PROCEEDINGS

OF THE

Biological Society of Washington

VOLUME 41

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PUBLICATION NOTE

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

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OF THE

BIOLOGICAL SOCIETY OF WASHINGTON

(FOR 1928-1929)

(ELECTED MAY 5, 1928)

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H. C. Oberholser, 1926–1927

*Deceased.

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The Committee on Publications declares that each paper of this volume was distributed on the date indicated on its initial page. The index and minutes of proceedings for 1928 (pp. ix–xiii; 215–220) were issued on March 30, 1929. The title and lists of officers and committees for 1928–1929 (pp. i–iv) were issued on June 29, 1928.

ERRATA.

Page 23, line 12, for W. H. Hoffman read W. A. Hoffman.

PLATES.

Vol. 41, pp. ix–xiii

PROCEEDINGS
OF THE
BIOLOGICAL SOCIETY OF WASHINGTON

PROCEEDINGS.

The Society meets from October to May, on alternate Saturdays. All meetings during 1928 were held in the new assembly hall of the Cosmos Club.

January 14, 1928—714th Meeting.[1]

President Goldman in the chair; 205 persons present.

New member elected: Robert Shosteck.

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

Informal communication: R. M. Libbey, Observation of a saw-whet owl.

Formal communications: A. N. Pack, in Glacier Park with the white goats, bighorns, beavers, and other wild life; V. Bailey, a real live beaver from Michigan.

January 28, 1928—715th Meeting.[2]

President Goldman in the chair; 58 persons present.

New member elected: Mrs. Margaret M. Nice.

Informal communication: E. P. Walker, Notes on weight of elk.

Formal communications: T. K. Chamberlain, Life history and conservation of fresh water mussels in the Mississippi River; L. Radcliffe, The International Halibut Commission.

[1] Abstract in Journ. Washington Acad. Sci., vol. 18, p. 517, November 19, 1928.

[2] Abstract in Journ. Washington Acad. Sci., vol. 18, p. 517–518, November 19, 1928.

February 11, 1928—716th Meeting.[1]

President Goldman in the chair; 135 persons present.

New member elected: B. S. Crandall.

A resolution regarding the death of Bradshaw H. Swales was presented.

Informal communications: F. L. Thone, Publication of Schertz's translation of Wilstaetter's work on Chlorophyll; C. W. Stiles, A case of Jacksonian epilepsy caused by an armed tapeworm; E. Brown, Note on a cardinal flying against a window.

Formal communication: H. O'Malley, Life and habits of the fur seal and the salmon of the Pacific coast.

February 25, 1928—717th Meeting.[2]

President Goldman in the chair; 110 persons present.

Informal communications: L. O. Howard, Meeting of the New Jersey Mosquito Extermination Association; A. A. Doolittle, Note on the case reported of a cardinal flying against a window; C. D. Marsh, Fatal poisoning of a ranger in Yellowstone Park by eating Cicuta roots.

Formal communications: W. B. Miller, Alaska reindeer and forage problems; C. W. Stiles, Zoology and religion.

March 10, 1928—718th Meeting.[3]

President Goldman in the chair; 95 persons present.

New member elected: L. T. Gager.

Informal communications: T. Ulke, Exhibition of specimen of pelican flower; A. S. Hitchcock, Note on the financial support of the Interim Committee on Botanical Nomenclature.

Formal communications: S. P. Young, Predatory animals and methods for their control; E. P. Walker, Alaska bird colonies.

March 24, 1928—719th Meeting.[4]

President Goldman in the chair; 135 persons present.

Informal communication: C. W. Stiles, Exhibition of specimens of Ascaris lumbricoides.

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[1]Abstract in Journ. Washington Acad. Sci., vol. 18, p. 518–519, November 19, 1928.

[2]Abstract in Journ. Washington Acad. Sci., vol. 18, p. 519, November 19, 1928.

[3]Abstract in Journ. Washington Acad. Sci., vol. 18, p. 519–520, November 19, 1928.

[4]Abstract in Journ. Washington Acad. Sci., vol. 18, p. 520–521, November 19, 1928.

Formal communications: F. G. Ashbrook, Muskrat farming; N. B. McClintock, The ways of beaver.

April 7, 1928—720th Meeting.[1]

President Goldman in the chair; 57 persons present.

New members elected: Richard Jones, H. S. Klausner, W. E. McIndoo, C. N. Smith.

Informal communications: A. Wetmore, Note on the C. F. Baker collection of Philippine insects; H. H. T. Jackson, Announcement of the annual meeting of the American Society of Mammalogists; R. M. Libbey, Note on the early arrival of purple martins; A. Wetmore, Note on a rare thrush.

Formal communications: W. P. Taylor, The biology of forest and range; W. H. Rich, Determination of the age of salmon by their scales.

April 21, 1928—721st Meeting.[2]

President Goldman in the chair; 38 persons present.

New member elected: P. S. Goltroff.

Informal communications: Ray Greenfield, Note on the capture of a specimen of *Sorex fontinalis;* Howard Ball, Capture of a red-throated loon in the Potomac Basin.

Formal communications: R. L. Piemeisel, Types of vegetation of East Africa; L. W. Kephart, Geography of East Africa.

May 5, 1928—722d Meeting.[3]

49th Annual Meeting.

President Goldman in the chair; 21 persons present.

New members elected: Malcolm Davis, C. C. Sanborn, G. S. Walley.

A resolution on the death of Dr. J. N. Rose was presented.

The annual reports of the Recording Secretary, Treasurer, and Publication Committee were presented.

The followng officers and members of the council were elected: *President,* E. A. Goldman; *Vice-Presidents,* A. Wetmore, C. E. Chambliss, H. H. T. Jackson, C. W. Stiles; *Recording*

[1]Abstract in Journ. Washington Acad. Sci., vol. 18, p. 588–589, December 19, 1928.

[2]Abstract in Journ. Washington Acad. Sci., vol. 18, p. 589, December 19, 1928.

[3]Abstract in Journ. Washington Acad. Sci., vol. 18, p. 589–590, December 19, 1928.

Secretary, S. F. Blake; *Corresponding Secretary*, W. H. White; *Treasurer*, F. C. Lincoln; *Members of Council*, H. C. Fuller, W. R. Maxon, A. A. Doolittle, I. Hoffman, T. E. Snyder.

October 20, 1928—723d Meeting.[1]

Vice-President Wetmore in the chair; 70 persons present.

A resolution approving the services to science of Dr. Carlos E. Porter of Santiago, Chile, was presented.

Informal communications: T. E. Snyder, Report on the Fourth International Entomological Congress; C. W. Stiles, Exhibition of drawings of a nematode; Howard Ball, Observation of golden plover in the vicinity of Washington; F. C. Lincoln, Capture of specimens of Forster tern, and collection of a nest and eggs of prothonotary warbler near Washington; A. Wetmore, Capture of boat-tailed grackle near Ocean City, Maryland.

Formal communications: A. H. Howell, Animal life in a North Carolina forest; A. Wetmore, Zoological exploration in Hispaniola.

November 3, 1928—724th Meeting.[2]

Joint meeting with the Philosophical Society of Washington and the Optical Society of America.

Vice-President Wetmore in the chair; 170 persons present.

New members elected: Mary E. Haynes, R. W. Jones, G. S. Myers, A. S. Rippey.

Formal communication: Selig Hecht, The nature of the sensitivity of animals to light.

November 17, 1928—725th Meeting.[3]

President Goldman in the chair; 175 persons present.

Formal communication: M. W. Stirling, By airplane to pigmy land.

December 1, 1928—726th Meeting.[4]

Vice-President Wetmore in the chair; 80 persons present.

Informal communications: C. W. Stiles, Certain questions of

[1] Abstract in Journ. Washington Acad. Sci., vol. 19, p. 103–104, March 4, 1929.
[2] Abstract in Journ. Washington Acad. Sci., vol. 19, p. 104–105, March 4, 1929.
[3] Abstract in Journ. Washington Acad. Sci., vol. 19, p. 105–106, March 4, 1929.
[4] Abstract in Journ. Washington Acad. Sci., vol. 19, p. 106–107, March 4, 1929.

nomenclature; T. S. Palmer, Meeting of the American Ornithologists' Union at Charleston, S. C.; Howard Ball, Notes on birds seen at Charleston; Frank Thone, Exhibition of recent books on biology.

Formal communications: E. R. Kalmbach, Notes on Washington starlings; A. S. Hitchcock, Collecting grasses in Newfoundland and Labrador.

December 15, 1928—727th Meeting.[1]

President Goldman in the chair; 40 persons present.

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

New members elected: E. B. Bartram, J. E. Benedict, Jr., H. B. Conover, M. B. Driscoll, G. A. Schulze, Mary S. Skinker, C. E. Underdown.

Informal communications: H. C. Oberholser, Abundance of ducks on the Potomac River; F. C. Lincoln, Note on a tamed robin; Frank Thone, Exhibition of a volume from a new edition of Pasteur's works.

Formal communications: C. E. Rachford, Game administration in national forests; F. C. Bishopp, The warble fly and its fifty million dollar tune.

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[1]Abstract in Journ. Washington Acad. Sci., vol. 19, p. 107, March 4, 1929.

Vol. 41, pp. 1–6 January 25, 1928

PROCEEDINGS

OF THE

BIOLOGICAL SOCIETY OF WASHINGTON

FIVE NEW MAMMALS OF THE GENUS PEROMYSCUS FROM EL SALVADOR.[1]

BY DONALD R. DICKEY.

Our present work with the birds and mammals of El Salvador, Central America, was initiated many years ago under private auspices, when A. J. van Rossem made his first expedition to El Salvador for the purpose of collecting birds for A. Brazier Howell. The work was returned to seriously in the early summer of 1925, when Mr. van Rossem returned to the Republic on a second expedition. On this trip he was accompanied by R. A. Stirton, as mammalogist, in order that both birds and mammals might be studied in the field, and adequate material secured. The third expedition, made with the support and encouragement of the California Institute of Technology, was initiated by Mr. Stirton, who returned to El Salvador in November, 1926, accompanied by his cousin, George D. Stirton, as his assistant. Mr. van Rossem rejoined the Stirtons in January, 1927, and field work was continued in the Republic until the early summer of that year.

It is our intention to carry the work, thus begun, through to its logical conclusion, a report on the birds and mammals of El Salvador being in preparation. Meantime, this is the first of three descriptive papers dealing with the few Salvador mammals which appear to be new. The genus *Peromyscus* is taken up in the present paper.

The 360 specimens of *Peromyscus* procured in El Salvador by Mr. Stirton on his two expeditions divide naturally into three lots. The first of these is obviously of the *boylii* group; the second includes a chain of geographic races of the species *mexi-*

[1]Contribution from the California Institute of Technology.

canus; while the third consists of a series of specimens which, although allied to the *mexicanus* group, is nevertheless so distinct as seemingly to represent a hitherto undescribed species not closely related to any known form.

Taking up this material in order and attacking the *boylii* group first, it seems necessary to describe the following forms of this species.

Peromyscus boylii cordillerae, subsp. nov.

MT. CACAGUATIQUE WHITE-FOOTED MOUSE.

Type.—Female (old adult); no. 10,716, collection of Donald R. Dickey; Mt. Cacaguatique, Dept. San Miguel, El Salvador, C. A.; altitude 3,500 feet; "mountain canyon slope—oaks"; November 24, 1925; collected by R. A. Stirton.

Characters.—Size rather large for the group. Color deep, rich tawny in fresh pelage. Hind feet almost wholly white. Skull large (long and rather narrow), with rostrum and nasals particularly produced; molar teeth heavy; audital bullae small.

Color.—This is one of the chain of richly colored races which the *boylii* stock has developed in Central America. Similar in general to *Peromyscus boylii aztecus* (Saussure), which it closely resembles, but with color a trifle less deep and rich a shade of tawny, and hind feet wholly white from just below the tarsal joint to the claws (largely dusky in *aztecus*, and strikingly so in *Peromyscus boylii evides* Osgood). Upper parts with considerable admixture of dusky hairs concentrated chiefly in a broad dorsal band. Ears rather small, as is usual in the species (average 15 mm. in the flesh). Tail bicolor, but thinly haired and therefore not conspicuously contrasted; annulations 17 per cm. at middle. Pectoral spot present or absent. Orbital ring and spot at base of whiskers black and strongly marked. Differs from *Peromyscus boylii levipes* Merriam, as judged by the type and 3 topotypes of the latter, which I have been privileged to examine in the Biological Survey collection, U. S. National Museum, in totally different tone of coloration, *levipes* being a grayish and buffy animal, strongly reminiscent of the northern form *Peromyscus boylii rowleyi* (Allen), and not even remotely like the present rich, deep tawny animal. Differs from *evides* in darker and richer tawny coloration, and in having the feet white. Very similar to the long-furred high mountain animal *Peromyscus oaxacensis* Merriam in color, but differing in smaller size throughout.

Measurements of type.—Total length, 248 mm.; tail, 132; hind foot, 25; ear, 15. Skull: greatest length, 31.5; zygomatic breadth, 16.0; interorbital constriction, 4.9; length of nasals, 13.0; shelf of bony palate, 5.0; palatine foramina, 6.4; maxillary tooth row, 4.9 (very worn).

Range.—Slopes and high ravines above 3,500 feet altitude, and among the grass and oaks, on Mt. Cacaguatique, El Salvador. Sonoran Zone.

Specimens examined.—Type and 39 topotypes.

Peromyscus boylii sacarensis, subsp. nov.

SAN JOSÉ DEL SACARE WHITE-FOOTED MOUSE.

Type.—Male adult; no. 12,722, collection of Donald R. Dickey; San José del Sacare [San José del Sacario of maps], Dept. Chalatenango, El Salvador, C. A.; altitude 3,600 feet; "caught in dry ravine in oaks"; March 15, 1927; collected by R. A. Stirton.

Characters.—One of the smallest of the Central American forms of this species. Color much as in topotypes of *levipes;* ochraceous buff sparingly interspersed with dusky, instead of rich tawny as in *cordillerae.* Hind feet wholly white. Skull small, light, weak and narrow throughout, with smoothly-rounded braincase and supraorbital border. Rostrum short and weak. Bullae rather small; about as in *cordillerae;* much smaller than in the type of *levipes.* Maxillary tooth row weak and short.

Color.—This form is a moderately colored race of *boylii,* much less rich than *cordillerae,* from which it further differs in having the tail lighter both above and below and more distinctly bicolor; annulations 16 per cm. at middle (type). The white feet will serve to distinguish it externally from *evides,* while its cranial characters easily separate it from typical *levipes.*

Skull.—Cranially, small size instantly differentiates *sacarensis* from *cordillerae, oaxacensis* and *evides.* From *levipes,* in typical form, it is distinguished by smaller, narrower and lower braincase; by smaller bullae; and by shorter tooth row. From *Peromyscus boylii simulus* Osgood of the coast of Tepic and Sinaloa, which it resembles in general size, it differs in having a narrower and less angular skull, with lighter rostrum.

Measurements of type.—Total length, 200 mm.; tail, 103; hind foot, 23; ear, 16. Skull: greatest length, 27.1; zygomatic breadth, 13.4; interorbital constriction, 4.2; length of nasals, 10.5; shelf of bony palate, 4.4; palatine foramina, 5.4; maxillary tooth row, 4.1 (worn).

Range.—Taken only at the type locality, among oaks and scattering pines, in dry ravines, and under fern cover, at an altitude of 3,600 feet. Sonoran Zone.

Specimens examined.—Type and 15 topotypes.

Throughout most of El Salvador *Peromyscus mexicanus saxatilis* Merriam is the race representing the species *mexicanus.* At high altitudes in the northwest corner of the country, however, a large, mountain form of the species occurs, which it seems necessary to describe. Another race of the same species is found in the eastern part of the Oriente. These two apparently new races may be known as follows:

Peromyscus mexicanus philombrius, subsp. nov.

LOS ESESMILES WHITE-FOOTED MOUSE.

Type.—Female (very old adult); no. 12,519, collection of Donald R. Dickey; Los Esesmiles, Dept. Chalatenango, El Salvador, C. A.; altitude,

8,000 feet; "caught under large log in oak rain forest"; February 12, 1927; collected by R. A. Stirton.

Characters.—Size very large for the species. Indistinguishable in color from *saxatilis,* which it approaches closely in all external and cranial characters, save in its larger size and decidedly longer tail. Distinctly lighter than *Peromyscus mexicanus totontepecus* Merriam, the only other race of this species which attains the size of *philombrius.* Tail proportionally long for the species; annulations 15 per cm. at middle in the type. Skull as in *saxatilis,* but slightly larger throughout. Supraorbital border moderately sharp-angled, but with no trace of beading.

Measurements of type.—Total length, 285 mm.; tail, 152; hind foot, 29; ear, 21. Skull: greatest length, 35.0; zygomatic breadth, 16.0; interorbital constriction, 5.4; nasals, 14.0; shelf of bony palate, 5.2; palatine foramina, 7.7; maxillary tooth row, 4.9 (very worn).

Range.—The rain forest above 8,000 feet on the range of mountains known as Los Esesmiles, Chalatenango, El Salvador.

Remarks.—The present race is simply a large, high mountain form of *mexicanus* closely allied to *saxatilis,* but differing so constantly in size as to require formal recognition. The type is an old individual with exceedingly worn teeth. It therefore seems probable that it approaches nearer to the maximum of the race than to the mean. From the other large species of Central American *Peromyscus,* with which it might be confused because of size, it is differentiated as follows: It approaches *guatemalensis* in size and equals *nudipes* and *furvus,* but is instantly separable from each of them by reason of its lighter color, and shorter pelage, with no trace of 'wooliness.' Its unbeaded skull, without even trenchant-angled supraorbital shelves, distinguishes it instantly from all members of the *melanophrys* and *megalops* groups except *zarhynchus.* The tremendous size of the latter alone serves to set it off.

Specimens examined.—The type and 35 topotypes.

Peromyscus mexicanus salvadorensis, subsp. nov.

SALVADOR WHITE-FOOTED MOUSE.

Type.—Female (old adult); no. 10,748, collection of Donald R. Dickey; Mt. Cacaguatique, Dept. San Miguel, El Salvador, C. A.; altitude 3,500 feet; "in ferns near waterfall"; November 28, 1925; collected by R. A. Stirton.

Characters.—Similar to *saxatilis,* but averaging darker with dark hairs more generally distributed over back, face and sides, submerging the buff almost entirely in mass effect, and giving a dark, hard, buffy-gray tone to the series, instead of the ochraceous or cinnamon-rufous tone of the average series of true *mexicanus* or *saxatilis* in equally fresh pelage. Brown pectoral spot generally present. Skull smaller than in *saxatilis* with shorter average nasals and rostrum, slightly smaller molar teeth and small audital bullae, as in *mexicanus.* Supraorbital borders sharp-angled, but not beaded. Tail generally longer than head and body; thinly haired;

dusky above, and blotched irregularly with yellowish white below; annulations 19 per cm. at middle. Broad black orbital ring and whisker patch present, and sometimes almost confluent. Dark wedge of color extends below tarsal joint and well down on upper side of foot. Ears moderate and almost naked; apparently smaller than in *saxatilis*.

Measurements of type.—Total length, 220 mm.; tail, 119; hind foot, 25; ear, 16. Skull: greatest length, 31.2; zygomatic breadth, 15.1; interorbital constriction, 5.2; length of nasals, 12.2; shelf of bony palate, 4.4; palatine foramina, 6.4; maxillary tooth row, 4.4 (very worn).

Range.—Shaded ravines and damp jungle growth on Mt. Cacaguatique, El Salvador, at altitudes ranging from 3,500 to 4,000 feet, and in dry stream beds, brush, and even up into the pines on the nearby Pine Peaks, Volcan Conchagua, at from 3,300 to 3,500 feet. Upper Tropical Zone.

Remarks.—*Saxatilis*, in apparently typical form, extends southeast from central Guatemala on the Atlantic side of the backbone of the Cordillera at least as far as north-central Nicaragua, so that Allen's name "*nicaraguae*" has no application in the present connection, but remains a strict synonym of *saxatilis*.

The four forms described above ally themselves naturally and easily with one or the other of the widely distributed species of which they have been named as local races. The most interesting series of the genus secured by Mr. Stirton, however, could not be allocated to any one group with certainty, and it finally developed that we were dealing with an apparently new species, which is described as follows:

Peromyscus stirtoni,[1] sp. nov.

STIRTON'S WHITE-FOOTED MOUSE.

Type.—Female (old adult); no. 10,634, collection of Donald R. Dickey; Rio Goascoran, 13° 30′ N., Dept. La Union, El Salvador, C. A.; altitude 100 feet; "base of rocky cliff"; October 29, 1925; collected by R. A. Stirton.

Characters.—A member of the typical subgenus *Peromyscus*. Size medium (average length, 197 mm.; tail, 95; hind foot, 23.7; greatest length of skull, 29.8). Color ochraceous buff, with sometimes (as in the type) a hint of ochraceous tawny, and with a large and widely distributed admixture of dusky hairs, giving the species a richer and much darker average tone than is found in the somewhat similar *Peromyscus banderanus angelensis* Osgood in like pelage. Orbital ring narrow and inconspicuous, and whisker patches only weakly indicated, or absent. Pectoral spot sometimes present, as in the type, but more frequently absent. Tail about equal to head and body, or a trifle shorter; heavy, distinctly bicolor, and conspicuously furred, in marked contrast to the nearly naked tails of most

[1] It is a privilege to name this species for Mr. R. A. Stirton, whose untiring energy has been the outstanding factor in bringing together a comprehensive collection of Salvador mammals.

of the truly tropical species of the genus; hair and annulation scales dark brown or dusky above, contrasted with yellowish white below; annulations nearly concealed but approximately 15 per cm. at middle. Ears moderate (about as in the *boylii* group). Hind foot largely or entirely white and thinly haired; sole naked nearly or quite to the calcaneum along a narrow median strip. Claws short and sharply curved. Pelage moderately short and rather harsh.

Skull.—Of medium size and smoothly-rounded contours. Rostrum fairly heavy, but not long. Nasals broad, generally ending somewhat abruptly in a truncate posterior suture. Supraorbital border flat and very sharp-angled, with the extreme edge sometimes flaring slightly upward in an incipient ridge, but never definitely beaded. Interorbital constriction not excessive (5.0 mm.). Braincase rather narrow and smoothly-rounded, neither flat, nor unduly high, and not produced posteriorly. Palatine foramina of moderate length, but relatively rather wide from center to posterior end. Shelf of bony palate short. Audital bullae small. Accessory cusps present, but not strongly developed. Maxillary tooth row very weak and short (4.1 mm.). Last upper molar exceedingly weak.

Measurements of type.—Total length, 190 mm.; tail, 100; hind foot, 24; ear, 15. Skull: greatest length, 29.6; zygomatic breadth, 14.7; interorbital constriction, 5.0; length of nasals, 11.7; shelf of the bony palate, 4.5; palatine foramina, 5.6; maxillary tooth row, 4.0 (very worn).

Range.—Tropical Zone, near sea level, on the Rio Goascoran, and about Lake Olomega, El Salvador.

Remarks.—Systematically, its combination of characters has prevented me from associating *stirtoni* closely with any of the established species. It probably belongs at the end of the *mexicanus* group, with the species *banderanus* and *yucatanicus*.

Specimens examined.—El Salvador: Department La Union: Rio Goascoran, 13° 30′ N., the type and 7 topotypes; Pine Peaks, Volcan Conchagua, 6. Department San Miguel: Lake Olomega, 2. Department Morazan: Divisadero, 1. Total, 17.

Vol. 41, pp. 7–14 February 1, 1928

PROCEEDINGS

OF THE

BIOLOGICAL SOCIETY OF WASHINGTON

FIVE NEW MAMMALS OF THE RODENT GENERA SCIURUS, ORTHOGEOMYS, HETEROMYS, AND RHEOMYS, FROM EL SALVADOR.[1]

BY DONALD R. DICKEY.

The whole group of large Central American squirrels is of peculiar interest because of the wide diversity shown in color and pattern by the many described forms. In certain areas the color is homogeneous throughout a series, whereas in other areas the range of individual variation is great, and the local forms in such cases are unstable, or at least difficult to characterize, because of wide departure from the mean. The latter condition probably indicates comparatively recent intergradation of distinct forms in these areas. Unfortunately many Central American names have been based on such material. It would have been preferable if the type localities could have been located in areas of stability; early conditions prevented this, of course, but our abundant Salvador material now makes it possible to plot two such stable areas in that country. In the Oriente, the animal long known as *Sciurus variegatoides variegatoides*[2] Ogilby is found, while the western part of the country has given rise to the race described below.

Sciurus variegatoides bangsi, subsp. nov.

BANGS' SQUIRREL.

Type.—Male adult; no. 12,746, collection of Donald R. Dickey; Barra de Santiago, Dept. Ahuachapan, El Salvador, C. A.; sea level; April 3, 1927; collected by G. D. Stirton.

1Contribution from the California Institute of Technology.

2For discussion of type locality, see Nelson, Proc. Washington Acad. Sci., vol. 1, 1899, p. 79–81.

Characters.—Nearest externally to *Sciurus goldmani* Nelson, but lighter and grayer than the grayest extreme of that variable form, with less black hairs interspersed through the pelage of the back, and with no trace, in fresh pelage, of the rusty wash which gives tone to the whole dorsal pelage of *goldmani.* A soiled buffy wash is present in old, worn pelage, but this is due to fade and stain alone. Face in particular much lighter (light pepper and salt gray) than in the dark-faced *goldmani.* Ears narrowly edged with black posteriorly, and with a narrow anterior border of black, or sometimes rusty; buffy or rusty terminal ear tuft reduced to a minimum in area, and comparatively dull in tone; very prominent basal ear patch, pure white. Feet very light gray; toes white. Whole underparts white. Tail black and white both above and below, with no trace of rusty, the individual hairs being banded with black and white alone. The type and topotypes are remarkably uniform in color, indicating a stable race. The type is in old, worn pelage with the fresh, clear gray and white new coat just coming in, so far involving only the left hind foot and patches on the face, forelegs and underparts. Specimens from San José del Sacare are in full fresh pelage.

Skull similar to that of *variegatoides;* averaging wider and more rugged than in *goldmani.*

Measurements of type.—Total length, 520 mm.; tail, 260; hind foot, 60; ear, 23. Skull: greatest length, 59.5; basilar length of Hensel, 45.7; zygomatic breadth, 35.1; interorbital constriction, 19.9; length of nasals, 21.0; palatilar length, 25.7; maxillary tooth row, 12.0; breadth across molars, 14.4; shelf of bony palate, 19.7.

Range.—Western El Salvador from the Department of Chalatenango south and west to the seacoast in the Department of Ahuachapan; undoubtedly ranging into southeastern Guatemala.

Remarks.—Two specimens from the Department of Chalatenango are both so obviously intermediate between *bangsi* and *variegatoides* as to make it certain that these two races are conspecific. On the other hand, certain specimens from the type locality of *goldmani* vary so much from the mean toward *bangsi,* as to leave no doubt in the writer's mind that actual intergradation, or at least overlap of characters, also occurs between the two forms last named. The races of *Sciurus variegatoides,* with their type localities, would thus stand

Sciurus variegatoides variegatoides Ogilby	La Union, La Union, El Salvador.
Sciurus variegatoides bangsi, subsp. nov.	Barra de Santiago, Ahuachapan, El Salvador.
Sciurus variegatoides goldmani Nelson	Huehuetan, Chiapas, Mexico.

Specimens examined.—*Sciurus variegatoides variegatoides:* El Salvador: La Union: [East shore of] Lake Olomega, 2[1]; Pine Peaks, Volcan Conchagua, 2. San Miguel: Lake Olomega, 7[1]; Mt. Cacaguatique, 2; Rio San Miguel, 3; Volcan San Miguel, 2. Usulutan: Puerto del Triunfo, 1. Total, 19.

1Practically topotypes.

Sciurus variegatoides bangsi: El Salvador: Ahuachapan: Barra de Santiago, type and 6 topotypes. Chalatenango: San José del Sacare, 6 (series averages quite typical, but one specimen strongly intermediate toward *variegatoides*); Los Esesmiles, 1 (intermediate toward *variegatoides*). Sonsonate: Hacienda Chilata, 2. Santa Ana: El Tablan, Lake Guija, 1. Total, 17. *Sciurus variegatoides goldmani:* Mexico: Chiapas: Huehuetan, type and 6 topotypes. Total, 7.

