5, is the youngest bird in the series, with short tail. It resembles the adult, but is notably darker and duller. Several other fully grown birds from other localities agree with it in these respects and are obviously young in juvenal dress.

Specimens examined.—Panama: Divala, 6. Costa Rica: Pozo Azul de Pirris, 8; Miravalles, 1; El Pozo de Terraba, 2; Boruca, 24; Paso Real, 4; Pozo del Pital, 2; Buenos Aires, 4; Barranco, 3; Pozo del Rio Grande, 4; El General, 15. Total, 73.

Pipromorpha assimilis assimilis (Sclater).

Mionectes oleaginus (not *Muscicapa oleaginea* Lichtenstein) Sclater, Proc. Zool. Soc. London, "1856," 1857, 296 (Cordova, Vera Cruz, Mexico).—Boucard, Ann. Soc. Linn. Lyon, n. s., XXV, 1878, 50 (Guatemala).

Mionectes assimilis Sclater, Proc. Zool. Soc. London, 1859, 45 (range), 46 (Cordova, Mexico [type-locality]; Guatemala; orig. descr.; type now in coll. Brit. Mus.), 366 (Jalapa, Vera Cruz, Mexico).—Sclater and Salvin, Ibis, 1859, 124 (Sclater's record).—Sclater, Ibis, 1859, 445 (Cordova,

Mexico; range; references).—Sclater, Cat. Am. Birds, 1862, 213 (Coban, Guatemala; "Mexico?"; references).—Sclater and Salvin, Proc. Zool. Soc. London, 1864, 358, in text (crit.).—Sumichrast, Mem. Boston Soc. Nat. Hist., I, 1869, 556 ("Tierra caliente" of Vera Cruz, Mexico).—Salvin, Ibis, 1869, 315, in text (Costa Rica; crit.).—von Frantzius, Journ. f. Orn., XVII, 1869, 307, part (Costa Rica).—Sclater and Salvin, Proc. Zool. Soc. London, 1870, 837 ([San Pedro], Honduras).—Giebel, Thes. Orn., II, 1875, 596 (ref. orig. descr.).—Zeledon, Cat. Aves Costa Rica, 1882, 14, part (Costa Rica).—Zeledon, Proc. U. S. Nat. Mus., VIII, 1885, 108, part (Costa Rica).—Bangs, Proc. New England Zool. Club, II, 1900, 21, in text (crit.).—Sharpe, Hand-List Birds, III, 1901, 114, part (range).—Bangs, Auk, XVIII, 1901, 362, in text (crit.).

Elainia assimilis Gray, Hand-List Birds, I, 1869, 355 (syn.; range).

Mionectes oleagineus Lawrence, Ann. Lyc. Nat. Hist. N. Y., IX, 1868, 111 (Costa Rica, fide Salvin).—von Frantzius, Journ. f. Orn., XVII, 1869, 307 (Costa Rica).—Sclater and Salvin, Nom. Avium Neotrop., 1873, 47, part (range).—Nutting, Proc. U. S. Nat. Mus., VI, "1883," 1884, 402 ("Los Sábalos," Nicaragua).—Salvin and Godman, Biol. Centr.-Am., Aves, II, 1888, 22, part, and I, 1904, xxii, part (Mexican, Guatemalan, British Honduras, Salvador, and Costa Rican [part] localities and references; descr.; range; crit.).—Underwood, Avifauna Costarriquena, 1899, 7, part (Costa Rica).

Pipromorpha assimilis Giebel, Thes. Orn., II, 1877, 203 (syn.).—Heine and Reichenow, Nom. Mus. Heineani Orn., 1883, 141 (Cordova, Mexico).—Dearborn, Field Mus. Orn. Series, I, 1907, 102 (Patulul, Guatemala).—Bangs, Proc. Biol. Soc. Washington, XXII, 1909, 33 (range; crit.).

[*Mionectes oleagineus*] a. Subsp. *assimilis* Sclater, Cat. Birds Brit. Mus., XIV, 1888, 113, part (Mexican, Guatemalan, and Costa Rican [part] localities and references).

Mionectes semischistaceus Cherrie, Proc. U. S. Nat. Mus., XV, 1892, 27 (Guayabal, Costa Rica; orig. descr.; type in coll. U. S. Nat. Mus.).—Underwood, Avifauna Costarriquena, 1899, 7 (Costa Rica).—Sharpe, Hand-List Birds, III, 1901, 114 (ref. orig. descr.; range).

Mionectes oleagineus assimilis Richmond, Proc. U. S. Nat. Mus., XVI, 1893, 505 (Greytown and Escondido River, Nicaragua).—Chapman, Bull. Am. Mus. Nat. Hist., X, 1898, 31 (Jalapa, Vera Cruz, Mexico; habits).—Hartert, Nov. Zool., IX, 1902, 607, in text (crit.).—Hellmayr, Nov. Zool., XIII, 1906, 22, in text (crit.).

[*Mionectes*] *oleagineus*. Var. *assimilis* Dubois, Syn. Avium, I, 1902, 237, part (ref. orig. descr.; range).