Pocket gophers of the genus *Orthogeomys* occur in suitable associations throughout El Salvador. Specimens from the Oriente extend our concept of the distribution of the genus considerably to the south and east of the range as heretofore known. These specimens apparently belong to an undescribed species which may be known as follows:

Orthogeomys pygacanthus, sp. nov.

MT. CACAGUATIQUE POCKET GOPHER.

Type.—Female adult; no. 10,803, collection of Donald R. Dickey; Mt. Cacaguatique, Dept. San Miguel, El Salvador, C. A.; altitude, 3,500 feet; December 3, 1925; collected by R. A. Stirton.

Characters.—Closest externally to *Orthogeomys scalops* (Thomas), but smaller and with color a trifle darker (between the Vandyke Brown[1] of *scalops* and Light Seal Brown); pelage harsher and more setose, particularly on the rump, with a more strikingly glossy sheen. Much darker than *Orthogeomys grandis* (Thomas) which is between Bister and Vandyke Brown, to judge by specimens of the latter from Volcan Santa Maria, Quezaltenango, Guatemala, in the Biological Survey collection, U. S. National Museum. Pelage shorter and more hispid than in *grandis.* Tail comparatively short; naked. Feet naked except for scattering silvery hairs in fresh pelage.

Skull much shorter than those of *scalops* and *grandis,* and smaller in all dimensions except in the matter of zygomatic breadth, in which it equals *scalops,* and in interorbital constriction, in which it exceeds *grandis,* and in rostrum width, in which it exceeds them both, not only proportionally, but actually.

Mastoid bullae smaller and more slender, as viewed from behind, than in either *scalops* or *grandis.* The distinctive, narrow, cuneate, posterior portion of the nasals of *Orthogeomys nelsoni* Merriam alone serve to differentiate it from *pygacanthus,* which has short broad nasals ending posteriorly in a broad truncate suture. Ascending arms of the premaxillae short and broad, just reaching, but not cutting, the anterior plane of the orbits. Supraorbital borders of frontals ultratypical of the genus; very straight; constriction or concavities reduced to insignificant notches; prominences also reduced or wanting. Ratio of zygomatic breadth to condylo-basal

[1]Colors, when capitalized in the present paper, are those of Ridgway, Color Standards and Color Nomenclature, 1912.

length 59.4 mm., as contrasted with 55.8, and 55.1, respectively, in the proportionally longer-skulled *scalops* and *grandis*. Dentition normal for the genus.

No comparison is necessary with the smaller and much lighter-skulled *Orthogeomys latifrons* Merriam, nor with the even smaller *Orthogeomys cuniculus* Elliot. The above comparisons are based upon adult females alone.

Measurements of type.—Total length, 341 mm.; tail, 104; hind foot, 54; ear, 4. Skull: condylo-nasal length, 62.0; basilar length of Hensel, 51.8; length of nasals, 24.0; maximum breadth of nasals, 7.6; zygomatic breadth, 36.9; breadth across squamosals, 37.0; interorbital constriction, 13.9; breadth of rostrum in anterior plane of zygomatic articulation, 14.7; maxillary tooth row at alveolar border, 14.4; articulating face of the maxillary root of the zygoma, 8.4.

Range.—Banana groves at the type locality.

Specimens examined.—The type and three topotypes.

A series of large *Heteromys* secured by R. A. Stirton at comparatively high altitudes in a range of mountains in the northwestern part of El Salvador, proves to be an apparently undescribed race of the species of *desmarestianus*. It may be known as follows:

Heteromys desmarestianus psakastus, subsp. nov.

LOS ESESMILES SPINY POCKET MOUSE.

Type.—Male (old adult); no. 12,477, collection of Donald R. Dickey; Los Esesmiles, Dept. Chalatenango, El Salvador, C. A.; altitude 8,000 feet; "caught under rotten log among ferns, in oak rain forest"; February 7, 1927; collected by R. A. Stirton.

Characters.—Size large, but not maximum for the group. Nearest to the stock form *Heteromys desmarestianus desmarestianus* Gray, but consistently larger in body mass. Color nearly as in *desmarestianus*, but a trifle lighter; shade of lateral line and colored portion of fine, banded, guard hairs lighter and more buffy (Light Pinkish Cinnamon instead of Vinaceous-Cinnamon). Lateral line variable; generally present but rarely strong or conspicuous. Narrow white line almost always present on inner side of hind legs, extending continuously from thigh to foot.

Skull nearest to that of *desmarestianus*, but averaging larger, with less arched profile, greater spread across the zygomatic arches, and with definitely longer nasals. The latter generally reach quite to the plane of the posterior suture of the ascending arms of the premaxillae in *psakastus*, instead of falling short of the premaxillae as in *desmarestianus*.

Measurements of type.—Total length, 345 mm.; tail, 190; hind foot, 34; ear, 14. Skull: greatest length, 38.0; basilar length of Hensel, 27.0; zygomatic breadth, 17.4; braincase breadth, 15.5; interorbital constriction, 9.5; nasal length, 15.7; maximum spread of temporal ridges, 13.8; maxillary tooth row, 5.4 (worn).

Range.—Rain forest at the summit of the range at the type locality.

Remarks.—In view of the comparisons made by Gerrit S. Miller, Jr., with the type of *desmarestianus*, as recorded by E. A. Goldman (North American Fauna, No. 34, 1911, p. 22), the series of specimens from Tumbala, Chiapas, is here considered sufficiently typical of that form for the purposes of the present paper. *Psakastus* shares certain characters with *Heteromys fuscatus* Allen, but its larger size, lateral band, white-lined ankles and lighter coloration forbid its being considered as intermediate between *desmarestianus* and that species. Close comparison is not necessary with the much larger *Heteromys goldmani* Merriam, nor with the much lighter *Heteromys desmarestianus griseus* Merriam. The lighter coloration and short, heavy rostrum, and particularly the unusual shape of the nasals of *Heteromys longicaudatus* Gray, suffice to set that species apart from our race.

Specimens examined.—The type and 24 topotypes.

The series of water mice of the genus *Rheomys* secured by Mr. Stirton in El Salvador, during November and December, 1925, was found to bear no close relationship to *Rheomys raptor* Goldman, when compared with the type of that species in Washington. Specimens of our series were therefore forwarded to Oldfield Thomas, who was so good as to compare them with the type of *Rheomys underwoodi* Thomas in the British Museum. Mr. Thomas' full manuscript notes indicate that our series represents a new species, which is characterized below. In view of the fact that the genus was first made known to science by Mr. Thomas, and in appreciation of his cordial helpfulness in the present connection, it is a pleasure to dedicate this species to him.

Rheomys thomasi, sp. nov.

THOMAS' WATER MOUSE.

Type.—Female adult; no. 10,917, collection of Donald R. Dickey; Mt. Cacaguatique, Dept. San. Miguel, El Salvador, C. A.; altitude 3,500 feet; "small rocky canyon stream"; December 22, 1925; collected by R. A. Stirton.

Characters.—Size moderate for the genus; distinctly larger than in *raptor*, but smaller than in *underwoodi*. Color almost exactly as in *underwoodi*, the type of the present species having been itself compared with the type of *underwoodi* to determine this point. Pelage shorter and less woolly than in *underwoodi*, the hairs of the back averaging 9 mm. in the present species, instead of 11 mm. or more in *underwoodi*. Hind feet narrower and more lightly built than in *underwoodi*.

Skull.—Decidedly smaller than in *underwoodi*, with lower, narrower braincase, and with the anterior palatine foramina reaching fully back to or beyond the anterior plane of m^1, whereas the foramina of the type of *underwoodi* end a full millimeter in front of this plane. The molars of *thomasi* are distinctly smaller and lighter than in *underwoodi*. This is particularly apparent in the matter of width, m^1 in *thomasi* averaging 1.3 mm. to 1.4 mm. instead of 1.8 mm. as in *underwoodi*. The incisors of Salvador specimens are yellow, whereas those of *underwoodi* are practically white in front. This may indicate a trend in northern specimens of the genus, but I do not believe it will prove a constant character.

Measurements of type.—Total length, 233 mm.; tail, 125; hind foot, 33; ear, 6. Skull: greatest length, 29.4; basilar length of Hensel, 23.3; zygomatic breadth, 14.7; braincase breadth, 13.5; interorbital constriction, 5.0; nasal length, 11.2; anterior palatine foramina, 5.2; shelf of the bony palate, 5.7; maxillary tooth row, 4.5 (moderately worn); transverse diameter of m^1, 1.3.

Range.—The pebbly bed of a brook at the type locality, at an altitude of 3,500 feet.

Specimens examined.—The type and 14 topotypes.

In addition to the stock form of the species described above, another race of the same species is found high in the mountains of northwestern El Salvador. This race is described below.

Rheomys thomasi stirtoni, subsp. nov.

STIRTON'S WATER MOUSE.

Type.—Male adult; no. 12,593, collection of Donald R. Dickey; Los Esesmiles, Dept. Chalatenango, El Salvador, C. A.; altitude 8,000 feet; "caught in small stream in rain forest, north slope"; February 22, 1927; collected by R. A. Stirton.

Characters.—Size rather large; larger than *thomasi* but slightly smaller than *underwoodi*. Color almost identical with that of *thomasi*, but perhaps averaging a trifle browner, less blackish. Pelage longer than in *thomasi*, about as in *underwoodi*, the hairs of the back averaging 12 mm.

Skull.—Averaging larger than in *thomasi*, with less flattened profile, and with broader and more inflated braincase; nasals longer and more cuneate posteriorly; anterior palatine foramina wider and less parallel-sided (more bowed, particularly anteriorly), and extending back quite to or beyond the plane of m^1; interpterygoid fossa wider than in *thomasi;* m^1 slightly broader than in *thomasi*, but lighter than in *underwoodi*.

Measurements of type.—Total length, 253 mm.; tail, 120; hind foot, 32; ear, 7. Skull: greatest length, 29.4; basilar length of Hensel, 23.8; zygomatic breadth, 15.3; braincase breadth, 14.3; interorbital constriction, 5.1; nasal length, 12.6; anterior palatine foramina, 5.6; shelf of the bony palate, 5.9; maxillary tooth row, 4.7 (worn); transverse diameter of m^1, 1.5.

Range.—Bed of a small stream flowing through the rain forest at an altitude of 8,000 feet, at the type locality.

Remarks.—In general size this race is intermediate between *thomasi* and *underwoodi*. Its comparatively light dentition and produced palatine foramina closely resemble those of *thomasi*. Comparison has therefore been made chiefly with this form, and individual variation shows that the relationship is probably close. However, its wide and somewhat inflated braincase is definitely reminiscent of *underwoodi*, and it is not at all improbable that specimens from the mountains of Nicaragua will close the specific gap between *thomasi* and *underwoodi*.

Specimens examined.—The type and 3 topotypes.

In determining our Salvador material, all of the facilities of the Biological Survey and National Museum collections in Washington have been accorded me by those in charge. In particular, the splendid Nelson and Goldman collections from Mexico have been of inestimable value, for without them the difficulty of satisfactorily determining the El Salvador collections would have been increased many fold, to say the very least. The scientific staff of the Survey and those in charge of the birds and mammals of the Museum have, in addition, made me their debtor in countless other ways. Their generous helpfulness has been appreciated to the full.

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PROCEEDINGS

OF THE

BIOLOGICAL SOCIETY OF WASHINGTON

A NEW MARSUPIAL FROM EL SALVADOR.[1]

BY DONALD R. DICKEY.

Among the apparently new mammals included in the collections made by R. A. Stirton in El Salvador during the last three years, there is a local form of the interesting and rather rare marsupial genus *Chironectes*, which is described below.

Chironectes argyrodytes, sp. nov.

SALVADOR WATER OPOSSUM.

Type.—Male adult; no. 12,986, collection of Donald R. Dickey; Hacienda Zapotitan, Dept. La Libertad, El Salvador, C. A.; altitude 1,500 feet; "caught in Rio Sucio"; June 20, 1927; collected by R. A. Stirton.

Characters.—Very similar externally to *Chironectes panamensis* Goldman, but darker (blackish brown rather than Chestnut-Brown[2]), with the dark masses in the pattern of the dorsal pelage larger, and with the intervening broken bands of gray proportionally reduced in width, the band across the hips being especially reduced and inconspicuous. Gray of sides and narrow, broken dorsal bands, darker and clearer (less drab). Whole underparts, except dusky furring on base of tail, silky, silvery white. Terminal 34 mm. of tail of type flesh color.

Skull similar to *panamensis*, but with longer and much wider nasals, and with broader, heavier rostrum throughout. Maxillary tooth row longer, the premolars in particular being less crowded, and the molar series (especially m^2 and m^3) slightly heavier. Upper edge of the middle portion of the zygoma less incurved, and the postorbital constriction greater. Shape of frontals specialized; produced posteriorly along the sagittal line in a narrow tongue running back between the parietals. The comparatively long braincase, pointed posterior end of the nasals, and other cranial details which skulls of *argyrodytes* share with those of *panamensis* serve to distinguish the former, as well as the latter, from their South American neighbors.

Measurements of type.—Total length, 675 mm.; tail, 358; hind foot, 70;

[1]Contribution from the California Institute of Technology.

[2]Ridgway, Color Standards and Color Nomenclature, 1912.

ear, 22. Skull: condylo-basal length, 73.5; basilar length of Hensel, 66.4; zygomatic breadth, 45.2; nasal length, 34.3; greatest breadth of nasals, 13.2; interorbital constriction, 15.4; postorbital constriction, 8.0; palatal length, 47.0; maxillary tooth row, 33.0; upper premolar series, 13.0; rostrum breadth in plane of *pm*,[1] 15.8.

Range.—Type locality, so far as definitely known.

Remarks.—The use of the binomial in naming this animal does not imply that the writer feels it will ultimately prove specifically distinct from *panamensis*. On the contrary, the relationship is obviously close, specimens from Costa Rica proving this point conclusively by combining some of the characters of each form, although on the whole they are closer to *panamensis*. However, I am not sufficiently acquainted with the South American forms of the genus to give an intelligent opinion as to the proper specific allocation of either of the Central American subspecies. The genus has been taken as far north as southern Mexico,[1] but much more material is needed before we can hope to have an adequate idea of either its geographic variation or limits of distribution in Central America.

Specimens examined.—Type and 5 topotypes.

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[1]Goldman, Smithsonian Misc. Coll., vol. 69, 1920, No. 5, p. 45.

Vol. 41, pp. 17–20 March 16, 1928

PROCEEDINGS

OF THE

BIOLOGICAL SOCIETY OF WASHINGTON

WHAT IS *AGOSERIS APICULATA* GREENE?

BY WILLIAM A. DAYTON.

In what Forest Service range plant records term the "2d Holy Cross Collection," of 60 specimens (our serial nos. 2378 to 2437, inclusive) received January, 1912, from the Holy Cross National Forest, Colorado, was a specimen of mountain dandelion, field no. 5055, serial no. 2404, collected by Ranger Robert T. Sobey, and which was retained by the late Dr. E. L. Greene (at that time consulting expert of the Forest Service in matters of range plant identification) as a new and undescribed *Agoseris*. In Fedde's "Repertorium Specierum Novarum," vol. 13, p. 324 (1914) Dr. Greene named and described this new plant as follows:

"*Agoseris apiculata* Greene, spec. nov.

"Planta admodum robusta, usque 4 dm alta. Folia, petiolo longo latiusculo incluso, 1,5–2,5 dm longa, lanceolata, saepissime integerrima, interdum ± retrorsim dentata, utrinque viridia, vix glaucescentia, et petiolorum marginibus albo-lanatis exceptis glabra. Caput magnum sed breve, 2 cm longum et paullulo latius quam longius. Involucri bracteae 3-seriales, imbricatae, extimae ovato-lanceolatae, triangulari-apiculatae, intimae obovatae, conspicue cuspidatae. Achenia tenuiter fusiformia, rostro-brevi incluso 1,5 cm longa, pappo candido perfragili coronata.

"The specimens are from an altitude of 9500 feet in the mountains of west-central Colorado, on lands of the Holy Cross Forest Reservation. They were collected, 8 August, 1911, by R. J. Sabey[1] of the U. S. Forest Service. The species is the largest of all Rocky Mountain members of the genus, and noteworthy among all species for the broad but short heads; the beak of the achene being short, and not at all filiform-attenuate."

Since this time the identity of *Agoseris apiculata* has been among the mysteries of botany. No specimen labeled "*Agoseris apiculata*" exists in the type or main collections of the U. S.

[1]Clearly a clerical or typographical error for R. *T.* Sobey.

National Herbarium nor in the Washington or Denver offices of the federal Forest Service. Father Nieuwland of Notre Dame University (where Dr. Greene's herbarium is deposited) very courteously, at my request, went all through Dr. Greene's *Agoseris* series and was unable to locate the type or any other specimen of *A. apiculata.*

In his "Flora of the Rocky Mountains and Adjacent Plains" Dr. Rydberg remands *Agoseris apiculata* to synonymy under his earlier *A. maculata* Rydb., evidently basing his action on Dr. Greene's description.

Supervisor Harold L. Borden of the Holy Cross National Forest has recently located in the Forest herbarium at Glenwood Springs, Colorado, what is obviously the cotype, or isotype, of *Agoseris apiculata* Greene (Plate I) and has forwarded it to Washington for review. The phyllaries are ciliate and more or less pilose on the back, and the beaks of the achenes are shorter than the achene-body. The specimen fully accords with Dr. Greene's printed diagnosis and seems to the writer to agree with the usual conception of *Agoseris scorzoneraefolia* (Schrad.) Greene. Dr. S. F. Blake, to whom the plant was submitted for expert opinion, seemed to think that it was either *scorzoneraefolia* or else *maculata,* the latter a species then unknown to him. Through the courtesy of Doctors Small and Rydberg the type of *Agoseris maculata* Rydb. has been lent to the Forest Service for photographic purposes (Plate II).[1] It is evidently a plant closely related to "*Agoseris apiculata*" but smaller and with tawny instead of white tomentum about the heads; the phyllaries show the conspicuous purple dots from which the species derives its name and lack the conspicuously apiculated tips of *apiculata;* the achenes probably are not so pronouncedly beaked as those of *apiculata* but the material is too undeveloped to be sure on this point.

Dr. Blake has now seen the material of *Agoseris maculata* and I think he sympathizes with the writer's feeling that botany could well endure the suppression of *Agoseris apiculata* by mergence with the older, variable *A. scorzoneraefolia.*

[1]There seem to be only two authentic specimens of *Agoseris maculata* Rydb. on record: *Shear 4605* (the type) and *Osterhout 2643,* both from Colorado. Neither seems to be represented in the U. S. National Herbarium; both are on deposit in the N. Y. Botanical Garden herbarium. Specimens labeled *Agoseris scorzoneraefolia* with maculated phyllaries are however rather common.

Cotype of *Agoseris apiculata* Greene.

Type of *Agoseris maculata* Rydb.

P. S.—Since the above was presented for publication Supervisor Borden of the Holy Cross National Forest and the District Forester at Denver have, at the suggestion of Dr. Maxon, forwarded the cotype (and only specimen known) of *Agoseris apiculata* again to Washington where it will shortly be deposited in the type collection of the U. S. National Herbarium.

—W. A. D.

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PROCEEDINGS

OF THE

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SYNONYMICAL NOTES ON TINGITID GENERA WITH THE DESCRIPTIONS OF TWO NEW SPECIES FROM HAITI (HEMIP.).

BY CARL J. DRAKE.

One of the problems confronting the writer for some time has been the status of the tingitid genera *Leptopharsa* Stål and *Gelchossa* Kirkaldy. *Gelchossa* was proposed by Kirkaldy to supplant the generic name *Leptostyla* Stål, the latter being preoccupied by a genus of Diptera. After carefully studying the genotypes and numerous other species belonging to these genera, the writer feels that the two genera are identical and that the genus *Gelchossa* must be suppressed as a synonym of *Leptopharsa* Stål. A synopsis of the genus *Leptopharsa* (including the numerous species described in the genera *Leptostyla* and *Gelchossa*) will be discussed in a subsequent paper.

The writer wishes to acknowledge his indebtedness to Mr. W. L. McAtee of the U. S. National Museum for the privilege of studying the two new species of Tingitids from Haiti. The synonomy of the genus *Leptopharsa* is given below.

Genus **Leptopharsa** Stål, 1873.

Leptostyla Stål, Enum. Hemip., III, 1873, pp. 120 and 125.
Leptopharsa Stål, Enum. Hemip., III, 1873, pp. 122 and 126.
Gelchossa Kirkaldy, The Entomologist, XXXVII, 1904, p. 280.
Leptostyla Champion, Biol. Centr.-Amer., Rhynch., II, 1897, p. 11.
Leptopharsa Champion, Biol. Centr.-Amer., Rhynch., II, 1897, p. 21.
Gelchossa Drake, Mem. Carn. Mus., IX, 1922, p. 372.
Leptopharsa Drake, Mem. Carn. Mus., IX, 1922, p. 370.

Logotype, *Leptopharsa elegantula* Stål.

Leptopharsa hoffmani, n. sp.

Moderately broad, testaceous, with some of the nervures of elytra brown or fuscous. Head brown, with five long, slender, testaceous spines, the

posterior ones longest. Antennae long, slender, pale brown, apical segment black, clothed with numerous bristly hairs, segment I rather long, slightly curved, constricted a little in front of the apex, twice as long and a little stouter than II; III very long, two and two-thirds times as long as IV. Pronotum considerably swollen through disc, coarsely pitted, black, the triangular portion testaceous, tricarinate; each carina composed of a single row of large areolae; lateral carinae raised anteriorly, rounded in front, very faintly divaricating anteriorly; median carina becoming slightly lower in front of transverse swollen portion of pronotum. Paranota broad, moderately large, compressed laterally, faintly produced in front. Orifice distinct. Rostral channel deep, becoming wider posteriorly, cordate on the mesosternum; rostrum reaching to the metasternum.

Elytra rather broad, the outer margins beset with short slender spines to the distal third; costal area broad, irregularly triseriate, the areolae variable in size and shape; subcostal area regularly biseriate, the areolae mostly round or oblong; discoidal area bounded by a costate nervure, narrowed at both apex and base, with five areolae at its widest part, the nervelets embrowned beyond the middle and thus forming a transverse spot; sutural area with areolae much larger, the nervelets embrowned on the distal half. Reticulations of elytra, carinae and hood clothed with a few, long, fine, inconspicuous hairs; pronotum with very much shorter hairs. Legs long, slender, pale brown, tarsi darker, clothed with several bristly hairs. Outer margins of paranota irregularly beset with fine spines. Claspers strongly curved in the male.

Length, 3.19 mm.; width, 1.44 mm.

Holotype, male, Haiti, Dr. W. A. Hoffman, collector, in U. S. National Museum. Although very distinct, this species is probably most closely related to *G. panamensis* Champion. The shape of the paranota, narrower costal area and much shorter discoidal area are distinctive characters.

Leptopharsa digitalis, n. sp.

Elongate, eliptical, brown; the paranota and costal area testaceous, with some of the transverse nervures brown to fuscous. Legs very long, slender, dark reddish brown. Antennae very long, dark reddish fuscous; segment I a little stouter and not quite one and a half times as long as II; III very long, slightly curved, three and a half times as long as IV; IV considerably swollen towards apex, black, subequal to the length of I and II taken together. Head dark brown, the spines very short and testaceous. Eyes large, transverse, reddish. Bucculae short and broad. Rostrum reaching to the meso-metasternal suture. Rostral channel very deep on the mesosternum, parallel on pro- and mesosternum, very wide and cordate on the metasternum, closed behind. Body beneath blackish brown, mostly black on the thorax. Wings a little longer than the abdomen.

Pronotum strongly swollen through the disc, more or less covered with a white exudation, scarcely produced in front. Hood moderately large, sub-globose, faintly produced in front. Carinae parallel, equally raised, each composed of a single row of tiny areolae. Paranota strongly reflexed,

rounded, moderately wide, irregularly biseriate, the areolae large. Elytra (both taken together) rounded at the apex; costal area moderately broad, slightly reflexed, with a few brown to fuscous transverse nervures, irregularly biseriate, the areolae large; subcostal area a little narrower than costal area, mostly triseriate, brown; discoidal area brown, triangular in shape, very deeply impressed, bounded by a strongly raised, large, prominent, sub-apical nervure. Claspers strongly curved in the male. A subapical finger-like process on each side of the last segment of abdomen, projecting obliquely outward and backward.

Length, 2.59 mm.; width, .86 mm.

Holotype, male, Hayti, Croix des Missions, Plaine Gulde Sac., Apr. 30, 1925, on *Phylloxylon rhamnoides,* by Dr. W. H. Hoffman, in U. S. National Museum. *Paratype,* male, taken with type in Drake collection. This insect may be separated at once from all of the other described American species by the finger-like digitate last abdominal segment in the male. The female is unknown.

Megalocysta gibbifera (Picado).

Leptostyla gibbifera Picado, Bul. Sci. France Belgique, XLVII, 1913, p. 303.

This species, described from Porto Rico, should be transferred to the genus *Megalocysta* Champion. *Megalocysta* differs from the genus *Leptopharsa* Stål (=*Gelchossa* Kirkaldy and *Leptostyla* Stål) in having larger nervures and the third segment of the antenna is obliquely truncate at the apex. *M. gibbifera* is most closely related to *M. championi* Drake, but it may be distinguished at once by the much narrower and longer discoidal area, narrower subcostal area (biseriate) and smaller hood. *M. pellucida* Champion has an enormously developed hood.

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THREE NEW GERRIDS FROM NORTH AMERICA (HEMIP.)

BY C. J. DRAKE AND HALBERT M. HARRIS.

In working over numerous specimens of water-striders belonging to the family Gerridae the writers discovered a new species of *Potamobates* and two new *Trepobates* from North America. The descriptions of these species with distributional notes on related forms are given below.

Potamobates osborni, n. sp.

Form, size and color very similar to *P. bidentatus* Champ., but differing very distinctly in the structure of the male genital segments, the much shorter legs, and the color markings of the anterior legs. Length, 12.7 mm., width, 3.6 mm.

Apterous male: Elongate; black, an oblong spot on the vertex, a median line on the disc of the pronotum, the acetabula beneath, all coxae, anterior femora above (except at apex), anterior trochanters beneath, and body beneath (excepting a large elongate spot on each side of mesosternum, the anterior portion of metasternum and part of last segment of venter black) ochraceous. Proportional lengths of antennal segments and the patches of silvery hairs on sides of thorax, connexivum and venter as in *P. bidentatus*. Last segment of venter deeply and rather broadly notched in the middle, the sides of the notch nearly straight, the base rounded. Genital segments beneath mostly ochraceous, the apical portion of first segment and ventral portion of second blackish. The first genital segment is somewhat asymmetrical, without ventral teeth; the second bears (on left side) a long, sinuated, cylindrical, black process which is somewhat triangularly expanded at the apex.

Apterous female: Size and general color as in male, the posterior margin of the penultimate segment of venter triangularly notched in the middle. First genital segment narrowed posteriorly, terminating in a long, tapering, horizontal process; the entire segment as long as the four preceding abdominal segments. Second genital suspended beneath the enlarged basal part of first, its apical margin embrowned.

Holotype, male, and *allotype,* female, Montzorango, V. C., Mexico, Feb. 11, 1892, Professor H. Osborn, collector. *Paratypes,* two males and two females, taken with type. In both sexes the femora of the intermediate legs have a narrow ochraceous stripe on their inner and outer faces. The winged form is unknown.

Potamobates horvathi Esaki.

Ann. Mus. Nat. Hung., XXIII, 1926, p. 254, Fig. 2.

Three specimens from Escuintla, Guatemala, are at hand. The macropterous male and female differ from the apterous specimen before us and the original description in having the head entirely black, except for the ochraceous spot between the eyes. The pronotum is very large and long, rounded behind, with prominent humeri. The hemelytra and wings have been broken off at their bases.

Trepobates pictus H.–S.

As recently pointed out by Esaki the female of this insect is very distinct and may be recognized by the strongly produced median portion of the posterior margin of the mesonotum and the ciliate apical margin of the last segment of the venter. The claspers of the male are very long, sharply curved inward and quite different from those of related species. The color markings are quite variable. Specimens are at hand from Knoxville, Tenn., collected by Prof. H. E. Summers, and from Summit, Sept. 4, 1926, McComb, Sept. 8, 1924, Washington, Sept. 10, 1924, and Charleston, Miss., Sept. 7, 1925, collected by H. M. Harris. Most of the published records of this insect undoubtedly refer to *T. inermis* Esaki.

Trepobates inermis Esaki.

Esaki, Ann. Mus. Nat. Hung., XXIII, 1926, p. 140.

In the apterous form of this species the posterior margin of the mesonotum is truncate in both sexes. The femora and basal portion of tibiae of the intermediate legs are clothed beneath with long hairs in the male, the hairs being about as long as the diameter of the segment bearing them. The claspers of the male are much shorter and quite different from those of *pictus;* the form of the body is slightly slenderer and the color, while very variable, tends to be slightly darker. The third antennal segment is, as in *pictus,* distinctly longer than the second. However, it should be noted that the antennae tend to be a little longer in the female than in the male. Several hundred specimens from the following localities have been examined: *Ohio*—Columbus, Sept. 10, 1913; Sugar Grove, Aug. 24, 1914, Ira, Summit Co., Aug. 31, 1916; Berea, July 16, 1916; and Buckeye Lake, June 30, 1916, C. J. Drake. *Tennessee*—Knoxville, June–July, 1890–1891, H. E. Summers. *New York*—Ithaca, July 29, 1895, H. E. Summers. *Texas*—Weslaco, July 1, 1927, M. McPhail. *Illinois*—Oaktown, Aug. 10, 1905; and Havana, June 29, 1910. *Mississippi*—Charleston, Sept. 9, 1926; White Lake, Grenada Co., Sept. 14, 1926; Fayette, Sept. 10, 1924;

Natchez, Sept. 8, 1924; Heidelberg, Sept. 5, 1924; Washington, Sept. 16, 1924, H. M. Harris; Agr. College, Sept. 1896, H. H. Weed; and Vicksburg, July 17, 1921, C. J. Drake. *Iowa*—Ames, summers of 1922–1927 (Drake and Harris); Burlington, Sept. 8, 1925, H. M. Harris; Donnelson, July 2, 1927; and Cedar Falls, July 26, 1927, Harris and Johnston. *Kansas*—Kiowa County, July 5, 1923, R. H. Beamer. The winged form is at hand from Iowa, Tennessee, Kansas and Texas. The pronotum in this form is large, pentagonal, truncate in front, slightly narrowed anteriorly; black, a broad stripe on each side, a small spot in front and the posterior margin of triangular base yellow; or with a spot on each side in front and most of base yellowish.

Trepobates trepidus, n. sp.

Apterous form: Similar to *T. inermis* Esaki in form but slenderer and longer. Color markings very variable. The median portion of head, anterior margin of pronotum, also a broad median stripe and a broad stripe on each side, and most of mesonotum black. Mesonotum frequently with a broad yellowish band on each side above, its posterior margin yellowish to yellowish brown. Antennae dark brown, the basal portion of the first segment yellowish; segment I enlarged towards the apex, strongly curved, much longer than any of the others; II shortest, subequal to one-half of I; III a little longer than II, slightly shorter than IV. Body beneath yellowish; rostrum reaching beyond intermediate coxae, brown, the basal segment yellowish.

Male: Anterior femora quite stout, strongly curved at the middle, brownish black, their bases and apices yellowish; distinctly longer than tibiae. Intermediate legs very long, brown, the femora with a longitudinal yellowish stripe on each side; with long hairs beneath femora and base of tibiae, the hairs slightly shorter than the diameter of the segment bearing them. Abdomen above black, a triangular spot on first segment and basal part of last segment yellowish, the terminal segment roundly excavated behind; connexivum brownish black. Last segment of venter broadly and roundly emarginate behind, as wide as the two preceding segments, the margin with moderately long hairs; sides of abdomen brownish black. First genital segment with numerous very long dark brown hairs on the basal portion, the median portion behind with shorter blackish hairs. Claspers strongly curved, very stout, much stouter than in *inermis.* Length, 3 mm.; width, 1.42 mm.

Female: Slightly longer and broader than male. Anterior femora slenderer than in male. The yellowish stripes on each side of mesonotum broader. Connexivum, mesonotum, and sides of abdomen with prominent yellowish markings. Last abdominal segment beneath clothed with numerous long dark brown hairs.

Macropterous form (male): Pronotum large and shaped as in winged form of other species; with a longitudinal stripe on each side and the posterior margin yellowish. The apex of pronotum not so narrowly rounded as in *inermis;* the veins of hemelytra not as prominent. Wings slightly shorter than hemelytra.

Holotype, apterous male and *allotype,* apterous female, Soledad, Mexico, Jan. 14, 1899, in the H. E. Summers collection, Iowa State College. *Paratypes:* eight males and five females collected with type. *Morphotype,* winged male, Gualan, Guatemala, Jan. 23, 1905. Aside from other characters, the long hairs on the first genital segment of the male, the hairy last segment of venter of the female and the annulate intermediate and posterior femora serve to separate this species from its congeners.

Trepobates knighti, n. sp.

Antennae dark fuscous, the basal portion of first segment testaceous to dark reddish brown; segment I about twice as long as II, III and IV subequal, each one-fourth longer than II.

Apterous male: Color markings quite variable, generally with a broad longitudinal frequently arrow-shaped black stripe on head and a more or less distinct line above eye on each side. A small anterior portion, the middle and sides of pronotum, anterior portion of mesonotum, a median line, a broad band on each side above (connecting a little in front of posterior margin with a broad irregular black band on each side), and an irregular band on each side at base black. In many specimens the mesonotum is almost entirely black, having a spot on each side above, a narrow stripe on each side of posterior half of median line, and the posterior margin yellowish. Metanotum black with a small transverse line on each side yellowish. Abdomen above black, except the last segment, frequently with an aeneous lustre. Connexivum rather broad, narrowly rounded behind, brownish black, sometimes with yellowish markings. Entire body beneath yellowish. Sides of abdominal segments, except last, dark brown. Rostrum with a triangular spot on segment I, and almost all of II and III blackish. Anterior femora strongly curved, with a broad band at apex and the apical two-thirds above yellowish brown. Intermediate femora with a narrow brownish stripe on either side, the under surface and also basal portion of tibiae clothed with long hairs, the length of the hairs being about equal to the diameter of the segment bearing them. Last segment of venter almost as long as the two preceding, thickly clothed with erect hairs. Antennae with third segment beneath bearing a row of extremely long hairs, the longest being almost one-third the length of the entire segment. Length, 3 mm.; width, 1.42 mm.

Apterous female: Slightly longer than male. Antennae slightly longer than in male, the proportional lengths of segments practically the same, the third segment without the long hairs on its lower face. Posterior margin of mesonotum truncate. Connexivum very broad, the outer margin except at base and apex clothed with long hairs, the last segment terminating behind in a very long, almost erect, hairy, spine-like process. Color very variable, generally marked more or less similar to male. Intermediate legs without the long hairs on femora and tibiae.

Macropterous form: Pronotum large, pentagonal, black, the markings variable; frequently with a broad, yellowish stripe on each side of the posterior margin. In some specimens a spot on each side in front, some-

times a spot between these, and most of posterior margin of pronotum yellowish. Hemelytra black, the basal portion darker; veins dark, fairly distinct. Wings a little shorter than hemelytra, dark brown. Length, 5.13 mm.; width, 1.62 mm.

Holotype, apterous male and *allotype*, apterous female, Hollister, Missouri, Sept. 5–10, 1925, H. H. Knight, collector; in authors' collection. *Paratypes*, many males and females taken with type and at following localities: Ames, Iowa, Aug. 6, 1927 (H. Osborn), and in the summers of 1924–1927 (Drake and Harris); Mt. Pleasant, Iowa, July 14, 1927; Elkader, Iowa, July 28, 1927; and Donnelson, Iowa, July 13, 1927 (Harris and Johnston); Webster City, Iowa, Aug. 12, 1927 (H. M. Harris). Paratypes in collections of Iowa State College, Calif. Acad. Sci., U. S. National Museum, H. H. Knight and authors.

This species is very distinct from any known species and may be readily recognized by the long hairs on segment III of the antennae and the hairy terminal segment of venter and first genital segment of male, and the almost erect, spine-like connexival process of the female. The long hairs on the third antennal segment normally extend obliquely forward but sometime they lie almost directly forward and so close to the segment that they may be easily overlooked. The color as in other species is very variable.

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KEY TO THE SPECIES OF CLIVINEMA WITH DESCRIPTIONS OF SEVEN NEW SPECIES (HEMIPTERA, MIRIDAE).[1]

BY HARRY H. KNIGHT.

In working over material in the genus *Clivinema* Reuter it was found that several species are represented, with the result that a key for their separation is provided, also descriptions of seven new species. This brings the total number of known species in the genus up to ten. The writer is indebted to Mr. H. G. Johnston for testing out the key which he used successfully to identify all the species.

Clivinema medialis, n. sp.

Distinguished from all known members of the genus by the impressed median line on scutellum and median fuscous vitta on membrane.

♀. Length 4.6 mm., width across hemelytra 1.77 mm. Head: width .92 mm., vertex .56 mm. Rostrum, length 1.08 mm., reaching to middle of sternum. Antennae: segment I, length .30 mm.; II, 1.61 mm., cylindrical, clothed with fine appressed pubescence; III, .55 mm.; IV, .36 mm.; black, segment II more brownish. Pronotum: length .93 mm. along median line, but 1.03 mm. laterad of median line, width at base 1.66 mm.; basal margin broadly sinuate to median line where a distinct notch is formed, also notched on anterior margin at middle of collar; disk with median line rather broadly but distinctly impressed or sulcate, more narrowly on collar; calli represented by triangular, smooth, black impressions which are rather widely separated by the convexity of the collar meeting with the convex disk. Scutellum deeply impressed on median line, dividing the convex disk into equal parts, mesoscutum rather broadly exposed.

Clothed with flattened, scale-like pale pubescence, recumbent on hemelytra and venter but nearly erect on pronotum. Color yellowish to grayish, front of head, calli, impression on scutellum, sternum, coxae and femora,

[1]Contribution from the Department of Zoology and Entomology, Iowa State College, Ames Iowa.

blackish; tibiae yellowish brown, but darker at base and apex; cuneus, apical area of corium and small spot on middle, fuscous to blackish. Membrane whitish, apical half with fuscous on median line; veins yellowish to fuscous, darker on apices of areoles. Surface above and beneath, more or less coated with white, flocculent, wax-like powder. Abdomen bulging somewhat, the sides visible from above.

Holotype: ♀ June 24, 1891, American Fork, Utah (E. A. Schwarz); U. S. National Museum collection. *Paratypes:* 2 ♀ ♀, June 22, topotypic. ♀, "Col." This is the species which was recorded as *villosa* Reut. by Uhler (Proc. Ent. Soc. Wash., ii, 1893, p. 372), and reported as captured on Bigelovia by Mr. Schwarz. This is a very distinct species in the character of the pubescence and form of the pronotum and scutellum.

Clivinema sulcata, n. sp.

Suggestive of *medialis* but differs in form of pronotum and scutellum, and in the prominent, erect, simple pubescence.

♀. Length 4.1 mm., width 1.5 mm. Head: width .80 mm., vertex .52 mm.; yellowish, two rather broad glabrous lines, one each side of frons, two spots on vertex, and basal vittae on tylus, blackish. Rostrum, length .92 mm., extending slightly beyond middle of sternum, yellowish to blackish. Antennae: segment I, length .24 mm.; II, 1.2 mm.; III, .56 mm.; IV, .41 mm.; yellowish to fuscous. Pronotum: length .86 mm. along median line, but .92 mm. laterad of median line, width at base 1.51 mm.; posterior half of disk more broadly sulcate on median line than in *medialis,* more distinctly gibbous each side; callar impressions hook-shaped, the shank of the hook extending to near anterior angle of collar. Scutellum with median line broadly impressed on basal half but not carried to apex as in *medialis;* mesoscutum somewhat exposed.

Clothed with prominent, erect, simple but decurved hairs much as in *villosa* Reut., equally prominent on pronotum, scutellum, and hemelytra. Color rather uniformly pale yellowish, cuneus fuscous, marks on head and the sternum blackish; femora with a linear series of fuscous spots on both anterior and posterior aspects. Membrane whitish, apical half with a brownish cloud; veins pale to yellowish, not blackish apically. Surface not coated with wax-like powder as occurs in some species. Fine reddish, setigerous points are apparent on pronotum.

Holotype: ♀ Feb. 21, 1897, Palm Springs, California (Hubbard); U. S. National Museum collection. *Paratypes:* ♂ 2 ♀, topotypic (Cornell University). The male is not fit for description.

Clivinema sinuata, n. sp.

Distinguished by the deeply sinuate basal margin of pronotum and the subconically convex scutellum.

♀. Length 4.2 mm., width 1.74 mm. Head: width .86 mm., vertex .50 mm.; a broad glabrous black line each side of frons, meeting above on vertex which is partly covered by the overhanging pronotal collar. Rostrum, length 1.08 mm., nearly attaining posterior margin of sternum, blackish. Antennae: segment I, length .33 mm.; II, 1.27 mm.; III,

broken; dark brownish black, segment II yellowish on middle. Pronotum: length 1.08 mm., width at base 1.7 mm.; basal margin strongly sinuate, rather broadly exposing the blackish mesoscutum; disk rather evenly convex but more sharply so just behind calli; median line of collar indicated by a slender black groove; calli represented by a hook-shaped, glabrous, impressed black line, connecting transversely to separate the collar from the disk proper. Scutellum subconically convex, attaining a greater height than the pronotal disk, the basal half sloping to the crest of the convexity as a nearly flat surface.

Pubescence nearly as in *sulcata* and *villosa*, somewhat longer on pronotum. Color pale yellowish, scutellum blackish, sternum and marks on venter black; legs nearly as in *sulcata*, but tibiae with a black line on dorsal aspect, more or less obsolete on apical half. Membrane pale, veins yellowish, black at apex of smaller areole. Surface practically devoid of wax-like secretions. Sides of venter somewhat bulging and visible from above.

Holotype: ♀ Feb. 21, 1897, Palm Springs, California (Hubbard); U. S. National Museum collection.

Clivinema fuscinervis, n. sp.

Allied to *fusca* Downes, but distinguished by the longer second antennal segment which is equal to or slightly greater (♂) than basal width of pronotum.

♂. Length 4.4 mm., width 1.63 mm. Head: width .93 mm., vertex .53 mm. Rostrum, length 1.2 mm., attaining posterior margin of sternum. Antennae: segment I, length .34 mm.; II, 1.54 mm., equal to or slightly greater than basal width of pronotum, cylindrical, equal in thickness to segment I; III, missing. Pronotum: length 1.03 mm., width at base 1.52 mm.; very similar to *fusca* but collar more strongly inflated immediately before and between calli, this portion in contact with the inflated disk which is so strongly arched that the impressed line connecting calli is largely obscured; collar with a fine, dark, slightly impressed, median longitudinal line, anterior margin very slightly yet perceptibly notched. Scutellum rather strongly and evenly convex, median line glabrous and distinctly impressed on basal half, also an impressed line sharply delimiting scutellum from mesoscutum; clothed with erect, recurved hairs which appear somewhat longer than on hemelytra.

Dorsum clothed with erect, simple, pale to golden pubescent hairs, each hair strongly recurved, the curved portion exhibiting a golden glitter in certain lights, longer on pronotum and scutellum. Coloration grayish to fuscous, ventral surface tinged with reddish, femora more distinctly reddish; tylus, pair of broad smooth marks on frons, sternum, and genital segment, black; hemelytra and scutellum rather uniformly grayish to fuscous, the pronotum lighter; membrane uniformly fuscous, veins blackish.

Holotype: ♂ July 31, 1920, Missoula, Montana (A. A. Nichol); author's collection.

The writer is indebted to Mr. W. Downes for the loan of a male specimen of *Clivinema fusca* Downes with which the above species has been com-

pared. Some critical measurements for this specimen of *fusca* are as follows:

♂. Length 4.4 mm.; width 1.7 mm. Head: width .89 mm., vertex .52 mm. Rostrum imbedded in glue. Antennae: segment I, length .32 mm., thickness .12 mm.; II, 1.26 mm., thickness .103 mm.; III, .50 mm., slender (.045 mm. thick); IV, .38 mm. Pronotum: length 1.09 mm., width at base 1.45 mm.

Clivinema sericea, n. sp.

Distinguished by the fine short pubescence on hemelytra contrasted with the more prominent, sericeous, decurved hairs on pronotum, many hairs distinctly flattened.

♀. Length 3.9 mm., width 1.5 mm. Head: width .83 mm., vertex .55 mm.; with glabrous black lines much as in *sinuata.* Rostrum, length .95 mm., reaching to near posterior margin of sternum. Antennae: segment I, length .32 mm.; II, 1.15 mm.; III, .59 mm.; IV, .35 mm.; brownish black, segment II broadly yellowish on middle. Pronotum: length .98 mm., width at base 1.57 mm.; basal margin transverse for the width of scutellum, then obliquely angulate to the basal angles; collar only moderately convex, calli much as in *sinuata* but the connecting impressed line more easily seen from above since the disk is not so strongly convex. Scutellum not so strongly convex as in *sinuata,* with a triangular impression on median line at base. Pronotum and scutellum clothed with moderately long decurved hairs, many of which are somewhat flattened, sericeous and of golden yellow color. Pubescence of the hemelytra much shorter, although distinctly sericeous.

Color yellowish to dusky, scutellum dusky to fuscous; calli, glabrous marks on head, sternum, and coxae, fuscous to blackish. Femora with longitudinal series of small fuscous dots, tibiae fuscous on dorsal aspect. Membrane pale whitish, with a dusky or pale fuscous cloud extending behind larger areole to membrane margin, veins yellowish to dusky, dark fuscous at apex of areoles. Surface with a moderate amount of white, wax-like secretion on scutellum and pronotum, but thicker on sides of thorax.

Holotype: ♀ October 10, 1894, Las Cruces, New Mexico ("ISS"); U. S. National Museum collection. *Paratypes:* 3 ♀, taken with the type, "preying on Orthezia." The collector's name does not appear on the label but the "ISS" may refer to initials.

Clivinema detecta, n. sp.

Distinguished from *villosa* Reut. by the more strongly inflated scutellum and by the fuscous marks on membrane.

♀. Length 4.4 mm., width 1.7 mm. Head: width .87 mm., vertex .55 mm. Rostrum, length 1.03 mm., reaching slightly beyond middle of sternum. Antennae: segment I, length .35 mm.; II, 1.26 mm.; III, .63 mm., IV, .42 mm.; brownish black, more brownish on middle of segment II. Pronotum: length 1.06 mm., width at base 1.63 mm.; basal margin

transverse for a width somewhat greater than base of scutellum, collar more strongly convex than in *sericea*, calli and anterior half of disk thickly covered with white wax-like secretion. Scutellum shaped much as in *villosa* but more strongly inflated, rather broadly impressed on median line at base, but the whole rising abruptly due to the inflated contour. Dorsum clothed with rather long, erect hairs which become decurved apically much as in *villosa*.

Color testaceous to fuscous, cuneus, legs, and ventral surface nearly black. Membrane white, veins yellowish, with apex and basal half of vein forming smaller areole blackish; apical half of membrane with a fuscous cloud each side, more or less confluent around apical margin. Sides of thorax and venter rather thickly incrusted with white wax-like secretion.

Holotype: ♀ August 1–15, 1916, Jemez Springs, New Mexico, alt. 6400 ft. (J. Woodgate); author's collection. *Paratype:* ♀, Arizona (Morrison lot); Cornell University collection. Another female is at hand from Lamar, Colorado, which may belong here, but it is so thickly incrusted with wax the characters are largely obscured.

Clivinema bonita, n. sp.

Allied to *detecta* but larger and darker colored; distinguished by the broader, but less inflated scutellum with very shallow impression on median line at base.

♀. Length 5 mm., width 1.8 mm. Head: width .90 mm., vertex .53 mm. Rostrum, length 1.26 mm., just attaining posterior margin of sternum. Antennae: segment I, length .40 mm.; II, 1.48 mm.; III, missing; brownish black. Pronotum: length 1.26 mm., width at base 1.83 mm.; disk more strongly convex behind calli than in *detecta*. Scutellum broader but not so strongly inflated as in *detecta*, median line with very shallow impression at base.

Dorsum thickly clothed with pale to dusky, erect, long hairs with decurved tips, having a softer appearance than in *detecta*. Color dark fuscous to black, pronotum more brownish, hemelytra with a pale ground color over which the fuscous has become dominant. Membrane and veins nearly as in *detecta*, but the vein about smaller areole entirely black. Ventral surface, pronotum and scutellum thickly coated with white wax-like secretion.

Holotype: ♀ July 16, 1917, Post Creek Canyon, alt. 6500 ft., Bonita, Arizona (H. H. Knight); author's collection. Evidently scarce since considerable sweeping of all vegetation about the spot failed to reveal another specimen.

KEY TO THE SPECIES OF CLIVINEMA.

1. Body bright red, hemelytra, antennae and tibiae black..... *regalis* Kngt.
   Otherwise colored.....2
2. Pronotum strongly sulcated along median line, slightly notched at basal and anterior margins.....3

Pronotum not distinctly sulcated or notched on median line.....4

3. Dorsum clothed with short, thick, recumbent, almost scale-like pubescence; scutellum deeply sulcated along median line for its full length; membrane white, apical half with a distinct median fuscous vitta .....*medialis* n. sp.

Dorsum clothed with simple, erect, usually decurved hairs, scutellum broadly sulcated on basal half only; membrane more broadly infuscated on apical half.....*sulcata* n. sp.

4. Pronotum with basal margin transverse on middle third, or only very slightly sinuate.....5

Pronotum with basal margin deeply sinuate on middle third; scutellum more strongly convex on posterior half, subconically produced..... *sinuata* n. sp.

5. Membrane more or less infuscated on apical half.....6

Membrane uniformly whitish, not distinctly infuscated on apical half; scutellum evenly convex, with a short and rather narrow impression on median line at base.....*villosa* Reut.

6. Veins of membrane uniformly blackish.....7

Veins of membrane not uniformly blackish, distinctly paler around larger areole.....8

7. Antennal segment II not equal to width of pronotum at base (♂)..... *fusca* Downes.

Antennal segment II equal to width of pronotum at base (♂)..... *fuscinervis* n. sp.

8. Pubescence on the dorsum long, erect, each hair decurved apically, not distinctly shorter on hemelytra than on pronotum, not distinctly sericeous or flattened 9

Pubescence on hemelytra short, distinctly shorter than on pronotum, more or less sericeous, many hairs distinctly flattened....*sericea* n. sp.

9. Scutellum with a broad depression on median line at base; second antennal segment not equal to width of head plus width of vertex..... *detecta* n. sp.

Scutellum scarcely impressed on median line at base; second antennal segment equal to or slightly greater than width of head plus width of vertex.....*bonita* n. sp.

Of the ten species of *Clivinema* treated in the present paper, the male is known for four species only; and judging by these the genital characters appear to be largely of generic distinction, hence not so useful for separating the species. It is of interest to note that the male claspers are remarkably similar to those found in the genus *Largidea* Van D. However, good characters for distinguishing the species have been found in the form of the scutellum and pronotum, the type of pubescence, and in membrane colors.

Very little is known regarding the habits of the different species of *Clivinema*, although collecting records indicate that some members must be predacious, one on *Orthezia*, and others probably on mealy bugs and related insects. The general scarcity of specimens is also a good indication of predacious habits of the species.

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THE SONG SPARROW OF SAN MIGUEL ISLAND, CALIFORNIA.

BY JOSEPH GRINNELL.

Messrs. Chester C. Lamb and J. Elton Green visited San Miguel Island, off Santa Barbara, California, last fall for the prime purpose of obtaining for the Museum of Vertebrate Zoology representatives of the diminutive Gray Fox native to that island. The foxes were obtained, and also an interesting lot of birds among which a seemingly new race of Song Sparrow stands out conspicuously. This may now be named

Melospiza melodia micronyx, new subspecies.

Type.—Male adult, no. 51535, Mus. Vert. Zool.; San Miguel Island, California; September 21, 1927; collected by Chester C. Lamb; orig. no. 7930.

Diagnosis.—Among song sparrows in general (all the races of *Melospiza melodia*), coloration grayest; brown or brownish tones almost wanting; dark markings black and sharply contrasted against gray of dorsal surface or white of lower surface; bill, feet and especially claws weak; wing showing extreme of bluntness (longest primary not much longer than outermost).

Comparisons.—Nearest like the races already recognized from different islands in the Santa Barbara archipelago (see, for careful analysis of the characters of these, van Rossem, Condor, XXVI, 1924, pp. 217–220). Most nearly like *M. m. graminea* of Santa Barbara Island, but differs from it in broader and blacker dark streaking everywhere, in grayer ground-color dorsally, especially on the pileum, in paler flanks, in decidedly smaller claws, in blunter wing, and in slightly greater general size.

From *M. m. clementae, micronyx* differs as it does from *graminea*, only for the most part (save as to general size) in greater degree. Especially on the top of the head is the greater amount of grayness apparent; the broad brown capital side-stripes in *clementae* are in *micronyx* reduced to very narrow ones, which play out altogether on the nape instead of extending back to blend (in *clementae*) with the brownish tone of the dor-

sum. The broad gray occipital area is in *micronyx* lined sharply with black shaft streaks which are thus thrown into conspicuous contrast.

Measurements.—Twelve males, marked adult by field collectors on basis of skull condition, average as follows (minimum and maximum in parenthesis): Wing, 62.0 mm. (60.7–63.6); tail, 62.4 (60.5–63.7); tarsus, 21.7 (21.2–22.0); bill from nostril, 8.3 (8.0–8.7); outside chord of hind claw, 7.3 (6.4–7.9); weight, 22.1 g. (20.0–25.4). The first three of these sets of figures should be compared with those given by van Rossem (*loc. cit.*, p. 219).

With regard to outside chord of hind claw I find that the 29 specimens of *micronyx* give an average of 7.2 mm. (6.4–7.9); 51 of *clementae* give 8.2 (7.2–9.8); 25 of *graminea* give 8.1 (7.6–9.4). Sexual differences are slight: Of *clementae*, 17 females average 8.0, 34 males 8.3; of *micronyx*, 15 females 7.1, 14 males 7.3 mm.

Remarks.—In making the present study I have been helped by freely granted loans of Song Sparrows as follows: (1) A long series of *graminea* (Santa Barbara Island) from the Los Angeles Museum through Mr. L. E. Wyman; (2) a series of the Song Sparrow of Santa Cruz Island from the California Academy of Sciences through Mr. H. S. Swarth.

The Santa Cruz Island birds are not in satisfactory condition for accurate appraisement; but in so far as critical characters are appreciable (extent of brown, for example) I agree with van Rossem that they fall with *clementae*. I have seen no song sparrows at all from Santa Rosa Island.

Comparison of *micronyx* with examples of *cooperi* from the coast belt of Ventura County, as suggested by van Rossem's remarks (*loc. cit.*, p. 220) shows no close approach significant to me of immediate derivation. These examples of *cooperi* differ from *micronyx* in decidedly more massive bill, in broad brown side-stripes on head and correspondingly narrow median gray stripe, in browner flanks, and in browner, much less ashy, tone of coloration on sides of head and on whole dorsum.

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PROCEEDINGS

OF THE

BIOLOGICAL SOCIETY OF WASHINGTON

A CHARACTER FOR RECOGNITION OF THE FAMILY MEMBRACIDAE.

BY W. L. McATEE AND J. R. MALLOCH.

Recent publications bear evidence that there is at present no clearcut understanding of the scope of the family Membracidae. Funkhouser's Catalogue[1] (p. 341) says of the genus *Aethalion*, "Not a membracid genus. Should probably be considered a distinct family, the Aethalionidae." China states[2] that Goding has described two genera of Cicadellidae as Membracidae and in his reply[3] to this article Goding admits that another genus described as a membracid by him is a Heteropteron. These various genera, *Williamsiana*, *Eustollia* (Cicadellidae), and *Eufroggattia* (Pentatomidae), as well as the genus *Xerophyllum* Fairmaire (Acridiidae) are listed in the Funkhouser catalogue.

The definition of Membracidae quoted by Goding (l. c.) from Distant is so generalized it does not distinguish the group from certain representatives of the Cicadidae, Cicadellidae, and Cercopidae, nor even from some Heteroptera. Hansen according to Kirkaldy lumps the Membracidae with the Jassidae, but writers on Membracidae though undoubtedly having assumptions, at least, as to the extent of the group have mostly refrained from defining it either positively or negatively.