Pipromorpha assimilis assimilis Ridgway, Bull. U. S. Nat. Mus., No. 50, IV, 1907, 453 (diag.), 454 (descr.; range; references), 456, note (meas.).—Bangs, Proc. Biol. Soc. Washington, XXII, 1909, 33 (Carrillo, Tenorio, and La Vijagua, Costa Rica; crit.).—Carriker, Ann. Carnegie Mus., VI, 1910, 713 (Costa Rican localities and references; crit.).—Peters, Auk, XXX, 1913, 376 (Xcopen, Quintana Roo, Mexico).

Pipromorpha semischistacea Ridgway, Bull. U. S. Nat. Mus., No. 50, IV, 1907, 454 (diag.), 458 (descr.; range; references).—Carriker, Ann. Carnegie Mus., VI, 1910, 712 (Costa Rica; references; crit.).

Pipromorpha assimilis dyscola (not *Mionectes assimilis dyscolus* Bangs) Rendahl, Arkiv för Zoologi, XII, No. 8, 1919, 24 (San Juan del Norte, Nicaragua; crit.).

Description.—Adult: above, including sides of head, and wings and tail externally, plain olive green, the pileum slightly darker and duller; median and greater wing-coverts with indistinct paler (citrine) tips, and inner secondaries with more or less obvious buffy edgings and tips; inner margins of all the remiges pale buffy toward the base; chin and throat dull grayish, tinged with olive, and passing into pale citrine or olive lake on the breast, where it is more or less flammulated with chamois color or honey yellow, which color covers the rest of the under surface, including the under wing-coverts; sides and flanks usually with some darker shading; "iris dark hazel; bill dark brown, paler at base below; feet plumbeous."

Young in juvenal dress (Mus. Comp. Zool. 74,629) similar, the posterior under parts more decidedly buffy.

Measurements.—Male: wing, 64–69 (67.5); tail, 50–55 (53); bill, 11.5–13 (12); tarsus, 15–16.5 (16). Female: wing, 61–66 (63); tail, 46–52 (49); bill, 11–13 (11.5); tarsus, 14.5–16 (15.3).

Range.—Tropical Zone of southern Mexico (States of Vera Cruz and Tabasco), southward through Central America to eastern Costa Rica.

Remarks.—Sclater at first referred specimens from Cordova, Vera Cruz, Mexico, to *Mionectes oleagineus*, but shortly thereafter he was led to describe them as a new species, which he called *assimilis*. In 1888 Sclater reduced this to a subspecies of *oleagineus*, while Salvin and Godman declined to recognize it at all. The fine series we have examined in this connection, however, indicates that while the two forms are closely related, they are in our judgment best kept specifically separate, as claimed by Mr. Bangs and indorsed by Mr. Ridgway.

Ordinarily the species is subject to comparatively little variation, judging from the series examined. Some specimens have the throat grayer, in others it is more olivaceous and paler, but this is doubtless due to the fresher condition of the latter. The outer primaries are decidedly narrowed in fourteen out of thirty-seven specimens, while others still show traces of such a condition. Both sexes show this feature, assuming the specimens are correctly determined, and it may be purely dependent on age.

The type-specimen of *Mionectes semischistaceus* Cherrie, from Guayabal, Costa Rica, is an individual which has every appearance of being an abnormally colored example of the present form. It agrees in every respect with skins of *assimilis* from eastern Costa Rica, except for having the upper surface, from the forehead down to the middle of the back, deep neutral gray, and the sides of the neck and throat shaded with the same color. The specimen remains unique, and coming as it does from a region where birds of the usual type are known to occur, it is extremely unlikely that it is anything more than a freak. A careful examination shows that on one wing

the lesser wing-coverts are decidedly gray like the back, while in the other they are greenish like the rest of the wing. Such asymmetrical coloration is so frequent in cases of this character that we feel safe in ascribing it to abnormal development. It is interesting to note that this abnormal development follows the same course as is normal in the far-removed *Pipromorpha rufiventris*.

Specimens examined.—Mexico: Buena Vista, Vera Cruz, 1; Orizaba, 1; Mirador, Vera Cruz, 1; Teapa, Tabasco, 4; Xcopen, Quintana Roo, 1; unspecified, 1. Guatemala: Quirigua, 1; Potrero, 1; Cajabon, Vera Paz, 1; Choctum, Vera Paz, 1; unspecified, 6. British Honduras: Manatee Lagoon, 3; Toledo District, 7; Toledo, 2. Honduras: Julian, 1; unspecified, 1. Nicaragua: Los Sábalos, 1; Greytown, 1. Costa Rica: Guapiles, 3; Cuabre, 2; Rio Sicsola, 1; Carrillo, 4; El Hogar, 1; Peralta, 1; Val, 2; Angostura, 1; Naranjo (Juan Viñas), 1; Pacuarito, 1; Jiménez, 2; Bonilla, 4; Guayabo, 3; Guayabal, 2; Tenorio, 1; La Vijagua, 6; Matina, 1; unspecified, 1. Total, 73.

INDEX

New names are printed in heavy type.

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