In view of this state of affairs, the writers deem it timely to mention a character for recognition of Membracidae which they first studied several years ago. It occurs in such highly modified groups as *Bolbonotus* and Tragopinae, and also in those in which the pronotum is little specialized. Conversely it does not occur so far as we can discover in any other Homoptera.

[1]Funkhouser, W. D., Gen. Cat. Hemip. Fasc. 1, Smith College, Mass., 1927, 581 pp.
[2]China, W. E., Ann. Mag. Nat. Hist. 9th Ser., No. 114, June, 1927, pp. 625–627.
[3]Goding, F. W., Ann. Mag. Nat. Hist., 9th Ser., No. 119, Nov., 1927, pp. 541–542.

Funkhouser alludes[1] to the character in part as the episternal hook, which he says is found in the great majority of the genera but not in all. The character in full as we would define it is, mesopleurum with a process or lobe either at or near antero-lateral angle, or just below middle of anterior margin, or both, processes which overlap the propleurum, in many cases fitting into excavations along posterior margin of that sclerite. These processes, reversing so far as they go the normal order of overlapping of the segments, seem quite significant, and we regard them as the best criterion thus far advanced for recognition of the family Membracidae. The accompanying figures indicate the appearance of these mesopleural processes in a number of the genera.

EXPLANATION OF PLATE.

Fig. 1. Aethalion reticulatum.
" 2. Aethalion quadratum.
" 3. Oeda inflata.
" 4. Antianthe expansa.
" 5. Membracis albolimbata.
" 6. Bolbonota cuneata.
" 7. Tragopa involuta.
" 8. Lycoderes galeritus.
" 9. Stegaspis viridis.
" 10. Darthula hardwicki (now listed as a Membracid but apparently incorrectly so).
" 11. Homalodisca triquetra (Cicadellid).

N. B. The arrows on Fig. 9 indicate the overlapping mesopleural processes.

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[1]Mem. 11, Cornell Univ. Agr. Exp. Sta., 1917, p. 322.

Mesopleural processes in Membracidae.

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NEW CHINESE MAMMALS.

BY A. BRAZIER HOWELL.

Further work upon the Chinese mammals contained in the U. S. National Museum has brought to light three more undescribed races, which may be known as follows:

Pithecus pullus, sp. nov.

Type.—Male, young adult, skin and skull no. 252,157, U. S. National Museum, from Kuatun, Fukien, China; date unknown. Collected by F. T. Smith; original number 85.

Diagnosis.—A large, short-tailed macacque related to *P. thibetanus* but uniformly of a chocolate color.

Skin.—The dorsal coloration is rather dark chocolate with a suggestion of black overwash. The long full hairs are strongly waved and the play of light over the curves of these waves gives the appearance of several distinct annulations of lighter brown. The guard hairs of the dorsum are tipped with blackish, less densely so upon the sides, and over the thighs the dark tips are replaced by a golden brown, to be seen only in a favorable light. Below the coloration is a shade paler, the hairs being without darker tips. The eyebrows and scanty hairs about the face are broadly tipped with shining black. The sides of the head are of the same color as the remainder of the animal save that the hairs do not have darker tips.

Skull.—The posterior nares exhibit the narrowness and height characteristic of the stub-tailed macacques, but less marked than in *thibetanus*, and the bullae are less prominent than in that animal. The age is such that the temporal fossae do not quite meet.

Measurements.—Collector's measurements of the type are given in inches, as originally taken, followed in brackets by their equivalents in millimeters. Length of head and body, 23⅞ (605); tail, 2⅝ (66); hind foot, 7⅛ (181); and ear, 1½ (38). The greatest length of the skull, exclusive of the teeth, is 140; occipito-nasal length, 120; length of nasals, 28.5; zygomatic width, 89; height of posterior nares, 15.5; width across posterior nares (both), 13; and length of mandibular molariform series, 40 mm.

Remarks.—It has been known for many years that two species of *Pithecus* occur in the vicinity of Kuatun. The commoner was described by Elliot

under the name *littoralis* and the other presumably has not heretofore been secured and preserved by a naturalist. Arthur deC. Sowerby has recently presented to the U. S. National Museum a splendid specimen of this monkey, which proves to be a short-tailed macacque of the *thibetanus* rather than the usual *rhesus* group, and entirely distinct in coloration from anything heretofore known.

Rattus humiliatus sowerbyi, subsp. nov.

Type.—Male, young adult, skin and skull no. 199,620, U. S. National Museum, from near Imienpo, north Kirin, Manchuria, at an altitude of 500 feet; October 15, 1914; collected by Arthur deC. Sowerby; original number 735.

Diagnosis.—A large dark race with the blackish hairs of the dorsum very thick, sootiness of the face pronounced, and foot relatively long.

Skin.—The dorsal coloration is a warm tone of brown with plentiful admixture, rather evenly distributed, of blackish guard hairs. The head is less brown and the face is pronouncedly sooty, with white upper lips. Both fore and hind feet are well covered with snowy white hairs. The tail is bicolor, the scales very fine as in the other races and the hairs even more plentiful than usual. The sides are less brown and with fewer black hairs, the color merging into that of the underparts, which is plumbeous basally with the hairs broadly white distally, showing the faintest tinge of yellow. The ears are rather small as in *typicus*, the feet are very large, and the tail relatively short (90 per cent of the head and body).

Measurements.—Collector's measurements of the type are: head and body, 177; tail, 158; hind foot, 37 (38 in both dried skins); and ear probably 19 mm. (mistakenly marked 29 upon the label). Total length of the skull is 41; zygomatic width, 20; interorbital width, 6; nasal length, 14.4; and maxillary tooth row, 7 mm.

Remarks.—I do not know the precise color characters of typical *humiliatus* and apparently no one since Pere David has succeeded in capturing this rat near Peking. Indeed, doubt has been cast upon this really being the type locality for that very reason. But the measurements are known and hence, although it is represented by but two specimens, I have no hesitation in naming this new race on the character of size—chiefly large foot and to a lesser degree, short tail and probably large body. It is extremely likely, however, that color characters of darker back and more sooty head will prove to be valid criteria also, conforming to what one expects to find in the case of mammals from the two regions in question. As in the other races, one may at once distinguish *sowerbyi* from rats of the *norvegicus* group by the silkiness of the fur and more flaring (less precisely parallel) cranial beading.

In the naming of this race another opportunity is taken of expressing appreciation of the great value of the continued zoological collecting in China by Mr. Sowerby.

Euchoreutes naso alashanicus, subsp. nov.

Type.—Female adult, skin, skull and trunk skeleton no. 240,764, U. S.

National Museum, from the Alashan Desert, Inner Mongolia, 100 miles north-northwest of Ningsia, Kansu, China; collected April 26, 1923, by F. R. Wulsin; original number 1054.

Diagnosis.—Like *naso* but coloration more ochraceous and paler; bullae larger.

Skin.—Save where the plumbeous bases of the hairs show through there is no suggestion of gray in the dorsal coloration but only buffy ochraceous, each hair having the faintest of black tips. Below the hairs are white to their bases. The pig-like raised border of the nasal pad, characteristic of this genus, is very distinct. The ears are even more remarkable than is indicated by Sclater's plate of *naso* and are undoubtedly larger in proportion to the size of the body than in any other rodent. They are scantily covered both within and without by exceedingly short white hairs. The anterior edge of the pinna is fringed with a single row of fine white hairs some 4 mm. in length, this acting as a screen to exclude from the inner ear chance particles of dirt. The white tip of the tail has been broken off. The long claws of the fore feet and the extremely large, fleshy pads of the hind toes are much in evidence. The soles of the latter are naked but there is a fringe of long hairs upon the outer border of the second and of the fourth toe.

Skull.—The skull is exactly of the same length as that of the type of *naso*, making its comparison with the figure of the latter entirely satisfactory. The left bulla and the palatal region are damaged, but the right bulla is intact and distinctly larger, especially ventrad and rostrad, than in *naso*. The posterior terminations of the nasals are also more rounded.

Measurements.—Collector's measurements of the type are as follows: total length, 241; tail (imperfect), 150; foot, 41; and ear, 41. In the dried skin the foot measures 40.5 mm. Total length of the skull is 29.5; sagittal length of bulla, 11.3; transverse width of bulla, 8.4; and height of skull through bulla, 12 mm.

Remarks.—This specimen is one from the collection made by F. R. Wulsin and presented to the National Museum by the National Geographic Society. It apparently constitutes the third recorded instance of capture of this genus and the occurrence of a race in southern Mongolia is one of the most interesting facts encountered during a study of the Chinese mammals in the National Collection. The type locality is in the Alashan Desert north and west of the Holanshan Mountains, which constitute a part of the boundary between Mongolia and Kansu. A considerable proportion of this district is known to be sandy.

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PROCEEDINGS

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A NEW SPECIES OF CHAMAELINOROPS FROM HAITI.

BY DORIS M. COCHRAN.

During the spring of 1927, Dr. Alexander Wetmore, Assistant Secretary of the United States National Museum, went to Haiti on a collecting trip, the funds for which were provided by Mr. B. H. Swales. He secured 62 amphibians and reptiles, and in this small but extremely valuable collection was a new genus and species of lizard which I have already described.[1] Another find no less important is that of a second species of *Chamaelinorops*, a genus known hitherto by a single species inhabiting Navassa Island and described by Karl P. Schmidt in 1919 under the name of *Chamaelinorops barbouri*.

Chamaelinorops wetmorei, new species.

Diagnosis.—Differs from *Chamaelinorops barbouri* in having shorter limbs, in possessing a lateral series of enlarged spinose scales, in having small scales instead of granules in the area between this lateral series of enlarged scales and the enlarged dorsals, and in possessing a transverse gular fold which reaches almost to the nuchal region.

Type.—U. S. N. M. No. 72630, a young individual collected at Fonds-des-Negres, 20 kilometers southwest of Miragoane, Département du Sud, Haiti, on April 4, 1927, by Dr. Alexander Wetmore.

Description.—Head V-shaped in outline, very angular; canthus rostralis sharp, composed of two large scales, merging evenly into the supraciliary border where three scales may be counted, the second the longest and very wide; loreal region concave; four rows of loreal scales; nostrils lateral, somewhat elevated; four scales between the supranasals; rostral very broad and low, separated from the nasals by two rows of small scales; frontal region without ridges, flat; a patch of four or five unequal, enlarged supraocular scales, separated from the supraciliaries by smaller scales and

[1] A new genus of Anguid lizards from Haiti. Proc. Biol. Soc. Washington, vol. 40, June 30, 1927, pp. 91–92.

granules; ridges of the supraorbital semicircles prominent, covered with large keeled scales, and separated from each other by three rows of small smooth scales; occipital plate slightly larger than the scales immediately surrounding it, elongate, the pineal body very apparent; three scales between the supraorbital semicircles and the occipital; a very strong lateral ridge from the middle of the posterior orbital border extending horizontally backwards and ending in a heavy tuberculated knob above the ear; several enlarged spinose scales above this ridge; two weak ridges running parallel with these, and extending from the posterior border of the supraorbital ridges to the occiput; a faint transverse ridge across the occiput joining the posterior portions of all the ridges; nine upper and nine lower labials to a point directly beneath the center of the eye; all the head scales with a sharp keel or a spinose tubercle in the center, excepting the occipital and the scales between the supraorbital semicircles which are smooth; ear-opening with scarcely any indication of a ridge in front of it, oval, about half the length of the eye-opening. A short gular fan, and a decided transverse fold behind it extending on the side of the neck up to the knob above the ear and nearly onto the nuchal region; throat covered with rows of very small keeled scales.

Body extremely compressed, the sides vertical or concave, over twice as deep as wide at mid-body; no trace of a dorsal or caudal crest. Lepidosis heterogeneous; six rows of large dorsal scales; the two middle rows narrower than long, each scale with a distinct keel ending in a raised elevation posteriorly; the next two rows the largest, the scales about as wide as long and with their keels ending in elevations which are even more pronounced and which form in profile an irregular saw-toothed line; the two outer dorsal rows like the middle pair in size and carination; below these and merging gradually into them is a band of small, rather smooth but very irregular dorso-laterals about 12 scales in width; below these comes a lateral band of two rows of large, tubercular scales beginning in front of the shoulder, running above it and straight along the sides to the groin; below these and sharply separated from them is a latero-ventral band of smooth granular scales; these in turn suddenly give place to about fourteen rows of very large, heavily keeled ventral scales, the two or three median ventral rows much smaller than the others. The hind leg being adpressed, the tip of the fourth toe reaches a point half-way between the tympanum and the eye; the arm being laid back along the sides, the finger-tips extend about four-fifths of the way to the groin; limbs entirely covered with imbricate scales, the keels usually continuous. Digits medium in length, slightly depressed and very slightly expanded, the terminal phalanx of each digit compressed at the joint, then expanded before the claw is reached. Claws strong, inserted at the end of the expanded portion of the digits; third and fourth fingers nearly equal in length; fourth toe much the longest, with 25 lamellae beneath it; fifth toe as long as second, and set in at right angles to the others; first toe very short. Tail long, nearly two and one-half times the length of the head and body, round, covered with imbricate, keeled scales, not at all verticillate. No enlarged postanal scales visible.

Dimensions.—Snout to vent, 26 mm.; tail, 61 mm.; hind leg, 19 mm.; arm, 11 mm.; width of body, 3 mm.; depth of body, 6.5 mm.; width of head, 6 mm.; length of head, 10 mm.

General color above ashy gray; a dark-brown irregular ring completely encircling the head, between the eyes appearing as a chevron, under the eyes as a dark bar to the lips and on the lower jaw and throat as a sinuous dark marking set off by a light anterior border; another much fainter mark in front of this on the chin, ending on the upper lip in a dark vertical bar in front of the eye; a very light dark-edged longitudinal stripe on the frontal region, and another U-shaped one behind the dark chevron. Three light-brown vertical bars on each side of the body; a small dark triangular blotch just above the groin. Ventral surfaces dark grayish-brown, with irregular streaks of lighter color on the belly and lower surfaces of the limbs. Throat on either side of fan and in front of transverse fold intensely black; center of fan brown. Tail nearly white above, bluish-gray below, with about a dozen light bands edged with darker gray, these scarcely visible when seen from above. Occasional jet-black tips on the spinose tubercles and elevations on head and back. The type is unique.

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PROCEEDINGS

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A NEW GENUS AND SPECIES OF LIZARD, *HISPANIOLUS PRATENSIS*, FROM THE HAITIAN REPUBLIC.

BY DORIS M. COCHRAN.

During an excursion to Haiti in March and April, 1925, Mr. Gerrit S. Miller, Jr., of the United States National Museum, secured an important collection of amphibians and reptiles, among which are half-a-dozen specimens of a striped lizard representing a new genus allied to *Leiocephalus*. Mr. Miller found the animal rather common in the grass and scrub along the banks of small gullies in the northern edge of the central plain of Haiti (altitude about 425 meters). He did not see it on the nearby limestone hills. He noticed that in running it did not elevate its tail in the manner which is so conspicuous in *Leiocephalus personatus*, a lizard which was frequently seen on the roadway near sea level in the region of Saint Marc and Gonaives; also that it differed from *Leiocephalus personatus* in its fondness for scrub and grassy cover.

Hispaniolus, new genus.

Diagnosis.—Tympanum distinct; body slightly compressed; no dorsal or caudal crests; tail long, rounded; dorsal scales uniform, imbricate, keeled. Upper head-scales enlarged, keeled; occipital small. No transverse gular fold; no gular sac. Digits compressed, with keeled lamellae inferiorly. No femoral or preanal pores. Lateral teeth tricuspid; pterygoids not toothed. A sternal fontanelle closed by cartilage. No abdominal ribs.

This genus is somewhat similar to *Leiocephalus* in head scalation and general proportions. It differs in having no dorsal or caudal crests, in having a different style of coloration and in not being able to curl its round tail up over the back when running, as is the habit of the Leiocephali with compressed tails.

Hispaniolus pratensis, new species.

Type.—U. S. N. M. No. 69189, an adult male collected at the Atalaye plantation near St. Michel, Département du Nord, Republic of Haiti on March 23, 1925, by Gerrit S. Miller, Jr.

Description of the type.—Head-shields enlarged, all ridged excepting the internasals, which are smooth; nasal in contact with rostral; two scales between the rostral and the first supraocular; internasals very elongate; the frontals, prefrontals and internasals embracing a medial series of two subequal scales which completely separate the prefrontals but which do not reach the rostral; prefrontals separated from the canthals by an elongate scale; three supraorbitals; five supraoculars on each side, the fifth very small; occipital plate small, bordered laterally by two pairs of distinct parietals, the outer pair considerably larger than the inner pair; four upper and four lower labials to middle of eye. Dorsal scales large, uniform, extremely imbricate and mucronate; laterals slightly smaller, keeled; ventrals smooth, their posterior edges not denticulate; about 41 scales around the middle of the body; about 42 scales from occiput to a point directly above the vent; about 10 dorsal scales to a head-length; scales of the neck like the dorsals, those behind the ear keeled and imbricate, not granular; anterior auricular margin with two well-developed projecting scales. Shoulder folds present, but no lateral folds. The hind leg adpressed reaches only to a point a little in front of the shoulder. Digits compressed; fourth toe with 24 keeled lamellae. No dorsal or caudal crests, the scales of the mid-dorsal region like the surrounding scales in size and carination; the keels of the lateral and dorsal scales directed backwards and upwards, so that the longitudinal scale-rows strongly converge on the back. Tail round, about twice as long as the head and body taken together.

Dimensions.—Length of head, 11 mm.; body, 36 mm.; tail, 90 mm.; arm, 17 mm.; leg, 30 mm.; width of head, 8 mm.

Head olive-gray with some round black spots on the sutures of the head-shields; body light olive-gray, with ten dark brown stripes on back and sides running from the head onto the tail; three lateral white stripes between the brown ones on each side, the lowest white stripe running from in front of the shoulder to the groin and down the hind leg; the middle white stripe beginning in front of the eye, passing through the eye, through the ear and along the body onto the tail; the uppermost white stripe beginning at the upper posterior border of the eye, passing above the ear and along the body onto the tail. Ventral scales peppered with very minute gray dots, some of the scales with light bluish centers. Throat iridescent pale violet and green, with some small widely scattered gray spots. Upper and lower lips edged with black.

Variations.—In five paratypes from the same locality taken by the same collector the scalation shows remarkably little variation, as all without exception conform in number of supraoculars, in number and position of medial scales on the center of the snout and in having ten dorsal scales in a head-length. The scales around the body are about 40 or 41 in

number, although the excessive irregularity of the longitudinal rows make it difficult to be definite about this count, as it will differ if taken a quarter of an inch away in either direction. There are from 40 to 42 scales in a row from the occiput to a point directly above the vent. In two of the paratypes (69184 and 69185) the internasal plates, which are very elongate in the other four specimens, have divided transversely so that there are *two* scales between the first supraocular and that portion of the internasal actually in contact with the rostral. The largest individual, 69184, has a head-length of 12 mm. and from occiput to base of tail it measures 42 mm.

The stripes of some of the paratypes are not so evenly developed as in the type. In two specimens, the middle one of the three white lateral stripes is almost obsolete, while the brown stripe above the uppermost white lateral stripe is broadened and emphasized. The borders to the lips are not conspicuously darkened in some cases and the gray spots on the throat are not always evident, the throat being suffused with gray occasionally. None of the specimens show any traces whatever of the black bars or chevrons across the back which are usually so pronounced in most species of the genus *Leiocephalus*.

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PROCEEDINGS

OF THE

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THE HERPETOLOGICAL COLLECTIONS MADE IN HAITI AND ITS ADJOINING ISLANDS BY WALTER J. EYERDAM.

BY DORIS M. COCHRAN.

From June to October, 1927, Dr. Thomas Barbour of the Museum of Comparative Zoology employed the services of Mr. Walter J. Eyerdam, who made collections at several regions on the mainland of Haiti and who extended his efforts by visiting Grand Cayemite Island and by traversing the little-known Gonave Island, both lying a few miles off the Haitian Coast. That his efforts were distinctly worth while may be seen in the three species new to science which he secured. It is to be hoped that further careful collecting may soon be done in these islands, the fauna of which merits still greater attention than it has yet received.

Of the total of 210 specimens, 53 came from Gonave Island and 11 from Grande Cayemite Island, the number of species known from each of these islands being considerably enlarged. A tabular list of the entire collection is given. The numerals after each locality stand for the number of individuals taken at that place. The specimens are now in the Museum of Comparative Zoology at Cambridge, Massachusetts.

	Haitian mainland.	*Gonave Island.*	*Grande Cayemite Island.*
Gonatodes notatus	----------	Pte. à Raquette 1	
Aristelliger lar (juv.)	----------	Pte. à Raquette 1	
Sphaerodactylus cinereus	Miragoane 3 Mt. Rochelle 6 Cape Haitien 1		
Sphaerodactylus copei	Miragoane 3	----------	1
Anolis chlorocyanus	Hinche 2	Pte. à Raquette 2	
Anolis coelestinus	Cape Haitien 3 Miragoane 20	----------	2
Anolis distichus	Cape Haitien 2 Miragoane 35 Hinche 5	Pte. à Raquette 13	1
Anolis cybotes	Cape Haitien 10 Miragoane 23 Hinche 3 Mt. Rochelle 4 Port de Paix 1	----------	2
Anolis doris	----------	Pte. à Raquette 3 Anse à Galets 1	
Anolis olssoni	Cape Haitien 1		
Anolis semilineatus	Miragoane 1		
Leiocephalus vinculum *n. sp.*	----------	Pte. à Raquette 3	
Leiocephalus schreibersii	Port de Paix 1 Hinche 1		
Leiocephalus semilineatus	Hinche 1 Morne à Cabrite 1		
Leiocephalus personatus	Bellevue 2		
Cyclura cornuta	----------	Petit Gonave Id. 1	
Celestus costatus	----------	Anse à Galets 1	
Sauresia sepsoides	Morne Rochelois 1	Pte. à Raquette 1	
Ameiva barbouri *n. sp.*	----------	La Source 2	
Ameiva taeniura	Miragoane 5	----------	2
Ameiva chrysolaema	----------	Pte. à Raquette 18	
Amphisbaena caudalis *n. sp.*	----------	----------	2
Amphisbaena innocens	----------	Petit Gonave Id. 1	
Typhlops lumbricalis	----------	----------	1
Tropidophis haetiana	----------	Pte. à Raquette 1	
Uromacer catesbyi	Miragoane 2 Hinche 2		
Uromacer dorsalis	----------	La Grande Source 2	
Uromacer frenatus	Miragoane 1		
Uromacer oxyrhynchus	Miragoane 1		
Leimadophis parvifrons protenus	(no label) 2 Cape Haitien 1		
Leimadophis alleni	----------	Gonave Island 2	
Ialtris dorsalis	Miragoane 1		
Eleutherodactylus inoptatus	Lake Miragoane 1		

Leiocephalus vinculum, new species.

Diagnosis.—Parietal plates distinct, longitudinally divided, the outer not twice as large as the inner; a series of six band-like transverse supraoculars; nasal in contact with the rostral; ventral scales smooth; caudal crest higher than the dorsal crest; upper head-shields very weakly keeled; an enlarged scale on the temporal region above the ear; an elongate scale separating prefrontals from canthals. Allied to *Leiocephalus semilineatus* Dunn and to the *personatus* group through *Leiocephalus barahonensis* Schmidt.

Type.—Mus. Comp. Zool. No. 25435 (collector's no. 289, lot 54), adult male collected by Walter J. Eyerdam on August 5, 1927, at Pte. à Raquette, Gonave Island. ". . . curly-tailed lizards on rocks in forest near Saline Madre Siade."

Description of the type.—Head-shields enlarged, the anterior ones very

weakly ridged, the supraorbitals and posterior ones a little more heavily ridged; three scales between the rostral and the first supraocular, the posterior very large; nasal in contact with rostral; internasals not unusually elongate, separated from each other; the frontals, prefrontals and internasals embracing a medial series of three contiguous scales, the central one slightly the largest, the anterior one in contact with the rostral; frontals and prefrontals separated from the canthals by an elongate scale; three supraciliaries; six supraoculars; occipital small, bordered by two distinct pairs of parietals on each side, the inner about two-thirds as large as the outer; four (on left side of head only three) upper labials and five lower labials to a point below the center of the eye; a conspicuously enlarged, heavily keeled scale on the temporal region just above and in front of the ear opening; anterior border of the ear with four large projecting scales. Dorsal scales large, imbricate but not mucronate except towards the tail, some of the dorsals near the median line being hexagonal in shape with the tips squarely cut off; laterals slightly smaller than dorsals; ventrals larger than dorsals, smooth, their posterior edges highly denticulate; about 46 scales around the middle of the body; about 57 scales from occiput to a point directly above the vent; about 14 dorsal scales to a head-length; nuchal scales quite small; those on the side of the neck like the dorsals; those behind the ear keeled and imbricate, not granular. Shoulder folds present, but no lateral folds. The adpressed hind leg reaches to about the center of the eye. Digits compressed; the fourth toe with 26 keeled lamellae. A low but distinct dorsal crest and a higher caudal crest; the other caudal scales mucronate. The keels of the lateral and dorsal scales are directed backwards and upwards, so that the longitudinal scale-rows converge strongly on the back. Tail highly compressed.

Dimensions.—Snout to vent, 65 mm.; head, 14 mm.; tail (tip reproduced), 87 mm.

Color (in alcohol).—Head brown; back iridescent bronze-green with indications of cross-bands on the nuchal region; traces of a dark-brown, much interrupted lateral stripe leaving the eye, continuing over the shoulder and onto the side of the tail where it persists only as a series of small brown spots widely separated; upper surfaces of arms and legs bronze. Chin and throat with alternating dark brown and light bronze stripes which are somewhat irregular and tend to anastomose. Remainder of under surface tan, with occasional bluish scales. Beneath the eye two light patches, set off by dark vertical marks.

Variations.—In the two paratypes, secured under the same conditions as the type specimen, not much variation is shown. The scales around the body seem to be 45 and 49 in number in these two paratypes, but as the longitudinal rows are exceedingly uneven, due to the convergence on the back, the count varies at practically every scale. The number of scales from the occiput to a point directly above the vent is 58 and 60, and the number of dorsal scales in a head-length is 14 and 15. While the medial series of scales on the snout is continuous in the type, it is discontinuous in one of the paratypes. The other paratype has an old injury on the snout in this region.

In coloration the same essential features are present in all three specimens. One of the paratypes is much more brightly colored than the type, however, and has some brilliant pale green scales edging the darker crossbars over the neck, and likewise accenting the lower edge of the dark lateral stripe. Below this the sides appear purplish brown, with the occasional bright blue scales mingled there.

Remarks.—In possessing a greatly enlarged scale on the temporal region above the ear, as well as in the comparative smoothness of the anterior head-shields, the new species resembles *Leiocephalus semilineatus* Dunn. In having a strap-like scale separating the prefrontals from the canthals, the new species differs from *L. semilineatus*, but, on the other hand, this character links it with *L. barahonensis* Schmidt, which has smooth anterior head-scales, but no greatly enlarged temporal scale. The new species has more scale-rows around the body (45–49) than *L. barahonensis* (40); in this character, as well as in possessing the enlarged temporal scale it likewise differs from *L. beatanus* Noble which is allied to *L. barahonensis.*

Ameiva barbouri, new species.

Diagnosis.—Ten rows of ventral plates; caudal scales oblique and very feebly keeled above, smooth on the sides and bottom of tail; nostril anterior to the nasal suture; three large supraoculars, the first not in contact with the loreal; no white lines or light spots anywhere on head, body, limbs or tail.

Type.—Mus. Comp. Zool. no. 25537 (collector's no. 288, lot 53), adult from La Source, Gonave Island, collected on August 7, 1927, by Walter J. Eyerdam.

Description of the type.—Profile of head flat on top, not curved except at the very end of the snout; nostril anterior to the nasal suture; rostral forming a right angle behind; anterior nasals broadly in contact behind the rostral; frontonasal longer than wide, in contact with the large loreal; prefrontals broadly in contact; frontal in contact with three supraoculars on each side; three large supraoculars, the anterior one not touching the loreal; behind the third supraocular three small scales occupying the position of a fourth supraocular; frontoparietals in close contact with the third supraocular; seven supraciliaries on the right and six on the left, the two anterior ones on each side in contact with the first supraocular, the remaining supraciliaries separated from the posterior supraocular by a row of granules; two fronto-parietals, followed by a transverse row of five subequal occipitals, these in turn being followed by about three rows of irregular post-occipitals; ear-opening large; five upper labials to a point directly beneath the center of the eye, the third and fourth the longest; six lower labials to the same point, the third the longest; the wedge of granular scales on the chin extending to the first pair of chin shields, which are partially in contact; chin and throat covered with granular scales, a distinct wide band of enlarged scales across the middle; mesoptychium covered with one or two irregular rows of enlarged scales, bordered by two or three successively smaller rows. Dorsal scales granular, uniform,

34 in the standard distance (from tip of snout to center of eye); laterals similar but smaller. Ventral plates in eight longitudinal series bounded by two very small external series, and in thirty-five transverse series; brachials and ante-brachials well separated; four wide strap-like scales across the fore-arm; post-brachials present as four pairs of somewhat enlarged scales at the elbow, only slightly larger than the granular scales on the back; femoral pores 16 and 18; anterior face of thigh covered with six or seven rows of flat scales; two tibial rows, the external row composed of four scales, of which the second and third are much larger than the others; no enlarged postanals; a pair of enlarged plates at the anterior border of the anus and two single median scales in front of them, the anterior the smaller; twenty-two scales in the fifteenth verticil of the tail. The hind leg being adpressed, the fourth toe reaches to the anterior edge of the tympanum. Hands and feet long and slender; the small "combs" very evident on the toes; fourth toe with thirty-seven lamellae beneath it; fifth toe longer than first. Tail exceedingly long, almost three times the length of the head and body together, and somewhat noticeably depressed in its proximal third; the scales obliquely set, very weakly keeled above, quite smooth on the side and bottom.

Dimensions.—Head and body, 84 mm.; tail, 230 mm.

Coloration (in alcohol).—Tail, ventral plates and under side of limbs brilliant cerulean blue; throat, chin, labials and point of snout rosy pink; dorsal surfaces uniform dull bluish-gray, without any light spots or lines whatever, but showing a bronze iridescence on shoulders and on base of tail; a dusky band beginning indistinctly on the canthus, passing over the ear and above the shoulder, broadening and becoming black on the side, narrowing above the insertion of the hind leg and fading out on the side of the tail; the outer two rows of ventral plates black anteriorly.

Variation.—The only additional specimen of this species was collected at the same time and place. It is somewhat mutilated, but shows precisely the same coloration as the type. The only essential differences are that the paratype has five lower labials to a point beneath the center of the eye, and that the first pair of chin-shields is divided transversely into two, the wedge of granular scales on the chin extending thus only to this second pair of chin-shields. On the paratype the post-brachial plates are a little more pronounced than in the type specimen. The head and body length is exactly the same as that of the type; the tail is defective.

Relationships.—While *Ameiva barbouri* is more clearly related to *A. taeniura* than to any of the other Hispaniolan *Ameivas*, they are not very close. The new species has a much longer snout, which becomes much narrower towards the tip when viewed from above; the brachials and ante-brachials are not continuous; the post-brachials are less well developed, and finally, the third supraocular is fully in contact with the frontoparietal. *Ameiva taeniura*, on the contrary, has a shorter and blunter snout; the brachials and ante-brachials are continuous; the post-brachials are relatively larger, while the third supraocular is partially cut off from the frontoparietal by granules. While the two species are alike in having an immaculate bluish-gray mid-dorsal region, the black lateral bands of

A. taeniura are sharply marked off by a narrow light line above and below, and the central portion of the black band contains numerous light spots.

In *A. barbouri* the black band merges gradually into the dorsal and lateral ground-color, and is itself without any spots or vermiculations whatever.

Ameiva lineolata is not the young *A. taeniura*, as Drs. Barbour and Noble have maintained,[1] but is a distinct and well marked species. Its characteristics, separating it from *A. taeniura* decisively, are these: The first supraocular is in contact with the loreal; the row of granules separating the posterior supraoculars from the frontoparietal does not extend as far forward as the third supraocular; the tail at the fifteenth verticil has fewer scales (17 to 18); there are two pairs of enlarged preanal plates in the first row, the inner pair the larger; there are 28 dorsal granules in the standard distance (from tip of snout to center of eye). In *Ameiva taeniura*, the first supraocular is separated entirely from the loreal by an intervening scale; the third supraocular is partly and sometimes completely separated from the frontoparietal by a row of granules; the tail at the fifteenth verticil has more scales (25 to 28); there is but one pair of enlarged preanal plates; the dorsal granules are smaller, there being about 42 in the standard distance, the minimum number being 36 in this species.

Amphisbaena caudalis, new species.

Diagnosis.—Nasals forming a suture on the snout; four preanal pores; two prefrontals, distinct from the nasals and labials; suture between the nasals nearly one-half as long as that between the prefrontals; ocular forming a suture with the second and third labials; no preocular; body rings 217; tail rings 20 to 21.

Type.—M. C. Z. no. 25550 (collector's no. 407, lot 63), an adult from Grande Cayemite Island, Haiti, collected by Walter J. Eyerdam from under stones in September, 1927.

Description of the type.—Rostral small, triangular, scarcely any of it visible from above; prefrontals long, the suture between them a little longer than that between the frontals and slightly over twice the length of the nasal suture; ocular moderate, quadrangular, smaller than the postocular and about equal to the third supralabial; a well developed temporal between the postocular and third supralabial, just touching the ocular and about equal to it in size; eye plainly visible through the ocular; two pairs of occipitals in contact behind the frontals, the anterior pair longer than broad, the posterior pair squarish; three supralabials, the second as long as the other two together; three lower labials, the second much longer than the other two together; behind the second lower labial a large malar shield; mental followed by a large median postmental somewhat longer than broad; just behind the postmental and between the second supralabials are two scales (post-genials) lying in a transverse row; 217 rings on the body and 21 on the tail; the segments of each ring longer than broad, excepting the two median ventral ones which are slightly broader than long and

[1] Bull. Mus. Comp. Zool. Cambridge, vol. 59, No. 6, Oct., 1915, p. 435.

between which the suture is less deep than elsewhere; 14 segments above the lateral line and 20 below it; six anal shields; four preanal pores.

Color (in alcohol).—Drab above, the center of each segment darker; lighter below anteriorly, turning to yellowish-white posteriorly.

Dimensions.—Head and body length, 137 mm.; tail, 12 mm.; greatest diameter of body, 5 mm.

Variations.—A single paratype, taken at the same time and place as the type, besides being somewhat larger, varies from it in the following slight characteristics: The temporal scale is relatively somewhat smaller than in the type specimen; there are 18 segments below the lateral line instead of 20; there are 20 tail-rings instead of 21. In all other respects it agrees with the type specimen.

The length of the head and body in the paratype is 170 mm.; tail, 17 mm.; the greatest body diameter about 6 mm.; the body is somewhat shrunken and stiffened.

Remarks.—From the true *Amphisbaena innocens*, its closest relative, it differs in having 20 to 21 tail rings instead of 13 to 16; in having the first and third supralabials proportionately smaller in relation to the second supralabial, and in having a somewhat shorter postmental.

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PROCEEDINGS

OF THE

BIOLOGICAL SOCIETY OF WASHINGTON

CHARLES VANCOUVER PIPER AND THE FLORA OF THE PACIFIC NORTHWEST.

BY R. KENT BEATTIE.

We who knew Charles Vancouver Piper recognize his manifold interests, his breadth of training and vision, his ability to grasp the fundamentals of a problem and his practical insight into botanical and agronomic problems. Those who knew him in his later years only remember him chiefly for his brilliant leadership in the agronomic field.

But Professor Piper's older friends think of him as a naturalist, especially as a botanical explorer and pioneer. Aptly was he named Vancouver. What George Vancouver did for the geography of Puget Sound and the Pacific Northwest and more, Piper did for the botany.

Professor Piper's studies of the flora of the Pacific Northwest may be divided into three periods: (1) the years 1883 to 1892 when he resided at Seattle; (2) the years 1892 to 1903 during which he was Professor of Botany and Zoology at the State College of Washington at Pullman; and (3) the years 1903 to 1926 while he was connected with the United States Department of Agriculture at Washington, D. C.

Professor Piper graduated from the University of Washington in 1885 and later secured his master's degree from the same institution. His teacher in the biological sciences was Professor O. B. Johnson. Later he studied at Harvard University. Even in his student days he had become a collector of plants. Specimens are in herbaria gathered by him as early as June, 1883. He became a member of the Young Naturalists Club of Seattle. After his graduation he helped his father in his business but devoted much time to botanical exploration. In this

period his explorations reached many points in the Puget Sound Region and in the lofty mountains which surround it. In 1885 he was a member of the third party ever recorded as having climbed to the summit of Mount Rainier. The party consisted of eight men, was headed by Major E. S. Ingraham and included the naturalist, John Muir. The first reference to Professor Piper's work which I find in literature is in an article entitled "A Mountain Meadow" and was published in Garden and Forest in 1889. The article is a description of the wonderful natural flower gardens in Paradise Valley on Mount Rainier. In 1891 in the same journal there appeared over his signature an article entitled "Conifers on Mount Rainier." By this time he had already begun the correspondence and submission of specimens to eastern specialists which helped him so much in developing his knowledge of the taxonomy of the plants of the northwest.

Mount Rainier was always one of his favorite fields of exploration. He explored the mountain botanically in 1888, again in 1889, and again in 1895. In 1901, in the mountaineering magazine, Mazama, he published a critical list of the plants of this lofty snow peak.

In 1890 and again in 1895 he explored the Olympic Mountains, the range of snow-capped peaks which forms the west border of the Puget Sound region.

In 1892, Professor Piper was called to the position of Professor of Botany and Zoology at the State College of Washington. The institution was young; there were but few teachers and few students. He began an energetic survey of eastern and central Washington and northern Idaho, now accessible to him. He scoured the bunch grass plains and at every opportunity visited the nearby Thatuna Hills of northern Idaho and the Snake River valley to the southward. He gathered around him a group of students whom he interested in the flora of the region. He established connection with such local collectors as W. C. Cusick, R. M. Horner, W. N. Suksdorf, and Kirk Whited, who sent him many plants for determination. He built up at the State College a splendid herbarium representing the flora of the Pacific Northwest. He undertook a catalogue of the flora of the State of Washington. He spent the school year 1899–1900 at Harvard University. During this year he

completed most of the work on his catalogue which was published as volume 11 of the Contributions of the United States National Herbarium.

Soon after Professor Piper's return from Harvard in 1900 the preparation of the Flora of the Palouse Region was begun. This little volume was the forerunner of the later published Flora of Southeastern Washington and adjacent Idaho and the Flora of the Northwest Coast.

In 1896 Professor Piper explored the Blue Mountains in southeastern Washington and northeastern Oregon, penetrating to the Powder River and the Wallowa Mountains. In 1902 with two friends and a helper he made a five weeks pack horse trip over the Lolo trail into the Bitterroot Mountains of Idaho, following the path and studying the work of the Lewis and Clarke expedition.

With Professor Piper's removal to Washington, D. C., his interest in the flora of the Pacific Northwest did not waver. Rather, his field broadened. His forage crop problems frequently led him through the region. He botanized in Alaska while he studied its grasses and forage plants. During vacations he camped on Priest Lake in northern Idaho, where he found a most interesting flora. He penetrated the fascinating Siskiyou Mountains in southwestern Oregon. He established more than friendly relations with the students of the flora of Vancouver Island and British Columbia. He stimulated others to visit the regions he himself could not reach. All this continued almost to the day of his death. It made him for all time the dominant factor in the Systematic Botany of the Pacific Northwest.

In his taxonomic work, Professor Piper was sane, critical and a fearless student. He was conservative in his ideas but not to an extreme. He believed that species were human concepts and that names were conveniences. Rules of nomenclature were acceptable in so far as they were useful. He described and published over a hundred new species and varieties of plants but there was to him no sanctity in his own species. If new material or a new point of view or a suggestion from another botanist called in question one of his species no one could be more critical of it than he.

Professor Piper's personal herbarium and his collection of

taxonomic books, separates, and notes go to the State College of Washington to augment his collection already there and make it a splendid monument. Many of his types are in the National Herbarium. Duplicate sets of many of his collections are in the larger eastern herbaria. During the last few weeks of his life he arranged for the preparation of a list of additions and corrections to his Catalogue.

The genus Piperia of Rydberg (Bull. Torr. Bot. Club 28: 269. 1901) was named after him. A considerable number of species also bear his name.

Professor Piper was not primarily a laboratory and herbarium man. He was a field botanist. He knew and loved plants as they grew out of doors. A surprisingly large number of the plants cited in the Flora of the State of Washington were collected by himself and he had explored personally perhaps a hundred localities in all parts of the State in securing them.

This intimate knowledge of the living plant expressed itself in his writings and in his discussions of plants with his fellows.

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PROCEEDINGS

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A NEW BAT FROM DOMINICA.

BY H. HAROLD SHAMEL.[1]

In the collection of alcoholic specimens in the U. S. National Museum are 22 bats of the genus *Natalus* from the Island of Dominica, Lesser Antilles, collected in 1901. It has been assumed for some time that these specimens represented *N. stramineus* for the reason that up until the year 1921 there were no members of this genus from continental South America in the collection. Brazilian specimens now at hand, one adult and two young from Natal, show that the bat from Dominica is a different animal.

Natalus dominicensis, sp. nov.

Type.—Adult male (in alcohol), No. 113605 U. S. National Museum, collected on the Island of Dominica, May-July, 1921, by H. Selwyn Branch.

Characters.—A larger form than *Natalus stramineus* from Brazil, more resembling *N. mexicanus* in its larger ear and longer tibia, but exceeding this bat in length of tibia and forearm, as well as average length of ear.

Color.—All specimens examined are alcoholics collected in 1901. Comparing these with the three alcoholics of *N. stramineus*, collected in 1921 at Natal, Brazil, they seem darker, a deep reddish brown on the back and lighter on the underparts, while the three specimens of *N. stramineus* are a much paler brown with less red.

Skull.—The skull has a longer rostrum, narrower braincase, longer maxillary and mandibular toothrow, greater breadth at m^2, and greater condylobasal length. Comparing 4 skulls from Dominica with one from Natal, Brazil, the results are as follows: width of braincase 8.0–8.2 (8.6); maxillary toothrow, 7.2–7.5 (6.6); width at m^2, 5.6–6.0 (5.5); mandibular toothrow, 7.6–7.8 (7.0); condylobasal length, 15.4–16.0 (14.8).

Teeth.—The teeth, except for the greater length of the toothrows, seem to be not different from those of *N. mexicanus* and *N. stramineus*.

Measurements.—Type: Head and body, 48.0; tail, 53.0; tibia, 21.4;

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

foot, 9.0; forearm, 41.0; third metacarpal, 39.5; fifth metacarpal, 37.6; ear from meatus, 16.0; ear from crown, 12.8; width of ear, 12.2; thumb, 4.2; total length of skull, 16.5; condylobasal length, 16.0; interorbital breadth, 3.5; zygomatic breadth, 8.2; breadth of braincase, 8.0; occipital depth, 7.0; breadth at m^2, 5.6; breadth at canines, 3.8; maxillary toothrow (including incisor), 7.5; mandibular toothrow, 7.8; length of mandible, 12.8.

Specimens examined.—Twenty-two, including the type, all from the Island of Dominica.

Remarks.—With the exception of *Natalus major* this is the largest known form of this genus. In color and size it resembles more the northern race *N. mexicanus*, but the skull may be separated by its larger size and especially by its greater condylobasal length which is 15.4–16.0 in four specimens as against 14.2–15.2 in nine specimens of *N. mexicanus*. The skins may be separated by their longer forearm (39.5–41.5) in six specimens as against (36.6–39.2) in 5 specimens of *N. mexicanus*. The ear averages larger than in *N. mexicanus* and is actually much larger than *N. stramineus*, which is 13.4 from meatus.

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A NEW CRAB FROM COSTA RICA.

BY MARY J. RATHBUN.[1]

In a recent shipment to the National Museum by M. Valerio, of Crustacea from the Pacific Coast of Costa Rica, there is a crab of the genus *Cyrtoplax*, family Goneplacidae, which strongly resembles the hitherto unique genotype of the Atlantic coast. It has been named for the donor.

Cyrtoplax valeriana, sp. nov.

Type, male, Puntarenas, Costa Rica, Oct. 1, 1927, M. Valerio, collector; Cat. No. 61048, U. S. Nat. Mus.

The Pacific analogue of *C. spinidentata* (Benedict).[2] Carapace wider in proportion to length; fronto-orbital distance greater, due to length of eyes and orbits; lobes of front more arcuate; supra-orbital fissures and emarginations obsolete. Anterolateral margin with 4 teeth instead of 5, first or orbital tooth simple, directed forward, outwardly rounded; second tooth wider than first, third wider than second, fourth smallest; last three acute; sinuses diminishing in width from first to third or posterior. Surface more coarsely granulate than in *spinidentata*. Wrist longer than in the type species of the genus, outer distal angle a right angle; inner margin armed with a single strong spine parallel to distal margin. Palms longer than in the allied species, punctate and microscopically granulate. The first and third segments of the abdomen(♂) are narrower (from side to side) and the terminal segment somewhat longer than in *spinidentata*. Length of carapace 15.7, width of same 23.5, fronto-orbital distance 17.4, greatest width of front 6.2 mm.

[1]Published with the permission of the Acting Secretary of the Smithsonian Institution.
[2]Johns Hopkins Univ. Circ., No. 11, 1892, p. 77.

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PROCEEDINGS

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CONCERNING THE STRUCTURE, FUNCTION, AND ORIGIN OF THE CORNICLES OF THE FAMILY APHIDIDAE.

BY F. C. HOTTES.[1]

Introduction.

The Homopterous family Aphididae has long been looked upon as furnishing abundant favorable material for investigation. The peculiar method of reproduction of the family seems to have received extensive and careful consideration by the early investigators. It was while pursuing this line of research, no doubt, that attention was directed to the form and function of the cornicles, structures which so fundamentally separate aphids from all other insects. It is not surprising that sensory, respiratory and excretory functions should have been attributed to such conspicuous and unique structures as the cornicles by the early workers. Morphological studies on the internal structure of the cornicles had to wait until suitable histological technique was developed. Since such technique has been perfected, few students have applied it to the study of the cornicles. Therefore, our knowledge of their internal structure is extremely limited, and as a consequence of this, the significance of the internal structure of the cornicles has never been fully appreciated. Emphasis has been placed upon their external form alone, ignoring the fact that it is the internal functional portion of the cornicle that is the more fundamental.

This study has been attempted with the view in mind of explaining what the cornicles are, what they do, and from what

[1]I consider myself extremely fortunate to have been able to carry on this work under the guidance and direction of Dr. O. W. Oestlund, and I take this opportunity of acknowledging his valued assistance, encouragement, and kindly criticism.

structures they may be traced phylogenetically. This has been done in order to arrive at a better understanding of their value as characters useful in the classification of the family Aphididae, the application of which is left to the future.

Part I. Structure.

Cornicles may best be described as a pair of tube-like structures which are situated on the dorso lateral surfaces of the sixth abdominal segment of most species of Aphididae. Because the external form of the cornicles is given to considerable variation, they have long been recognized as useful taxonomic characters.

In general, it may be said that the external portions of the cornicles present five distinct types. The procornicular type (fig. 1), the tuberculate (fig. 2), the truncate (figs. 3, 4), the cylindrical (figs. 5–9), and the pore-like (figs. 10, 11). The procornicular type of cornicle, as represented by the cornicles of the genus Monellia is a very primitive type, heretofore not recognized as such. Cornicles of this type differ but slightly from lateral tubercles, which are rudimentary structures, and usually functionless. In the tuberculate type of cornicle, the cornicle proper is situated upon a tuberculate or volcano-shaped area of the body. Cornicles of this type are characteristic of the tribe Lachnini. The truncate type of cornicle is well exemplified by the cornicles of species belonging to the tribes Chaitophorini and Callipterini. In these tribes, the cornicles are rather truncate or trunk-like in shape, and as a rule are no longer than they are wide at the base. Cornicles of species belonging to the tribe Chaitophorini are often more or less irregularly reticulated, the reticulations in this case being of the same nature as the reticulations found on the body. Cornicles of species belonging to the tribe Callipterini are characteristically never reticulated, although in some species they may be modified by being somewhat swollen at the base. Cylindrical cornicles are usually much longer than wide. Tuberculate and truncate cornicles show but comparatively few modifications, but cornicles of the cylindrical type are given to exceedingly great external variation. In general, cornicles of this type are long, more or less movable tube-like structures in contrast to the short fixed cornicles of the Lachnini, Chaitophorini, and Callipterini.

Cornicles, regardless of type, always have at or near their apical end an opening which is usually in the form of a semi-circular slit. This opening is of primary importance, because it is actively concerned with the internal function of the cornicles. The slit is so constructed that it may be opened and closed by a valve which is moved by a muscle attached near the median, free portion of the valve. The valve muscle has its insertion in the ventral portion of the body wall. The valve is usually attached for a short distance around the rim of the cornicle by a flexible hinge.

Cornicles of the long cylindrical type are at least somewhat movable. This presupposes some sort of a moving mechanism. Flögel mentions and figures such (fig. 13). I have not been able to locate the muscles found by Flögel either in cross or frontal sections, and suggest that the

valve muscle may perform a double function, since the cornicles are but slightly movable.

The literature of the structure of the cornicles is scarce and on the whole not very satisfactory. Few workers have based their observations on sectioned material. They seem to have depended largely upon gross dissection and upon the clearing and mounting of specimens in toto, processes not lending themselves to accurate interpretation. No comparative study of the internal structure of the cornicles seems to have been made. My study of the embryology of the cornicles, while fragmentary and not intended as a comprehensive treatment, adds a little to our knowledge of their development, and is apparently the first based upon sectioned material.

The external portion of the cornicles is derived from the ectoderm. That the comparatively little known internal portion is derived from the same germ layer as the external portion of the cornicle, has been taken for granted, for all authors except Witlaczil so consider it. Witlaczil believed the internal portion of the cornicles to be derived from the mesoderm, and the evidence furnished by my sections so indicates. The structures described by Sulc as being present in *Pseudococcus farinosus* DeGeer are certainly suggestive of the internal structure of the cornicles of certain species of aphids. Sulc looked upon the cells which he found as being degenerated fat tissue which functioned in the defense of the organism. Without considering the function of these structures, but judging them solely by their structure, it would appear that Sulc was justified in declaring them homologous to the cornicles of the family Aphididae.

The structure of the cornicles of the genus Lachnus will be described first. Mordwilko, having sectioned *Tuberolachnus viminalis* Boyer (considered at that time to belong to the genus *Lachnus*) appears to have been the first worker to make a histological study of cornicles of this type. I have not had material of this species to section, but my interpretation of the structure of the cornicles of two typical species of the genus *Lachnus* differs somewhat from Mordwilko's interpretation.

Structure of the cornicles in the embryo of Lachnus coloradensis Gillette (Figs. 14–16). Before there is any indication of a tubercle in the locality where the cornicles will shortly manifest themselves there appears beneath this area a rather finely granulated nucleus in a mass of greatly vacuolated tissue, usually more or less intimately associated with fat cells. Such nuclei are usually larger than any nuclei found within the body cavity. The cytoplasm of the glandular mass, although greatly vacuolated, presents a very homogenous appearance. These vacuoles are apparently empty spaces which were once filled with secretory substance.

Structure of the cornicle in the adult of Lachnus coloradensis Gillette (figs. 17–19). The chitin covering the tubercle appears to be considerably thicker than the chitin covering the outer portions of the body. The cornicle itself is short. A narrow, flat brim extending slightly downward is found at the apex. The valve is not set flush with the outer margin of the cornicle but is somewhat sunken or depressed. The chitin

to which the valve is fastened extends downward for a short distance within the cornicle and then bends back upon itself, thus forming a rather flexible hinge. The valve fits up against an inwardly projecting portion of the rim of the cornicle, enabling the opening to be completely closed. Within the tubercle is found a large, nucleated glandular mass consisting, apparently, of two kinds of cells, which for convenience will be distinguished by the letters A and B. The cytoplasm of the A type of cell, which takes a dark stain, is coarsely vacuolated, the vacuoles varying considerably in size. Large granular nuclei are scattered at random throughout the cytoplasm. There are no cell boundaries. Cells of this type are usually found close to the valve. The B type of cell is much more delicate in structure. They may surround three sides, or may lie directly beneath the glandular mass made up of the A type of cell. Cells of this type are greatly vacuolated, the vacuoles being small and uniform in size. There are no cell membranes apparently, separating cells of the B type, but the limits of the individual cells may in some cases be distinguished. The B type of cell fills the greater portion of the cornicular cavity. I regard the cavity or cavities often seen at the extreme inner portion of the tubercle as artifact. It is this cavity which I think Mordwilko interpreted as the wax sac. The wax sac of Mordwilko could be derived by a shrinking or disintegrating of the cells in the interior, leaving only a membrane-like residue toward the outside containing nuclei.

Mordwilko mentions the fact that the cells on the inner side of the valve are larger than those forming the hypodermis proper, and concludes that they are glandular in function. I agree with him that they are larger than the ordinary cells of the hypodermis, but not perhaps to the extent that Mordwilko's figure of them would lead one to expect (fig. 20). I do not agree with him that these cells are glandular in function for they certainly exhibit none of the characteristics of active glandular cells. They appear to be slightly modified hypodermal cells, since they differ only in the matter of size. At the margin, away from the attachment of the valve, the valve muscle attaches itself. At this point, there is an almost imperceptible transition from the hypodermal cells to the cells of the muscle proper. The valve muscle runs backward and downward to attach itself near the median line on the ventral side of the abdomen. From sections it is impossible to tell precisely the segment to which it attaches itself, but it would appear to be the segment posterior to the cornicles, and according to Mordwilko it is.

The cornicles of Longistigma caryae (Harris). The cornicles of this species are very similar to the cornicles described for the genus *Lachnus*. The glandular portion is apparently considerably larger than that found in the genus *Lachnus*, while the cells of the A type are not as numerous.

The cornicles of Eulachnus agilis (Koch). The oviparous females of this species were sectioned. Externally, the cornicles of this species are greatly reduced; internally, they depart widely from the cornicles of the genus *Lachnus*.

The Cornicles of Monellia caryella (Fitch). Internally, the cornicles of *Monellia caryella* differ in many respects from the cornicles of

other genera. By virtue of the active, functioning cells, which are intimately united in a glandular mass resembling a small sac closely associated with the valve, these cornicles appear most closely related structurally to the cornicles of the genus *Lachnus*.

Structure of the cornicle in the embryo (fig. 21). The information pertaining to the structure of the cornicles in the embryo is based upon rather meager material representing somewhat mature embryos of approximately the same age. There is apparently no thickening of the hypodermis in the vicinity of the two hollow, ball-like structures found in the posterior lateral portions of the abdomen. These structures in section resemble hollow rings, and are the first indication of the developing cornicles. In the embryos studied they were already well developed. Nuclei are to be found within the band, while the area within is clear and apparently empty, indicating that at this stage it was already filled with secretory substance. There appears to be no internal membrane, and because the internal surface is rather uneven, it is very doubtful if such a membrane is present. No sections show the opening of the cornicles or the muscle operating the valve. This, however, is not surprising, for even in the adult the external portion of the cornicle is difficult to find.

The structure of the cornicle in the adult (fig. 22). The internal portion of the cornicle consists of a sac-like, glandular tissue in which the cytoplasm is differentiated into three regions; there is an open, sac-like region next to the mouth of the cornicle, which in life may have been filled with secretory substance. This region is surrounded by a deeply staining mass of vacuolated cytoplasm containing nuclei. This, in turn, is surrounded by a layer of cytoplasm which takes the stain to a much less degree than the former. Since no cell membranes may be distinguished, and in as much as there are no nuclei present, except in the darker staining inner portion, the various regions will have to be interpreted as differentiated areas of the cells making up the inner portion of the cornicle. The nuclei are large and stain deeply. Near the mouth of the cornicle a muscle attaches itself to a rather sloping valve. The valve muscle runs downward as well as backward, presumably to find its insertion in the ventral body wall.

The structure of the cornicles in Symydobius americanus Baker.

Structure of the cornicle in the embryo (figs. 23, 24). No embryos show the cornicles in their early stages of development. A small embryo shows a hollow structure of glandular tissue not unlike that mentioned for the genus *Monellia* in the embryonic stage. Near the outer margin of the glandular mass it lies close to the slightly thickened hypodermis. Several embryos show one or two smaller glandular masses near the larger ones, but these are apparently of the same nature. Another embryo which seems to be almost mature, shows the glandular mass in contact with the hypodermis, which at this point is greatly thinned. The nuclei in this thinned area are absent.

The structure of the cornicles in the adult (fig. 25). The valve, which opens towards the anterior end of the body, is situated about one half of the way down the cornicle, and is set at a rather sharp angle.

There is a slight thickening on the opposite wall of the cornicle so that when the valve fits up against it, the opening is tightly closed. The valve muscle attaches to the free end of the valve and runs downward and backward to attach itself to the ventral body wall. The glandular sac is large, and is usually oval or oblong in shape. Along the wider and longer portions of the sac the walls consist of a single layer of vacuoles surrounded by a homogeneous, deeply staining cytoplasm in which the nuclei are situated. At the ends of the sac there may be several rows of vacuoles present. Large, deeply staining nuclei are found in the walls of the sac. One or two individuals show smaller, glandular, sphere-like sacs similar to those mentioned as being present in the embryo. The large sac does not join directly with the opening made by the valve, although it may extend up into the cavity of the cornicle and thus approach it. The fact that some specimens show smaller sacs in addition to the larger one may indicate that the cornicles of this species are in what may be called a transition stage between the cornicles of the myzocallis type and the cornicles of the genus *Aphis*.

The cornicles of the genus Neothomasia. The oviparous females of *Neothomasia populicola* (Thomas), and the viviparous females of *Neothomasia abditus* Hottes were sectioned. In general, the cornicles of this genus differ but slightly from the structure of the cornicles of *Symydobius americanus*.

The cornicles of *Callipterinella betulaecolens* (Fitch) and *Myzocallis bellus* (Walsh) are similar structurally to the cornicles of *Symydobius americanus* except that they do not show small, sphere-like sacs in addition to the larger one. (Figs. 26, 27.) The cornicles of *Calaphis betulella* (Walsh) occasionally show small spheres.

It is suggested that the valve of the genus *Symydobius*, in the process of being drawn in, drew in also that portion of the cornicle which ordinarily enters into the formation of the rim.

The structure of the cornicles of Anoecia oenotherae Wilson. Only poor sections of *Anoecia oenotherae* were obtained. Provisionally, it would seem that the cornicles of this species conform more closely to the cornicles of the genus *Neothomasia* than they do to the cornicles of the genus *Lachnus*. This fact suggests that the genus *Anoecia* may not be as closely related to the Lachnini as has been thought.

The structure of the cornicles of Drepanaphis acerifolii (Thomas). The cornicles of this species differ from those heretofore described in this paper. They seem to represent the phylogenetic goal towards which the internal structure of the cornicles has been directed.

The structure in the embryo. In this genus, it is the internal structure again, which first makes its appearance. The first indication of the cornicles was found in rather mature embryos. At this stage a number of hollow spheres, consisting largely of vacuoles surrounded by cytoplasm, may be seen near the posterior lateral margins of the abdomen. Each sphere consists, apparently, of but one cell; there is but one nucleus present.

No embryos show any indication of the external portion of the cornicle.

The structure of the cornicle in the adult. Within the body

cavity in the vicinity of the cornicles and within them, numerous hollow and partially hollow spheres may be seen, each containing a single nucleus. If the spheres are hollow, the outer surface is only one vacuole thick. If not they appear to be partially filled with vacuoles separated from each other by a net work of cytoplasm. These spheres are tightly compacted within the cornicles, but within the body cavity they present a somewhat looser arrangement. In general, they bear a striking resemblance to the loose, small spheres present in the genus *Symydobius*. The solid spheres show a somewhat distant resemblance to fat cells, from which they may be separated quite easily by their nuclei. Their cytoplasm is more uniformly vacuolated than the cytoplasm of the fat cells and takes a darker stain.

The cornicles of the genus Melanoxantherium (fig. 28). Two species belonging to this genus were sectioned, *Melanoxantherium salicis* (Linnaeus) and *Melanoxantherium smithiae* (Monell). Internally, both in adult and embryo, the cornicles of this genus are suggestive of the cornicles of the genus *Drepanaphis*.

The cornicles of the group Macrosiphini (fig. 29). Species belonging to the following genera were sectioned: *Acyrthosiphon*, *Microsiphum*, *Macrosiphoniella*, *Catamergus*, and *Tritogenaphis*. The species of this group present but minor differences as far as the internal structure of the cornicles is concerned, from the cornicles of the genus *Drepanaphis*. The number of spheres varies greatly. Sometimes they are so numerous that they extend across the posterior end of the body joining those in the vicinity of the cornicle on the other side. At other times they are very limited in number.

The cornicles of the tribe Aphidini (fig. 30). Species of several genera belonging to the tribe Aphidini were sectioned. The cells at the base of and within the cornicles of *Thargelia albipes* (Oestlund) differ enough from the cells thus far described to warrant a description. The cells found here are somewhat suggestive of oenocytes from which they may be easily separated by their small size, evenly vacuolated cytoplasm, and the manner in which they stain.

The structure of the cornicles of Schizoneura lanigera (Hausmann). My interpretation of the structure of the cornicles of this species differs from the interpretation of Baker and Davidson, and is more in line with what one would naturally expect knowing the structure of the cornicles in other species belonging to the family. Because of this discrepancy, further sections will be made before publishing.

General Consideration of Internal Structure.

On the basis of internal structure, two types of cornicles may be considered. In the primitive type, the glandular mass has a direct connection with the outside, as is the case in the cornicles of *Monellia* and *Lachnus*. The more modern type of cornicle has an indirect connection between the glandular mass and the cornicular opening, and is well illustrated by cornicles of the Macrosiphini and Aphidini. Cornicles having an indirect connection are of two kinds: those having mononuclear sacs or spheres,

as for example the cornicles of Macrosiphini and Aphidini; and those having a polynuclear sac, as for example the cornicles of the genus *Symydobius*. The mononuclear spheres are apparently derived by a breaking up of the polynuclear sac, and are therefore homologous to it.

Part II. The Function of the Cornicles.

Reaumur, who appears to have been the earliest worker to make an extensive study of the family Aphididae assigned to the cornicles for the first time a function, although a function had been implied by Von Frisch in his designation of them under the name of Fühlspitzeln. Reaumur regarded the heavy, dark colored liquid which came from the tips of the cornicles as analogous to the feces of other animals, and the liquid from the anus as analogous to urine.

Bonnet, a follower and reported student of Reaumur, first considered the cornicles to function in the production of honey dew; later, however, he considered the cornicles to function as urinary organs. Bonnet looked upon the pulverulent matter often seen on the bodies of aphids as being of the same nature as the material given off by the cornicles. He took it to be a kind of perspiration having a great similarity to urine, which he thought found its way to the surface of the body by means of numerous small pores.

Linné followed the first view held by Bonnet, and believed that the cornicles functioned in the secretion of honey dew.

Rev. Kyber thought that aphids would soon bury themselves by their own feces, if the function of the cornicles was excretory, and therefore assigned to them two functions. First, that they were breathing pores, a theory held by several subsequent workers. His second theory seems to have figured but little in literature. Briefly, he thought it not unlikely that the cornicles functioned as levers by means of which the aphids could more easily raise the hinder part of the abdomen when the cornicles were inclined towards the head.

Charles Morren declared the cornicles to be prolonged stomata. He believed the cornicles to have a second function; that of secreting the honey dew which he regarded as being the first food of the young, since he repeatedly saw young aphids suck the secretions fron the tips of the cornicles.

Kaltenbach considered the cornicles to be respiratory in function. He looked upon them as organs necessary for the rapid oxidation of food matter, a condition brought about by the rapid vital functions carried on by the individuals of this family.

Buckton, after reviewing all previous theories as to the function of the cornicles regarded them as excretory ducts, from which oily globules were passed from time to time, thus removing material which would cause the death of the individual if allowed to accumulate. Buckton, however, perpetuates the idea that ants gather honey dew from the cornicles, for in one of his plates he shows an ant in the act of receiving a drop of honey dew from the tip of one of the cornicles of *Aphis sambuci* L.

Witlaczil in his first paper written in 1881 designated the cells found in

the cornicles and in the vicinity of their base by the name of sugar cells (Zuckerzellen). These cells, he thought, were given off through the medium of the cornicles, and as evidence of this he cited the empty spaces found at the base of the cornicles of adult aphids. Witlaczil, however, recognized that the honey dew came from the anus. In his second paper published in 1882 Witlaczil retained the view brought out in his first paper, but in his third paper published in 1884 he regarded the cells found at the base of the cornicles as having a urinary function.

Büsgen was the next worker to offer a function for the cornicles. His theory has been widely accepted by entomologists, and is the one offered by most present day workers who venture an opinion. Büsgen considered the cornicles to be wax producing glands which function as organs of defense against predacious enemies.

To recapitulate, the theories brought forward in regard to the function of the cornicles may be broadly classified as excretory, respiratory and protective.

The theories held for the function of the cornicles by Kyber, Linné, Morren and others have long since become a matter of history. The protective theory even as long ago as 1908 was rather severely questioned by Gillette, who at that time doubted if a secretion which did not often free itself from the cornicles could be very effective in defending aphids from the attacks of predaceous and parasitic insects. Several others, while doubting the effectiveness of the cornicles as organs of defence, have failed to publish their opinions, or have referred to them merely as excretory ducts.

When the cornicles are considered critically from their internal structure, form and performance, it becomes evident that they are not well adapted to perform effectively the function of protection. The cornicles at their best are but slightly movable, thus making the possibility of their being aimed in all directions practically nil. While the amount of secretory substance appears to be ample in all species, it is seldom that more than a single drop may be coaxed to the tip of the cornicle. The droplet coagulates immediately, retaining the shape of a small sphere, and has no tendency whatever to spread. Thus, should it ever leave the tip of the cornicle, there would be great need of effective placing in order to glue up the mouth parts of the enemy. It has been said that aphids would expel droplets from the cornicles when confronted by their enemies. It has been my experience, however, that aphids are not easily frightened, and that they remain unconcerned even while being walked over by those who are in the habit of feeding upon them. Droplets may, however, be brought to the surface of the cornicles by pressure applied to the body of the aphid. In nature, this pressure naturally is produced by the aphid's enemy at the moment of grasping the aphid between its mandibles. The droplets must, therefore, be looked upon as a result of pressure, and not as a result of the desire of the aphid to defend itself. The large glandular masses present at the base of the cornicles of the Lachnini indicate that the function of the cornicles is of a physiological nature.

From the location of the internal portion of the cornicles, which is

bathed on all sides by the body fluids, it is suggested that the cornicles may function in connection with some of the metabolic processes carried on by the individual. If this is true, the product is of an excretory nature, given off in the form of a gas at the mouth of the cornicle. Morphologically, the structure of the cornicles is of such a nature that volatile matter could be given off, if it were present, and if it were necessary for it to be removed. The valve is ideally constructed for such a purpose. The internal portion of the cornicle is close enough to the mouth of the cornicle so that volatile matter would not be greatly hampered in making its escape. It is known that the material within the cornicles coagulates or hardens immediately upon coming in contact with the air, and it may be deducted from this, that there is constituent within it which is highly volatile.

If the function of the cornicles is excrétory as has been suggested, the source of the volatile matter will have to be accounted for, and the reason for its not being taken care of by ordinary means explained. Structure, when taken alone, indicates the degree of functional development which an organism or organ has attained. Differences in structure may therefore be taken as indicative of the variability and complexity of function. The variation in the internal structure of the cornicles may therefore be taken as an indication that the factors entering into their function are variable. This is what one might expect, knowing something of the biological habits of the family.

Aphids have, perhaps, established a closer, more continuous, and a more intimate relationship with their hosts than any other ectoparasitic insects. This relationship has had its effect upon their mode of reproduction, their early maturity, and their reproductive capacity—all of which are highly characteristic of the family.

Büsgen's data showing the amount of honey dew produced per aphid in twenty-four hours would lead one to believe that the taking in of food has become an almost continuous process. Indeed, they appear at all times to have their beaks inserted in the tissue of the host, and to withdraw them only upon being disturbed. Early maturity and the development of a large number of young are processes which require a vast amount of food, so that the continuous feeding habit is not at all surprising. However, this food must be properly balanced. The large amount of waste material given off in the form of honey dew by the aphids indicates that the sap upon which they feed is limited in some element which is probably protein, which can be obtained in necessary amounts only by taking into the digestive system an excessive amount of sap which is composed largely of carbohydrates. The sap of plants is known to be a very complex substance. Certain of these sap products must be incapable of being assimilated, and made use of even though they enter into the blood stream of the aphid. These products must be removed by the glandular internal structure of the cornicles or by some other means. It is well known that the constituents making up the sap content of various plants differ. Since the amount of food consumed by aphids is comparatively large, and since there is some evidence showing that aphids have evolved along with their hosts, it is not at all surprising that related groups should have responded in a similar

manner to a similar stimulus; a stimulus not faced to such a marked degree by other insects whose food is not so limited as to kind, and where the consumption of it is not a continuous process. The loss of the cornicles must be accounted for by a change in the factors making them necessary. Their absence can be correlated with certain morphological and biological characteristics such as the presence of wax pores, the absence of cauda, low reproductive rate, and a slower rate of development which as a consequence decreases the number of generations per year. The biological factors indicate that the groups without cornicles have failed to maintain what may be called a degree of plasticity between the organism on the one hand and its host relations on the other. The slowing up of the biological processes may be interpreted as a direct result of this. Therefore, any change in the structure of the cornicles must be a result of the nature of the food consumed by the individual because this alone can affect the functional portion of the cornicle.

Part III. The origin of the cornicles.

In attempting to account for the origin of the cornicles, one may proceed in either of two directions. He may choose to look upon the cornicles as organs *de novo*. If he does so, he is immediately confronted not so much by the question how they arose, but how many times, for species with and without cornicles are found in all of the major groups of the family. Or he may proceed to derive the cornicles from and through modifications of preexisting structures. Since the cornicles are found well developed, even in the more generalized forms, and are apparently lacking only in those forms which have greatly modified their biological processes, it may be concluded that the cornicles arose only once.

Since the cornicles are such unique structures in the class Insecta, it is not surprising that structures with which they may be readily homologized are lacking. Examining the order Homoptera of which the family Aphididae is a member, one is immediately impressed by the well developed dermal glandular system, a system which certain aphids have retained, and a system which certain others show evidence of having once had.

The period of time during which the cornicles were undergoing their development may be divided into two epochs. A precornicular epoch and a cornicular epoch. A generalized dermal glandular system may have taken care of the function which is now performed by the cornicles in the progenitors of the family Aphididae. Such glands were undoubtedly arranged in six longitudinal rows, four dorsal and two marginal. This is quite evident from the arrangement of the wax glands and a somewhat similar arrangement of the tubercles and of the glandular and sensory hairs when they are present. During this time there was no differentiation either in structure or function between the glands on the dorsum and the glands on the lateral margins of the body. We may consider the first stage in the development of the cornicles to have been reached when a differentiation in structure and function took place between the glands on the dorsum and the glands on the lateral margins. We have examples of this in

Forda and Anoecia and a few other genera where the lateral glands no longer function in the same manner as those found on the dorsum. In the second stage of the development of the cornicles, which brings to completion the precornicular epoch, the lateral glands became lateral tubercles.

From sections, I am convinced that lateral tubercles and lateral glands are the same functionally. In fact, they do not differ fundamentally in structure, except that the former have become tubercles. In certain forms, the lateral tubercles are filled with large glandular cells which appear to be nothing other than greatly modified cells of the hypodermis. The cell cytoplasm is not greatly vacuolated. The nuclei are large and finely granulated. Apparently there are no pores in the chitin covering the tubercles in the vicinity of the gland cells. Pores leading to the outside may exist, but a careful search fails to reveal them. Two kinds of lateral tubercles may be distinguished in the family. One in which the lateral tubercles are filled by active, functioning cells and the other where the tubercles are filled with mesodermal tissue. Lateral tubercles where the cells have been lost appear to be the rule in the Calliperini and Calaphidini. In many species belonging to these tribes, the lateral tubercles are almost as well developed as the cornicles. A few species belonging to the tribes just mentioned bear on the sides of the lateral tubercles, window-like areas now covered over by chitin (fig. 12). Such areas are very suggestive of the terminal openings of the cornicles, and become very significant when considered as homologous structures of the terminal openings, now covered over. These structures are not found at the tips of the tubercles, but are to be looked for on the posterior side. This location may have been the original position of the cornicular opening; if so, it has been retained by but few species belonging to the family (fig. 7).

Just previous to the cornicular epoch we may suppose that certain lateral tubercles became more efficient than others. The centralization of function which seems to have been ever present and ever active, continued until finally one pair of tubercles which may now be called procornicles was performing the function once performed by several pair. The tubercles on certain segments seem to have been more persistent than others. With the exception of the tubercles found on the seventh abdominal segment, those tubercles which are furtherest away from the disturbing influence of the cornicles, such as those on the prothorax, and those on the first, second and third abdominal segments are the most common. This indicates that the cornicles did not become dominant all at once. The external portion of the cornicles at this time had not yet begun to change its form. Such a condition is met with in the genus *Monellia* and a few other genera in which the external portion of the cornicles is so feebly developed that they could easily be taken for lateral tubercles were it not for the presence of terminal openings.

The intimate relationship which exists between the internal functional portion of the cornicle, and the external portion, particularly the valve, presupposes that the two portions underwent their evolution during similar epochs. If this is so, one would not expect to find a high type of internal structure, such as is found in the group Macrosiphini, present in

cornicles belonging to the procornicular type; neither would one expect to find cornicles which belong internally to the type found in the genus *Lachnus*, present in cornicles which belong externally to the cylindrical type. The present status of our knowledge of the internal structure of the cornicles bears this out.

Our knowledge of the internal structure of the cornicles is at present too limited to draw a complete picture of their phyolgenetic development without relying rather strongly upon the evidence furnished by their external form. For example, a wide gap exists between the glandular mass type of cornicle and the polynuclear sac type, when the two are considered on the basis of their internal structure. When the two are considered on the basis of their external form, this gap no longer exists, for the truncate type of cornicle may be derived from the tuberculate type by a narrowing down of the tubercle. There is evidence to show that the mononuclear spheres were derived by a breaking up of the polynuclear sac. Externally cylindrical cornicles, which are internally characterized by mononuclear spheres, may be derived from truncate cornicles, which internally are characterized by a polynuclear sac, by a process which tends both to thin and lengthen the truncate cornicle.

EXPLANATION OF PLATES.

Fig. 1. Procornicular type of cornicle.
" 2. Tuberculate type of cornicle.
" 3. Truncate type of cornicle.
" 4. Truncate type of cornicle.
" 5. Cylindrical type of cornicle.
" 6. Cylindrical type of cornicle.
" 7. Cylindrical type of cornicle.
" 8. Cylindrical type of cornicle.
" 9. Cylindrical type of cornicle.
" 10. Pore-like type of cornicle.
" 11. Pore-like type of cornicle.
" 12. Lateral tubercle showing "window."
" 13. Figure taken from Flögel showing muscles for the movement of the cornicles. rö. die horizontal liegende Röhre, ar. arrector tubuli, mr. musculus valvulae, do. Dorsoventralmuskel, pi. Pigmentflecke, st. Stigma.
" 14. Longitudinal section of cornicle through embryo of Lachnus coloradensis Gillette.
" 15. Cross section through embryonic cornicle of Lachnus coloradensis Gillette.
" 16. Section through embryonic cornicle of Lachnus coloradensis Gillette.
" 17. Longitudinal section through the cornicle of Lachnus coloradensis Gillette. (Composite.)
" 18. Longitudinal section through the cornicle of Lachnus coloradensis Gillette. (Composite.)

Fig. 19. Cross section through the cornicle of Lachnus coloradensis Gillette.

" 20. Figure taken from Mordwilko, showing a section through the cornicle of Tuberolachnus viminalis Boyer. sh. Safthocker, hd. Deckel des Safthockers, dz. Region der höhen Drusenzellen, wh. Membran welche die flussig wachartige Masse weinschlieszt, br. m. grobkornige rothbraune Masse, r. m. dorsoventraler Respirationsmuskel, mt. r. Hypodermis.

" 21. Longitudinal section through the embryonic cornicle of Monellia caryella (Fitch).

" 22. Longitudinal section through the cornicle of Monellia caryella (Fitch). (Composite.)

" 23. Longitudinal section through embryonic cornicle of Symydobius americanus Baker.

" 24. Longitudinal section through embryonic cornicle of Symydobius americanus Baker.

" 25. Longitudinal section through the cornicle of Symydobius americanus Baker. (Composite.)

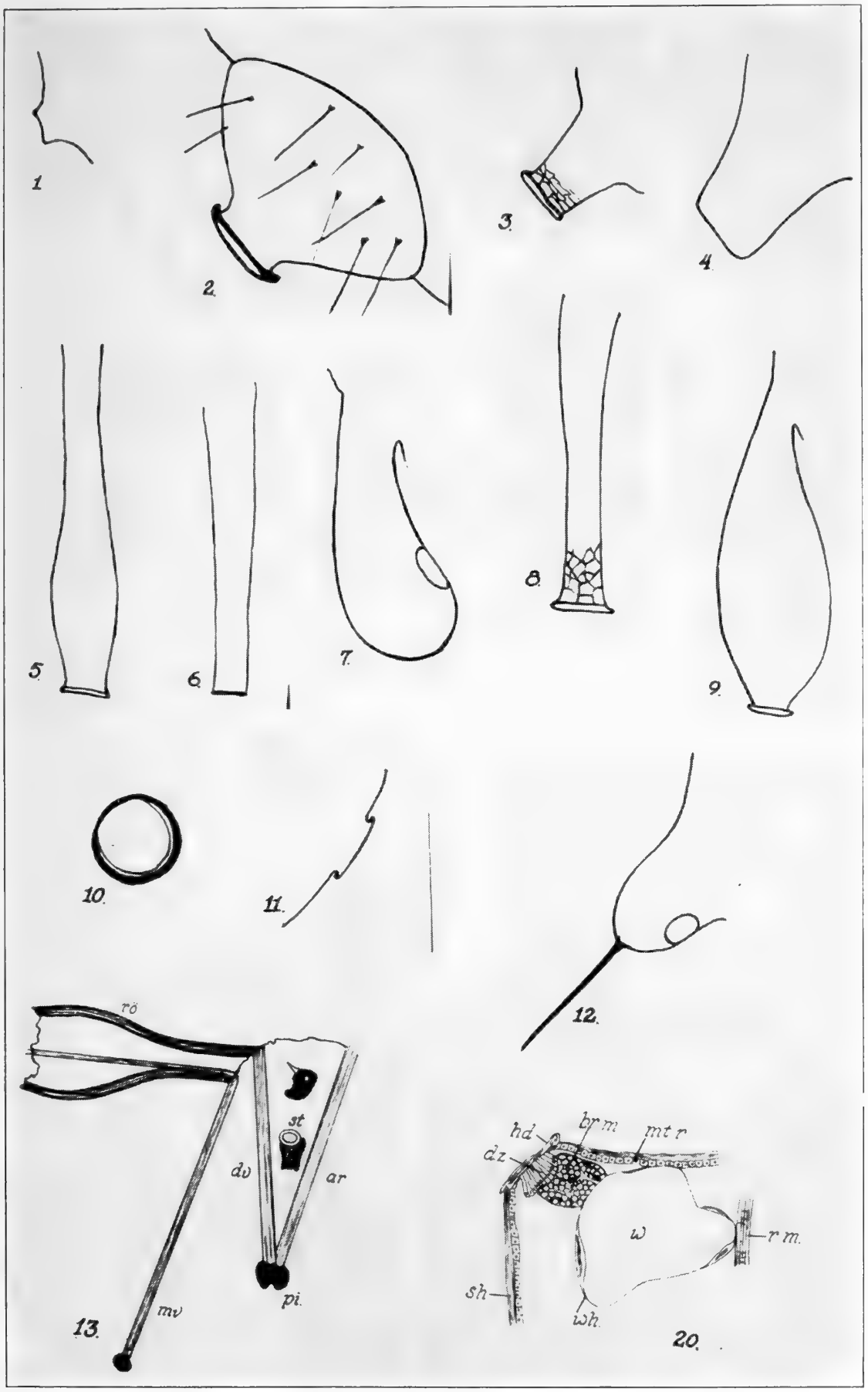
" 26. Section through the embryonic sac of Myzocallis bellus (Walsh), the section to the right through the top of the sac, the section to the left just under the section to the right.

" 27. Longitudinal section through the cornicle of Myzocallis bellus (Walsh). (Composite.)

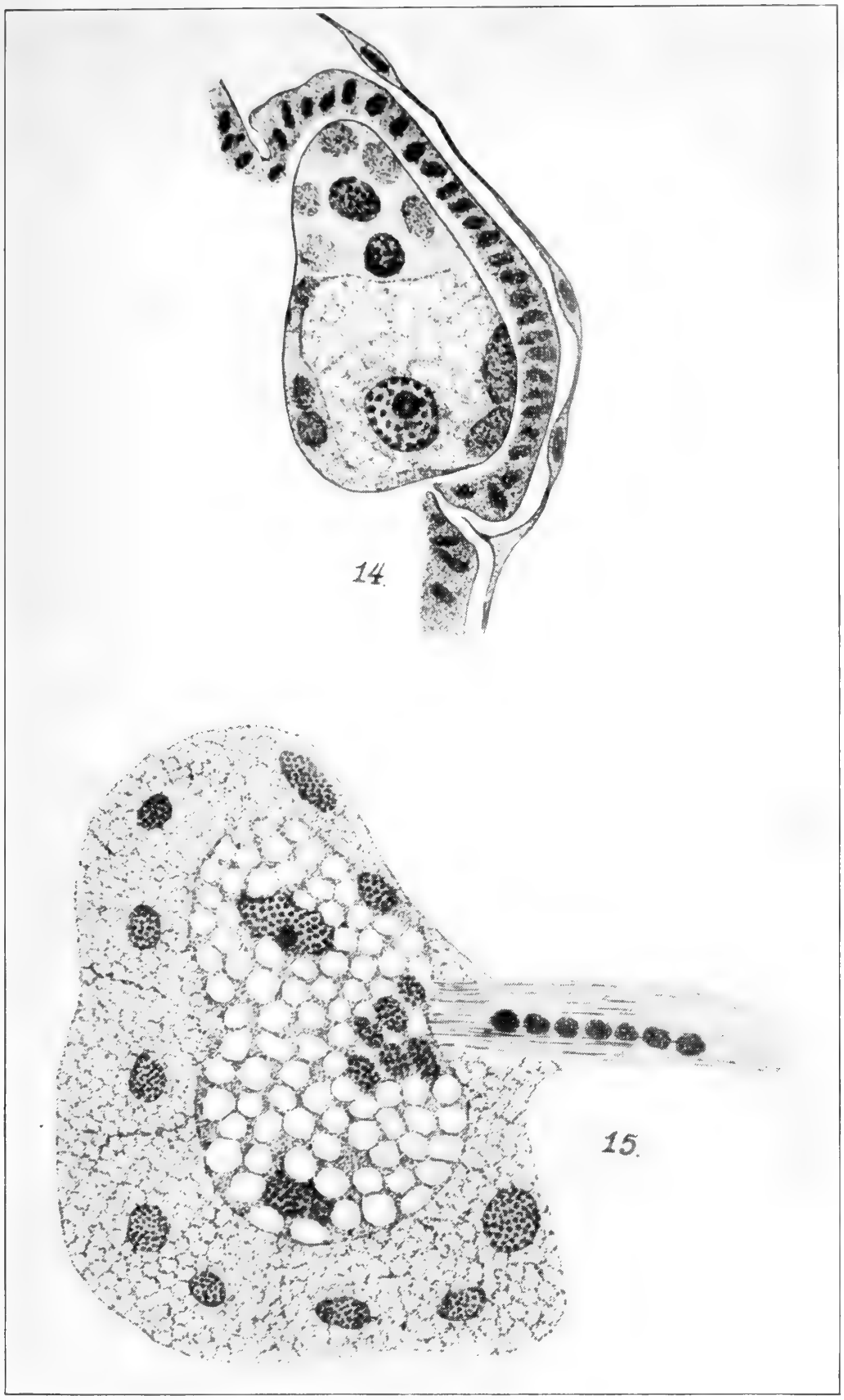
" 28. Section through the cornicle of Melanoxanterium salicis (Linnaeus).

" 29. Section through the cornicle of Microsiphum artemisiae (Gillette). (Composite.)

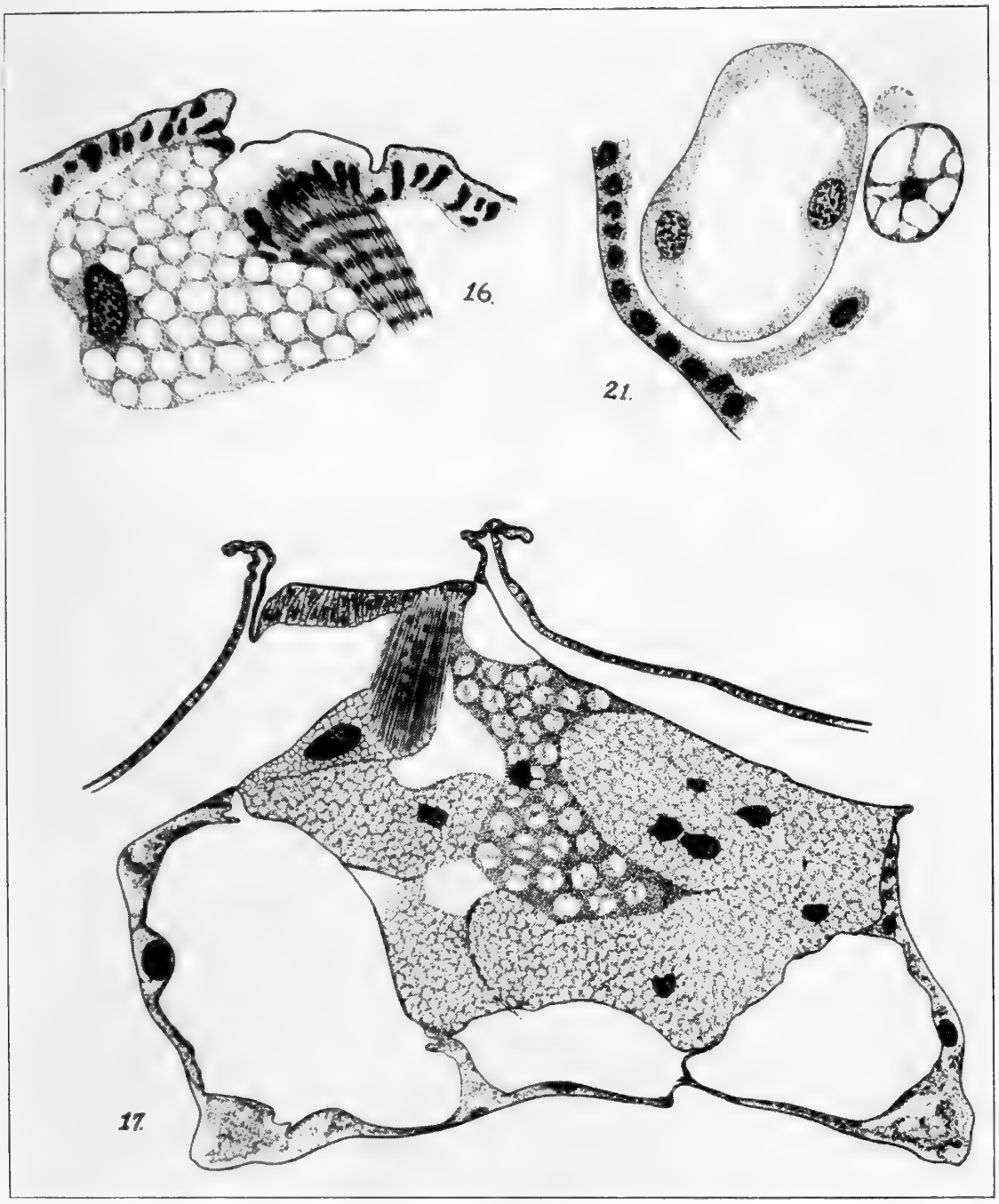
" 30. Section through the cornicle of Thargelia albipes Oestlund. (Composite.)



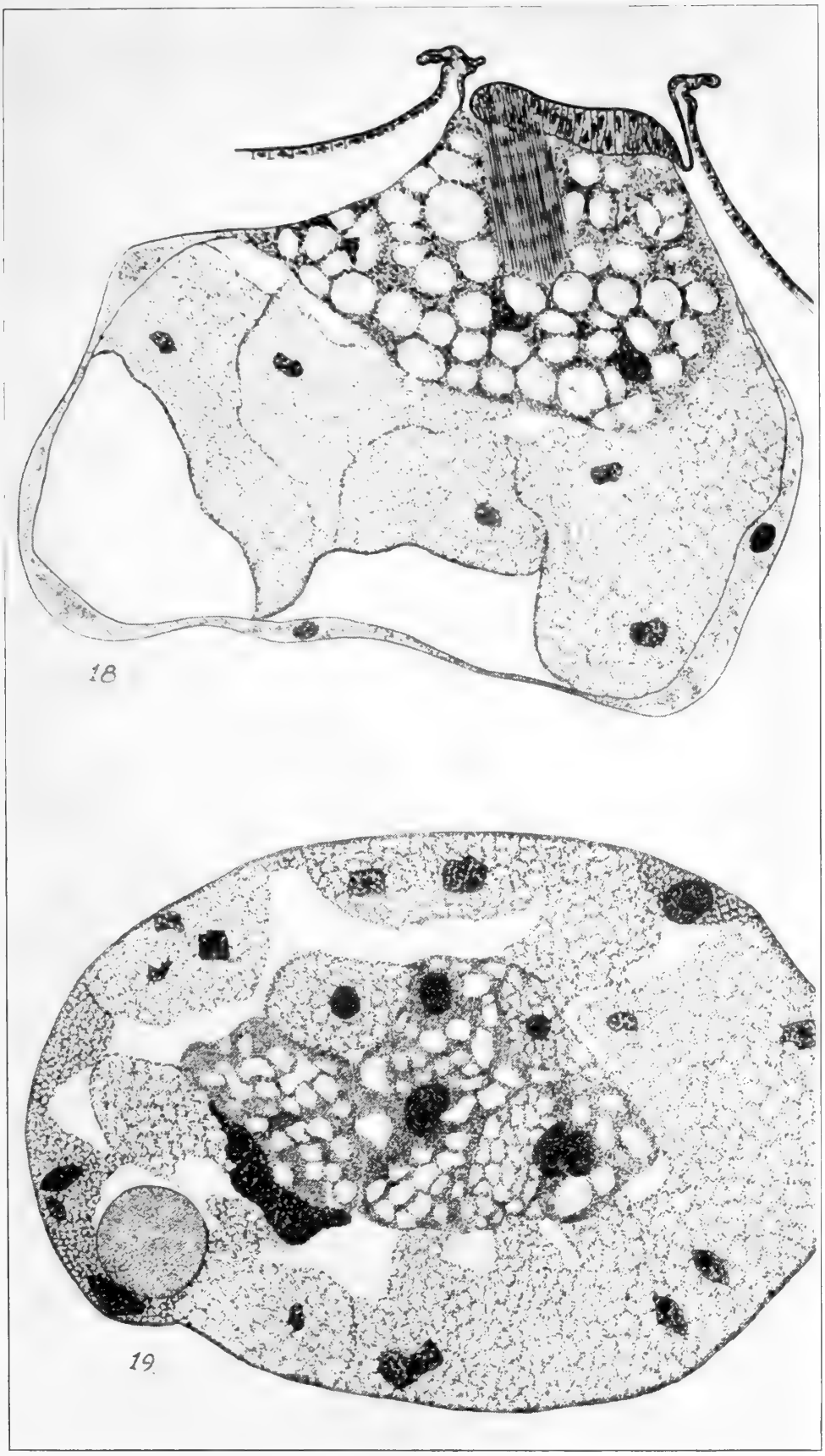
FIGS. 1–13, 20.—Cornicles of Aphididae.



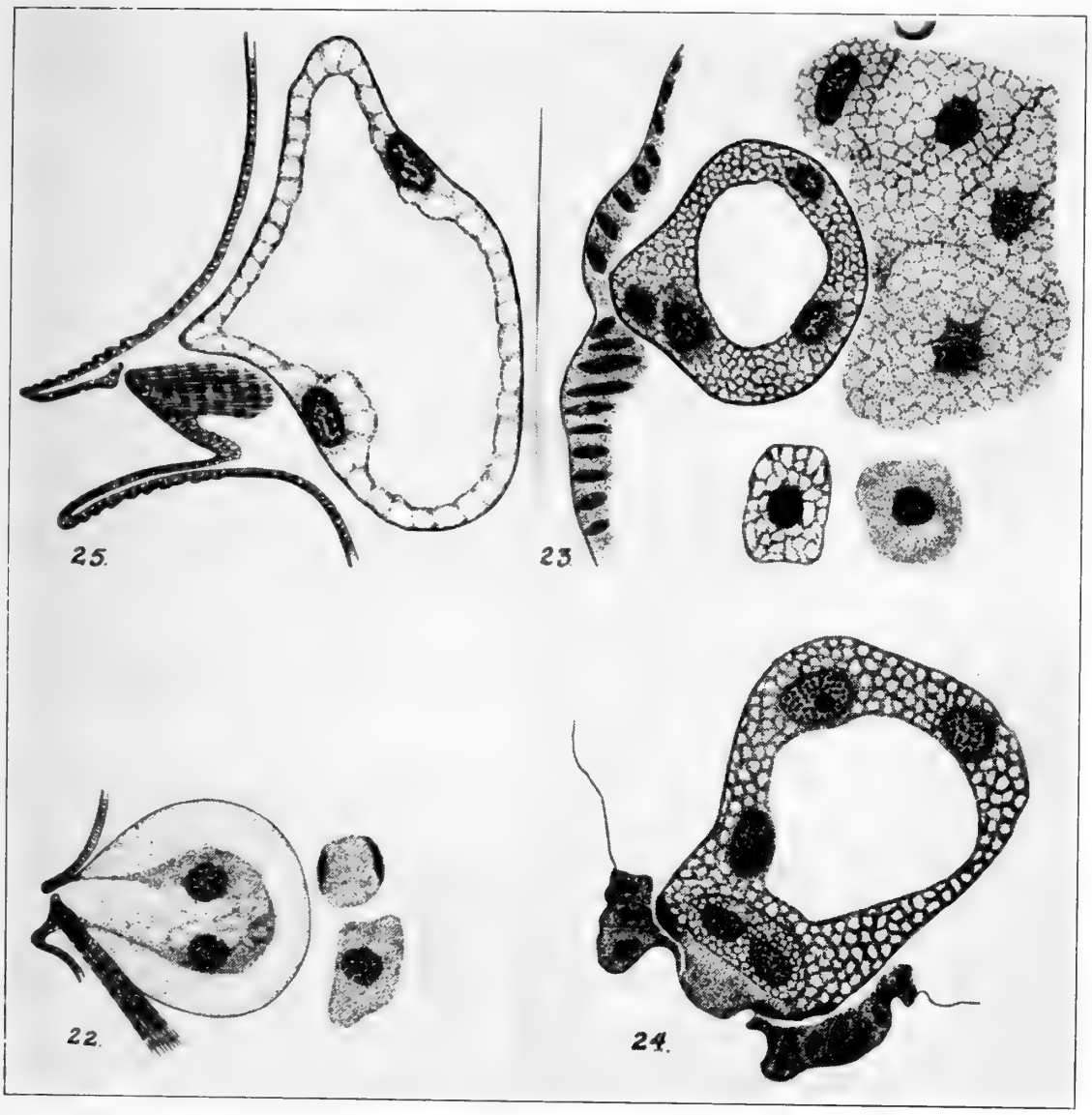
Figs. 14, 15.—Section through cornicle of *Lachnus*.



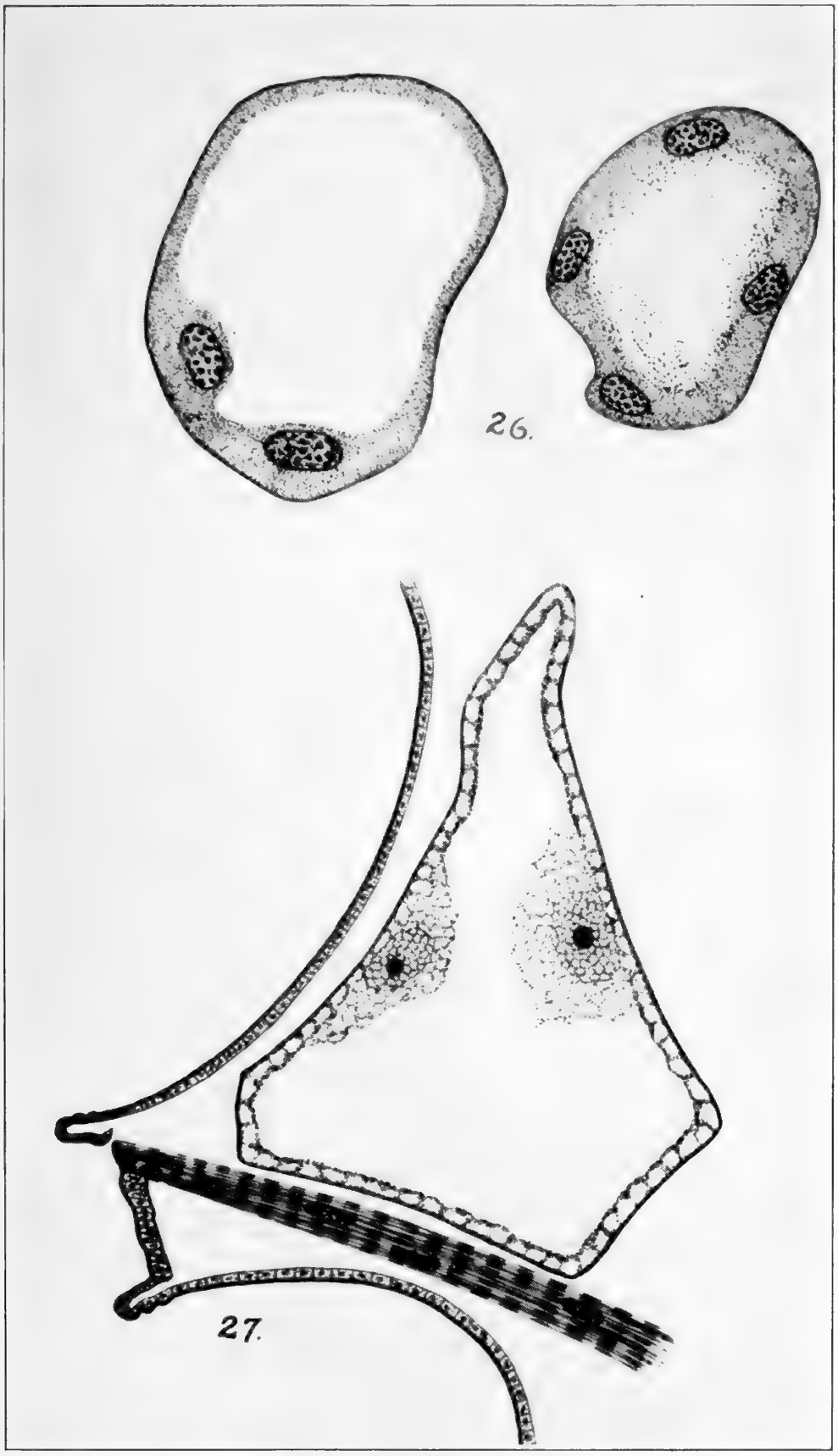
Figs. 16, 17, 21.—Sections through cornicles of *Lachnus* and *Monellia*.



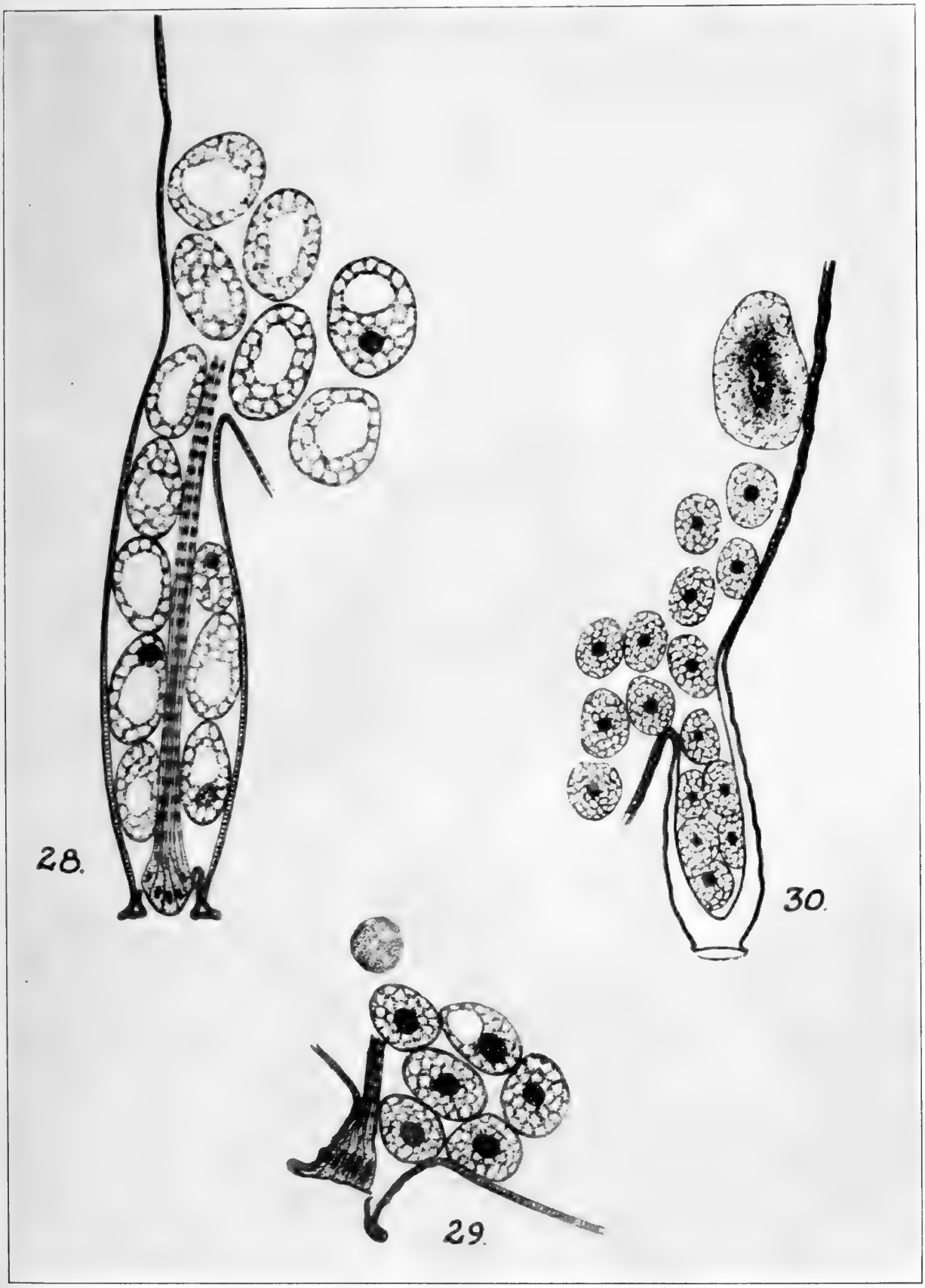
Figs. 18, 19.—Sections through cornicles of *Lachnus*.



Figs. 22–25.—Sections through cornicles of *Monellia* and *Symydobius*.



Figs. 26, 27.—Sections through cornicles, etc., of *Myzocallis*.



Figs. 28–30.—Sections through cornicles (*Aphididae*).

Vol. 41, pp. 85–86 March 16, 1928

PROCEEDINGS

OF THE

BIOLOGICAL SOCIETY OF WASHINGTON

A NEW BAT OF THE GENUS CŒLOPS.

BY GERRIT S. MILLER, JR.

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A bat of the genus *Cœlops* collected several years ago by Mr. Arthur de C. Sowerby in southeastern China was at first supposed to be a specimen of *C. robinsoni* Bonhote hitherto known from the Malay Peninsula and, perhaps, from the Philippine Islands;[1] but on more careful examination I find that it represents a distinct species, which may be known as:

Cœlops inflata, sp. nov.

Type specimen.—Adult male (in alcohol), No. 238991, U. S. National Museum, collected near Yen-ping-fu, at altitude of 2000 feet, Fukien, China, April 7, 1922, by Arthur de C. Sowerby. Original number, 1277.

Diagnosis.—Like *Cœlops robinsoni* Bonhote in general size, but tibia and foot larger and braincase conspicuously inflated.

External characters.—Externally there appears to be nothing to distinguish the animal from *Cœlops robinsoni.* Some details of the structure of the nose leaf appear to be peculiar, particularly a greater length of the plates which extend forward beyond the upper lip; but these may be merely the result of differences in the condition of the material, both of the specimens of *C. robinsoni* having been dried.

Skull.—The skull differs from that of *Cœlops robinsoni* in its much larger braincase; also, apparently, in more extreme narrowing of the interorbital region, and less sharp definition of the supranarial swellings on the rostrum. In the skull of the type and in the specimen of *C. robinsoni* from Port Swettenham, both of them adult males, the condylobasal length, zygomatic breadth and rostral breadth across supranarial swellings, are, respectively,

[1] In one of the last letters which I received from him Knud Andersen expressed the opinion that, in describing the genus *Chilophylla* from Mindoro (Proc. U. S. Nat. Mus., vol. 38, p. 395, August 19, 1910), I had renamed *Cœlops*, and that so far as could then be determined there were no characters to separate the species "*Chilophylla hirsuta*" from Bonhote's *Cœlops robinsoni.* With these conclusions I do not hesitate to concur; *Chilophylla* is certainly a synonym of *Cœlops;* the specific status of "*C. hirsuta*" must remain uncertain pending the capture of more specimens.

the same for the two skulls. The dimensions of the braincase—length from deepest part of interorbital constriction, greatest breadth, and depth including auditory bullae—are: in *C. robinsoni*, 8.2, 6.4, 5.8, and, *C. inflata*, 9.2, 7.6, 6.4. The obviously greater projection of the braincase beyond the level of the zygomata is at once seen in anterior or superior view of the skull; its greater posterior projection is indicated by the total length: 14.3 in *C. robinsoni*, 15.1 in *C. inflata*.

Teeth.—The teeth are slightly larger than those of *Cœlops robinsoni*, a feature more noticeable in the lower mandibular series. In form they show a few peculiarities which may prove to be of more than individual significance, namely: the lingual border of m^1 and m^2 is broader in proportion to the outer border than in *C. robinsoni*, and the hypocone is better developed; the cingulum is more conspicuous on the outer borders of the lower molars; the posterior lower premolar is larger and its length is greater in porportion to its height.

Measurements.—Head and body, 34 (29);[1] tibia, 15.0 (13.6); foot, 8.0 (6.2); forearm, 35.6 (34.2); thumb, 8.8 (8.2); third metacarpal, 27 (26); fourth metacarpal, 28 (27); fifth metacarpal, 29 (29); ear from meatus, 14 (14); greatest length of skull, 15.1 (14.3); condylobasal length, 13.0 (13.0); zygomatic breadth, 6.6 (6.6); rostral breadth, 3.6 (3.6); interorbital constriction, 1.6 (2.0); length of braincase, 9.2 (8.2); breadth of braincase, 7.6 (6.4); depth of braincase including auditory bullae, 6.4 (5.8); mandible, 8.8 (8.2); maxillary toothrow, 5.0 (4.8); mandibular toothrow, 5.6 (5.0).

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[1] Measurements in parenthesis are those of an adult male *Cœlops robinsoni* from Port Swettenham, F. M. S. (No. 175000, U. S. National Museum).

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PROCEEDINGS

OF THE

BIOLOGICAL SOCIETY OF WASHINGTON

AN EARLIER NAME FOR THE GENUS EVOTOMYS

BY T. S. PALMER.

For some years I have suspected that the name *Evotomys*, proposed by Dr. Elliott Coues in 1874 (Proc. Acad. Nat. Sci., Phila., 1874, 186–187), would prove to be antedated by some earlier name. It seemed almost incomprehensible that such a well-marked group as the Red-backed Mice of Europe, Asia and North America should have remained so long unnamed by the various active workers in vertebrate zoology in Europe during the last century. This suspicion now proves to have been correct, as the group was actually named in Germany many years ago.

Through the kindness of Dr. Chas. W. Richmond my attention has recently been called to a rare volume in the Smithsonian Deposit, Library of Congress, entitled 'Isis. Encyclopädische Zeitschrift vorzuglich für Naturgeschichte, Physiologie, etc.' This series of Isis, of which six numbers appeared in 1850, forms a small octavo, edited by G. Tilesius,[1] and published by the "Münchner Verein für Naturkunde." It is distinct from, and subsequent to, the better known one in quarto which ceased publication in 1848. In the second number of Isis, 1850, pp. 27–29, Tilesius published an article on 'Glirium species in Bavaria nonnullae,' in which he formally described two new genera of rodents, *Clethrionomys* (p. 28) based on *Mus glareolus* Schreber and *M. rutilus* Pallas, and *Clonomys* (p. 28) based on *Mus betulinus* Pallas. As Tilesius mentioned no type for *Clethrionomys*, *Mus rutilus* Pallas, from Siberia, the earliest known species, is here designated as the type. The name thus antedates *Evotomys* Coues by 24 years. *Clonomys* does not affect names now recognized, as it is a synonym of *Sicista* Gray, 1827, and *Sminthus* Nathusius, 1839.

[1] In No. 6, pp. 81 and 96, occurs the statement, "Dr. Johannes Gistel, *genannt G. Tilesius.*"

Vol 41, pp. 89–92 June 29, 1928

PROCEEDINGS
OF THE
BIOLOGICAL SOCIETY OF WASHINGTON

A NEW SPECIES OF HYLA FROM LOUISIANA.

BY PERCY VIOSCA, JR.

The species described herein had been called tentatively *Hyla phaeocrypta* Cope[1] pending its comparison by the writer with Cope's type of *phaeocrypta*, as well as with other North American *Hyla* types in the National Museum. I have had an opportunity recently to make such a study in the National Museum and found the Louisiana form to be a species distinct from any North American *Hyla* heretofore described. Further, I found the type of *Hyla versicolor phaeocrypta* Cope, U. S. N. M. No. 12074, to be a fairly typical specimen of *Hyla versicolor*, poorly preserved as to texture and color, but well within the range of individual variations normally exhibited by that species. The typical cruciform pattern of *versicolor*, though faint, is readily discernable, and the structural characters pointed out by Cope[2] place it unquestionably with that species.

Hyla avivoca, sp. nov.

Diagnosis.—Superficially resembling *Hyla versicolor* but of smaller size, adult males averaging about 33 mm., 30 to 37 mm. in specimens examined, females larger. Color in life, ashy gray to greenish above, generally intermediate, with darker spots and blotches, mimicking damp lichens. The darker markings on the back are irregular and asymmetrical, sometimes tending to, but never forming a distinct and symmetrical cruciform pattern. The greater portion of the dark color usually lies behind the middle of the back, but otherwise the design is extremely variable, often being broken into disconnected spots or blotches. The concealed surfaces of the thighs and sides are greenish, the green on the

[1]Notes on the Status of Hyla phaeocrypta Cope, Copeia, Sept., 1923, No. 122, pp. 96–99.

[2]Cope, The Batrachia of North America, Bulletin 34, U. S. N. M.

posterior surface of the femur being irregularly vermiculated with darker, sometimes tending to a reticulated pattern. The species can also be distinguished from *versicolor* by its less squat and more slender form, and by its truncate muzzle and more protuberant eyes. The dorsal integument is almost smooth, the tubercles being fine and granular. The voice is bird-like, being a plaintive whistle repeated in quick succession, much as in the red-bellied woodpecker. This call is sometimes preceded by a few notes of a slower call much like the voice of *Hyla crucifer*.

Distribution.—It is known from many specimens taken in the Florida Parishes of Louisiana, where it is found in the tupelo swamps in the valleys of the rivers and smaller streams of that region, where it is usually found on young tupelo gum and cypress trees, and on buttonbush. While this region is the extreme southwestern corner of the east gulf coastal plain, this *Hyla* has never been taken or heard in the swamps of the Mississippi Valley in Louisiana or in the coastal plain west of that valley. Fifteen specimens, Field Museum No. 2201, from Olive Branch, Ill., although averaging smaller in size, seem to be the new species, indicating a probable wide distribution.

Type.—U. S. N. M. No. 75017, an adult male collected in the outskirts of Mandeville, Louisiana, on June 12, 1926, by Percy Viosca, Jr.

Description of the type.—Head very short, broader than long, with eyes relatively very large and protuberant. Muzzle truncate in outline. Canthus rostralis rounded. Tympanum slightly less than half the diameter of the eye. Tongue nearly orbicular, slightly notched behind. Vomerine fascicles projecting slightly behind the line connecting the interior nares. Body moderately slender, length of head in total, three and a half times. Limbs moderate, length of leg to heel reaching forward to the eye. Discs on fingers and toes broad. Web large, leaving the last two joints of the fourth toe free, extending however as a margin to the tip of the toe. Dorsal integument very finely granular, ventral integument with a distinct granular pavement.

Dimensions of the type.—Total length, 32 mm. Length of head, including tympana, 9 mm. Width of head at posterior edges of tympana, 12 mm. Length of anterior limb from axilla, 17 mm. Length of posterior limb from groin, 47 mm. Length of tibia, 14 mm. Length of tarsus, 9 mm. Length of rest of foot, 13 mm.

Coloration of the type.—Fixed and preserved in formaldehyde 1 part, alcohol 3 parts, and water 9 parts shortly after capture, the lighter green pigments disappeared within a few days, giving the specimen a brownish cast with dark bluish gray markings on the back and dark brown markings on the limbs. Above each eye is an irregular elongated blotch of dark extending obliquely backward and meeting its fellow between the eyes. A small asymmetrical, substellate blotch on the anterior portion of the back is connected to an asymmetrical inverted V-shaped patch on the posterior portion of the back, the inverted V being of greater area than the stellate area. An indistinct dusky patch extends from the eye through the nostril to the tip of the snout. The edge of the upper jaw is mottled with the ground color. A conspicuous light spot margined with dark lies

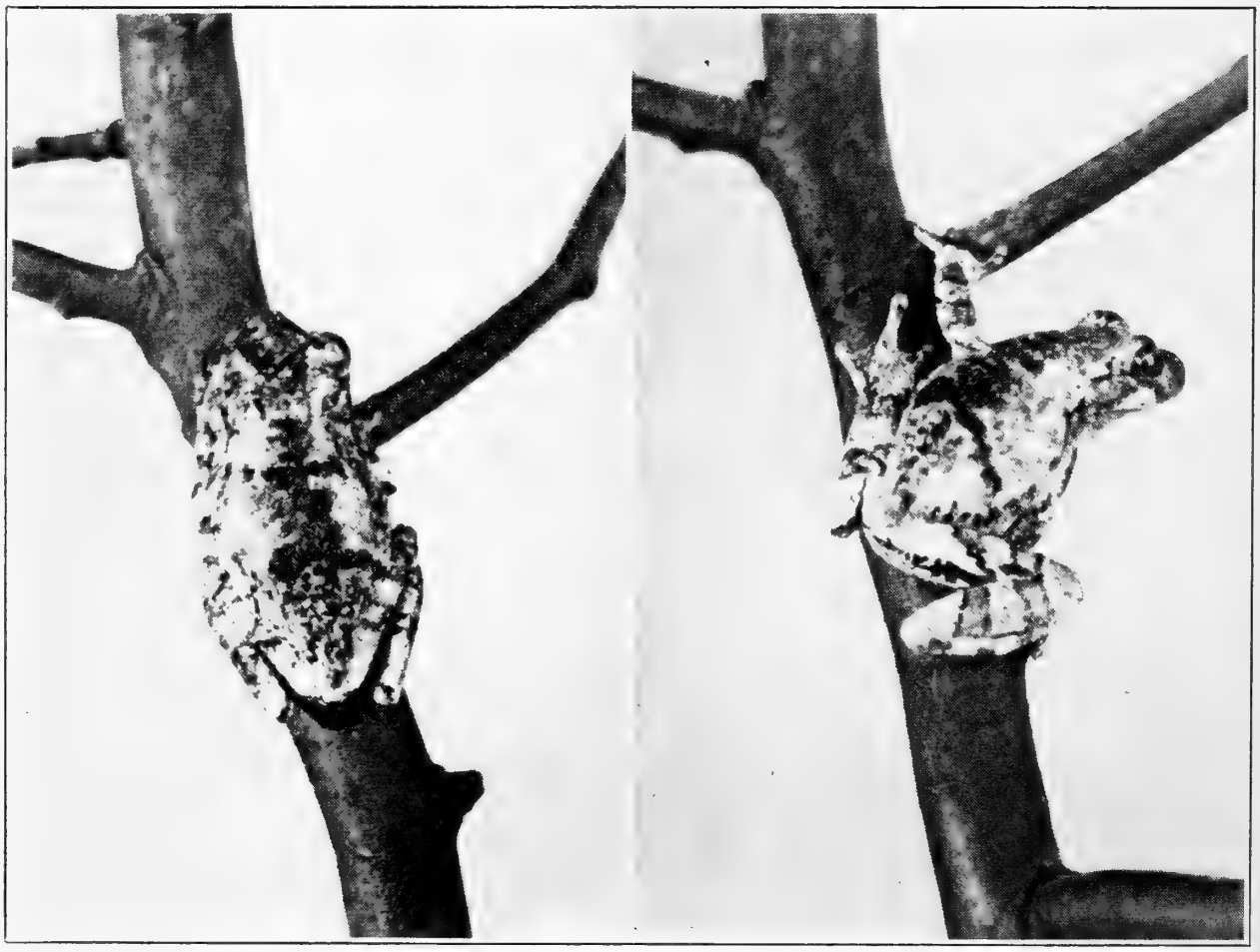

Fig. 1. Fig. 2.

Figs. 1, 2.—*Hyla avivoca.*

Fig. 3.

Fig. 5.

Fig. 4.

Figs. 3–5.—*Hyla avivoca.*

beneath the eye on the posterior portion of the upper jaw. A wavy mottled band passes backward from the eye just above the tympanum, continuing behind the arm pit as a broken peppered band. The forearm, thigh, leg and tarsus each has two transverse brown bands, margined with darker. Concealed surfaces vermiculated with brown on a light ground which was greenish in life. The underside is dull white, the throat peppered with dark.

Relationships.—Hyla avivoca is more clearly related to *Hyla versicolor* than to any other North American *Hyla*. In both structure and habits it stands somewhat as an off-shoot of that species. Its cruciform pattern seems to have lost the symmetry tended to in *versicolor*, and the markings in general are always more ill-defined. Its habitat is far more restricted than that of *versicolor*, but it is encroached upon more by this nearest relative than by any of the other *Hylas* whose range it overlaps. It seems more distantly related to *Hyla femoralis*, which is of about the same body proportions, but the markings on *femoralis* are better defined, however, and it can be easily distinguished from *avivoca* by its less protuberant eyes and more angular head proportions. In color *femoralis* inclines to the browns, whereas *avivoca* inclines to grays. *Avivoca's* habitat in the stream valleys alternates with that of *femoralis* in the intervening pine areas. Its next nearest relative perhaps is *Hyla crucifer*. This last named species, although breeding earlier in the year, overlaps the habitat of *avivoca* in the smaller stream valleys. The pitch and tone of the voice of *avivoca* is nearer to that of *crucifer* than to any other eastern American *Hyla* although its rate is far more rapid than that of *crucifer*.

EXPLANATION OF PLATES.

Fig. 1. Hyla avivoca, male, Mandeville, La., July, 1921. Photo by Percy Viosca, Jr.

Fig. 2. Hyla avivoca, male, Mandeville, La., July, 1921. Photo by Percy Viosca, Jr.

Fig. 3. Diagram showing dorsal aspect of Hyla avivoca, male, Covington, La., March 9, 1923. Drawing by Doris M. Cochran.

Fig. 4. Diagram showing lateral aspect of head of Hyla avivoca. Drawing by Doris M. Cochran.

Fig. 5. Diagram showing underside of left foot of Hyla avivoca. Drawing by Doris M. Cochran.

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PROCEEDINGS

OF THE

BIOLOGICAL SOCIETY OF WASHINGTON

NOTES ON MELIERAX WITH DESCRIPTION OF A NEW FORM.

BY HERBERT FRIEDMANN.

The African hawks of the genus *Melierax* have been variously treated by different authors. Swann (Monogr. Bds. of Prey, pt. 3, 1925, pp. 165–171) considers *metabates*, *neumanni*, *poliopterus*, and *mechowi* as races of *musicus*. Hartert (Vög. der Palaärkt. Fauna, 2, pp. 1164–1165) does substantially the same, using the specific name *canorus*, since abandoned in favor of *musicus*, while Sclater (Syst. Av. Ethiop., 1924, pp. 71–72) considers *musicus*, *metabates*, and *poliopterus* as separate species. On the other hand, van Someren (Novit. Zool., xxix, 1922, p. 39) considers *poliopterus* specifically distinct from *musicus*, but places *metabates* as a race of the latter because, "* * * apparently *M. poliopterus* and *M. metabates* are found in the same countries." Swann (*cit. supra*) doubts the occurrence of both together, but there can no longer be any question that they do occur in the same places.

Recently in working over the specimens of *Melierax* collected by the late Col. Edgar A. Mearns I found that he had taken both *poliopterus* and *metabates* in the same or adjacent localities. It therefore seems that these two are specifically distinct, but it is more natural to consider the latter specifically distinct from *musicus* as well, and the former a race of *musicus*, rather than vice versa as van Someren has done. Both *musicus* and *poliopterus* have pure white upper tail coverts, whereas *metabates* has these feathers barred. Of course, it might be argued that the secondaries are a better taxonomic character than the upper tail coverts, in which case van Someren's treatment would be the more proper, as both *musicus* and *metabates* have these feathers finely vermiculated, while in *poliopterus* they are uniformly gray. However, while it is true that the wing coverts and secondaries of *metabates* are usually vermiculated or freckled with white or grayish-white, there are several cases on record where these feathers are

uniform in coloration. This variation appears to be entirely an individual matter; it is certainly not correlated with age, season, sex, wear, or locality. About ten per cent of the birds have practically no vermiculations, but the lightness and abundance of the markings in the rest is by no means uniform. Every gradation occurs from no vermiculations at all to such abundance of markings that the folded wings seem markedly lighter than the back. Likewise Swann (*cit. supra*) writes that *poliopterus* sometimes shows the freckling on the wings. The upper tail coverts seem to be a more constant character and the birds should be arranged accordingly. The large species of *Melierax*[1] would then stand as follows:

A. Upper tail coverts barred.....*metabates* and races.
AA. Upper tail coverts white, unbarred.....*musicus* and races.

Melierax musicus has two races, the typical, southern form, and the eastern, tropical *poliopterus*, which is smaller in size.

Melierax metabates has three described races:—the typical northeast African form, the race *neumanni* (Blue Nile and White Nile to Lake Chad and the Nigerian border of the French Sudan) characterized by its smaller size, the freckling on the wings concentrated more or less into bars, tail coverts less barred; and the form *mechowi* (Angola to Rhodesia and the Belgian Congo) characterized by its generally darker color. However, there seems to be still another race, hitherto unrecognized, in southwestern Arabia. It is rather surprising that Swann (Ibis 1923, pp. 607–610) overlooked this form as all the specimens I have seen were originally in his collection. In fact, it was these very specimens, collected by Col. R. Meinertzhagen, that led him to make a re-examination of the genus. According to Swann, "* * * the Arabian skins comprised a good series of *M. metabates*, differing only slightly from African birds of that form * * *." I have examined a series of twenty-seven specimens of *metabates* and cannot agree that the Arabian birds are only slightly different from African ones. The size difference is very pronounced. In fact, Swann seems to have had a feeling, later apparently forgotten or changed, that the Arabian birds are different, as on the back of one of the labels he wrote "new subspecies Type." This form has never been named. For it I propose the name

Melierax metabates ignoscens, subsp. nov.

Type.—Museum of Comparative Zoology No. 92650, adult male, collected at Shekh Othman, Aden Protectorate, Yemen Province, Arabia, 19 January, 1922, by Col. R. Meinertzhagen.

Subspecific Characters.—Similar to typical *metabates* but smaller, wings (males) 278–290 as against 304–316 in African birds; (females) 304–305 as against 315–336 in African examples.

Measurements of type.—Wing 285; tail 208; culmen from cere 18.5 mm.

Range.—The Aden Protectorate, Yemen Province, Arabia.

[1] *M. gabar* may be left out of consideration in this paper as its much smaller size renders it very distinct from all the others.

Material Examined.—

Melierax metabates ignoscens—4 males, 3 females, Aden, Arabia.

Melierax metabates neumanni—1 male, Abyssinia.

Melierax metabates metabates—10 adult males, 2 adult females, 2 immature males, Abyssinia; 1 male, Eritrea; 1 male, 1 female, Tanganyika Territory; 2 females, Sudan; 1 female, Kenya Colony.

Remarks.—The ranges of typical *metabates* and also of *poliopterus* are more extensive than usually thought. *M. metabates metabates* is recorded by both Swann and Sclater as ranging south to Abyssinia. However, specimens are known from Uganda (van Someren), Kenya Colony and Tanganyika Territory (specimens in Museum of Comparative Zoology, A. Loveridge, coll.). *M. musicus poliopterus* is said to occur north to Somaliland, but Dr. Mearns collected two specimens in central Abyssinia, thereby extending the known range.

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PROCEEDINGS

OF THE

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A REVISION OF THE LOCO-WEEDS OF WASHINGTON.[1]

BY HAROLD ST. JOHN.

The loco-weeds are very well known and abundant in the Rocky Mountains and on the Great Plains to the east of them. There they have gained a very unfavorable prominence, due to certain poisonous properties. If a grazing animal eats of the loco-weed, it soon develops a craving for the plant, will seek it out, and eat but little else. A poisonous drug in the plant affects the nervous control of the animal, causing it to move in a crazy manner when walking or running. From this fact, the affected animal is said to be locoed, a word from the Spanish *loco*, meaning crazy. The craving for the drug is so strong, that the animal eats of it until it produces a sorry plight and finally causes death. Several species of plants are known to cause this trouble. A few are members of *Astragalus*, the milk vetch, and others are of unrelated genera. The best known species, however, are in the genus *Oxytropis* (*Aragalus*). In the present paper, the common name loco-weed is applied to this latter genus only.

The species of *Oxytropis* are distinctly rare in the state of Washington. Most of the early explorers in this part of the Pacific Northwest missed them entirely, but the intrepid and keen-eyed Douglas was one of the few to detect the plant. He records[2] his No. "(28) *Oxytropis Lambertii;* abundant in rocky, sandy situations; grows very luxuriant on limestone hills from the Great Falls upwards; at the mouth of the Spokane River a variety, or may prove a second species, is found of

[1]Contribution from the Botany Department of the State College of Washington, No. 12.

[2]Journ. by David Douglas, 164. 1914.

more slender growth; not so silky; the calyx longer and not swollen."

There are no limestone hills near the Great Falls, or The Dalles as they are now called, nor has the genus been found since in that vicinity. However, it has been found along the Columbia River not very far from the mouth of the Spokane River. Hooker in his Flora Boreali-Americana does not list any Douglas collection from either of these areas. *Oxytropis Lambertii* is not now known from Washington or from near its boundaries. Douglas may have mistaken a species of *Astragalus* for the plant in question, though on page 172 he lists a plant as *Oxytropis* or *Astragalus*. It is obvious that he was familiar with the two genera, so it is probable that he did find at least one of the loco-weeds within the boundaries of what is now Washington.

In the Botany of the Wilkes Expedition, Torrey recorded[1] *O. Lamberti* from "Interior of Washington Territory and Oregon." Due to the facts that the material was in fruit only, and that no definite locality is given, and to the well-known fact that the data on many of these specimens has been confused, the writer does not hesitate to reject this record. None of the other early explorers seem to have detected the plant.

In 1899 Dr. Aven Nelson described[2] an *Aragalus gracilis* from Wyoming, adding that he thought that *Elmer* 595 from Loomiston, Wash., must be referred to the same species. Some years later when he reviewed the group[3] and transferred the species to the genus *Oxytropis*, Dr. Nelson stated that the species was confined to Wyoming, Colorado, and the Black Hills region, thus excluding Elmer's Washington collection. He has also replied to a recent inquiry from the writer that this is his present understanding of the group. At this place it is a pleasure to record with thanks the loan by Dr. Nelson of the material including the type of *Oxytropis gracilis* (A. Nels.) K. Schum., from the Rocky Mountain Herbarium, University of Wyoming.

The only species that has been founded on Washington material is *Aragalus luteolus* Greene. This was described[4] in

[1] U. S. Expl. Exped. **17**: 279. 1874.
[2] Erythea 7: 60–61. 1899.
[3] U. Wyo. Publ. Bot. **1**: 116. 1926.
[4] Proc. Biol. Soc. Wash. **18**: 17. 1905.

1905 by Dr. E. L. Greene, and was based on an Elmer collection from the Olympic Mountains.

Prof. C. V. Piper listed in his Flora of Washington[1] in 1906 two species of *Aragalus*. The first he called *A. gracilis* A. Nels., listing under it the two *Elmer* collections, 595 from Loomiston and 2532 from the Olympic Mountains. The second is called *A. monticola* (Gray) Greene.

In a later joint work[2] with Prof. R. K. Beattie, Prof. Piper adopted the generic name *Oxytropis* for this group. For the first species he adopted Greene's name *luteolus* and made the combination under *Oxytropis*. This should be corrected to read *luteola*, so as to be in agreement in gender with the generic name. For the second species, occurring in the Olympic, the Cascade, and the Blue Mountains, he adopted the name *O. Cusickii* Greenm. This completes the review of the past treatment of the Washington species of *Oxytropis* or loco-weed. In studying them the writer has had access to the type of *O. gracilis*, to two duplicate types of *O. luteola*, and to authentic cited material of *O. Cusickii*, distributed by Cusick.

Since the loco-weeds are a serious menace to grazing animals in a large part of the west, and even as near as in Montana, a search has been made for reports of any loco-poisoning in Washington. No such records could be found at the State College of Washington or the Agricultural Experiment Station at Pullman, or at the Forest Service District Office in Portland, or at the State Dairy and Livestock Office in Olympia. To one knowing the distribution of the loco-weeds in the State of Washington, this fact is not surprising. Localities and collections are few, and most of these are from the alpine regions of certain of our mountains that are never, or very seldom, visited by range animals. In one part of the range country, however, the loco-weeds are fairly abundant at moderate elevations. This is on the limestone and magnesian limestone outcrops of Okanogan and Stevens Counties. Hence, if our species have the same poisonous properties of the tested species of this genus, trouble may very likely occur in this area.

The writer recognizes a much larger number of species of loco-weeds in Washington than has been done by his predeces-

[1]Contrib. U. S. Nat. Herb. **11**: 367. 1906.

[2]Fl. of the Northwest Coast, 227. 1915.

sors. All but one are most closely related to *Oxytropis gracilis* and like it are in the section *Campestres*. The solitary one is from Marcus. It also is a member of the section *Campestres*, though it does not seem to have any close relatives.

The characters found most useful in separating the following species are in the shape and pubescence of the stipules. It is of interest that the shape and size of the wing of the flower is so distinct in each of the species, that they could be distinguished on this basis alone.

Key to Washington Species of Oxytropis

A. Flowers white, blue-veined, the keel bluish-purple-maculate below the apex ..... *O. columbiana*

A.′ Flowers yellowish,

B. Stipules glabrous on the back ..... *O. mazama*

B.′ Stipules more or less pubescent on the back,

C. Stipules densely appressed long pilose dorsally, especially towards the base, leaflets 9–30 mm. long ..... *O. okanoganea*

C.′ Stipules at least sparsely pilose dorsally towards the apex, leaflets not over 15 mm. long,

D. Calyx at anthesis 9–10 mm. long, leaflets 21–27,

E. Stipules generally pilose dorsally, flowers 13–14 mm. long *O. olympica*

E.′ Stipules pilose mostly along the midrib towards the tip, flowers 15–17 mm. long ..... *O. luteola*

D.′ Calyx at anthesis 7–8 mm. long, leaflets 18–21 ..... *O. cascadensis*

Oxytropis columbiana, n. sp.

Caespitose herbaceous perennial; tap-root erect, bearing a multicipital crown; leaves numerous, very white when young but at maturity greenish; stipule adnate to the base of the petiole broad scarious rather generally white appressed pilose, each half deltoid, attenuate into a long caudate tip with a raised midrib; petioles long appressed white pilose, 2–5 cm. long; the blades abruptly or more commonly odd pinnate, the upper leaflets paired and equal, the lower alternate and often unequal in number, leaflets 17–21, narrowly elliptic- or oblong-lanceolate acute, the margins somewhat inrolled, pilose with soft long white appressed hairs, blade of leaflet 8–20 mm. long, 2–5 mm. wide; scapes numerous equaling or slightly exceeding the leaves at anthesis, about 15 cm. long, but in fruit about 20 cm. long, appressed white pilose below, but with the hairs more spreading above and often with an admixture of short black hairs; spike short and head-like, but by fruiting time elongating to 3 or 5 cm.; bracts linear-lanceolate, pilose but green, the lower equaling or nearly equaling the calyx; calyx narrowly campanulate, densely white appressed pilose or with a few short black hairs, 9–10 mm. long, the teeth subulate 2–3 mm.

long; flowers about 20 closely massed, ascending, 15–16 mm. long; corolla white, with delicate blue veins, the keel with a large bluish-purple blotch just below the apex; standard narrowed to the base, but oblong above, emarginate, bisulcate and reflexed; wings 13 mm. long with a slender claw nearly as long as the blade, the blade cuneate-oblong, with a small terminal and a large basal lobe on the upper side, with a narrow saccate infolding diagonally placed above the base of the basal lobe; keel with a broad claw exceeding the blade, the blade folded, sagittate, with rounded basal lobes and an apiculate tip; pod sessile oblong or lanceolate in outline, attenuate into a slender beak, appressed white pilose, the upper suture intruded a short distance, ovules numerous.

Perennis subacaulis, foliolis anguste oblongo-lanceolatis pilosis, floribus subcapitatis albis caeruleo-maculatis vel nervosis 15–16 mm. longis.

WASHINGTON: gravelly beach of the Columbia River, Marcus, Stevens Co., June 27, 1924, *Harold St. John* 6482 (type in Herb. State College of Washington).

The new *O. columbiana* falls into the section *Euoxytropis* and the series *Orobia* of Taubert's arrangement in Engler und Prantl's Pflanzenfamilien and into the section *Campestres* of Rydberg's treatment in his Flora of the Rocky Mountains. It is so different from the various North American species as not to require any statement of contrasting differences.

Oxytropis mazama, n. sp.

Caespitose herbaceous perennial; tap-root erect, branching above and multicipital; leaves few and sparse, green; stipules adnate to the petiole white and scarious glabrous on the back, each half deltoid with a short caudate tip and one prominent nerve, leaves small, appressed white pilose throughout, but greenish; petioles 1–3 cm. long; blades odd pinnate; leaflets 17–25, the upper pairs opposite, the lower more or less so, linear to oblong-lanceolate, the margin somewhat inrolled, 4–11 mm. long, 1–4 mm. broad; scapes exceeding and often twice the length of the leaves, appressed white pilose below, and above or with a more conspicuous short black appressed puberulence above; spike short and capitate, 5–10–flowered bracts lanceolate, green, more than half the length of the calyx; flowers yellowish, narrow ascending, 15 mm. long; calyx narrowly campanulate, appressed pilose, these hairs mostly black at anthesis but at fruiting time mostly white, sepal-lobes linear-lanceolate 1–2 mm. long; keel folded and the tip bent upwards, the claw oblong twice exceeding the blade, blade shield-shaped with two minute basal auricles, tip apiculate; wings 12 mm. long, the claw slender straight, equaling the blade, the blade oblong-cuneate, rounded truncate above, with auricle-like lobes at each end on the upper side, a saccate infolding placed longitudinally above the base of the basal auricle; standard with a short cuneate claw, the blade bisulcate, somewhat reflexed, oblanceolate emarginate; pod sessile, lanceolate in outline, slender beaked, strongly ascending, white and black appressed pilose, 1–2 cm. long, the upper suture somewhat intruded, ovules numerous.

Perennis subacaulis, stipulis glabris ciliatis, foliolis 17–25 lineari- vel

oblongo-lanceolatis, scapis valde folio longioribus, floribus ochroleucis, leguminibus pilosis.

WASHINGTON: clefts of rocks, alt. 6000 ft., Goat Mountains, July 6 and September 30, 1896, *O. D. Allen* 245 (type in Herb. State College of Washington); summit of Mt. Wow, Rainier National Park, September 20, 1919, *J. B. Flett* 3126; Olympic Mts., September, 1915, *J. M. Grant.* The last specimen, which is in the Rocky Mountain Herbarium, is more abundantly white pilose, has fewer black hairs, and somewhat narrower leaflets, but it seems conspecific with the above.

The specific name is the noun mazama used in apposition. It was formerly the technical name of, and is still used popularly for the mountain goat of the Pacific Northwest. *O. mazama* is, according to Taubert's treatment in Engler und Prantl's Pflanzenfamilien, a member of the section *Euoxytropis* and of the series *Orobia.* By Rydberg's treatment it is a member of the section *Campestres.* It is most closely related to *O. gracilis* (A. Nels.) K. Schum., which has the bracts lanceolate equaling the calyx, and the lower even equaling the flower, flowers 15–25, besides being a taller stouter plant and with a number of other technical characters *O. mazama* St. John has the oblanceolate bracts shorter than the calyx, the flowers 5–10, and the leaflets not exceeding 11 mm. in length. *O. Rydbergii* A. Nels. (*A. alpicola* Rydb.) is a small mountain species with decumbent curved scapes 2–6 cm. long.

Oxytropis okanoganea, n. sp.

Perennial acaulescent herbs; tap root slender and vertical, branching above and multicipital; leaves rather few from each crown, pale whitish green, large; stipules adnate to the petioles, white and scarious, densely long white appressed pilose below, each half deltoid and with a long slender linear caudate tip, with one prominent raised nerve, more or less pilose above at least along the nerve; petioles densely white appressed pilose, 3–8 cm. long; blades rather large, appressed white pilose throughout; leaflets 13–21 odd pinnate, the upper pairs opposite, the lower nearly so, lanceolate, 9–30 mm. long, 2–4 mm. wide, the margins inrolled; scapes several, exceeding the leaves at anthesis, markedly white pilose, the hairs appressed or some of them spreading or ascending as well as somewhat appressed soft pilose above; spike compact at first, but before the close of anthesis elongate and loose, and at least the lower flowers well spaced; bracts lanceolate white pilose, at least the lower equaling the calyx; flowers 10–22 pale lemon yellow 15–20 mm. long, ascending; calyx narrowly campanulate, 8–10 mm. long, white somewhat appressed villous and often with a few short black hairs, the sepal-lobes subulate 2–3 mm. long; standard spatulate, with the broad claw gradually blending into the blade, blade broadly emarginate bisulcate and somewhat reflexed; wing with a very slender linear claw equaling the blade, the blade broadly cuneate oblong, the apex with two broadly rounded divergent equal lobes and three smaller rounded ones in the deeply emarginate tip, the basal auricle prominent and 2 mm. long, a linear infolding of unaltered tissue placed

longitudinally above the base of the basal auricle; keel with a broad oblong claw much exceeding the blade, the blade infolded and bent upwards shield-shaped with small rounded basal auricles and an acicular caudate tip; legume lanceolate in outline, caudate beaked, white appressed pilose, sessile, the upper suture somewhat intruded, ovules numerous.

Perennis acaulis, stipulis ad basim valde pilosis, foliolis 13–21 lanceolatis 9–30 mm. longis, scapis subappresso-pilosis foliis valde longioribus, floribus ochroleucis 15–20 mm. longis, legumine lanceolato piloso.

British Columbia: Clinton, Aug. 25, 1918, *W. B. Anderson* 851; Kamloops, May 25, 1919, *W. B. Anderson* 853; Lytton, May 27, 1918, *W. B. Anderson* 851.

Washington: limestone shingle, border of small alkaline pond, plateau n. w. of Riverside, Okanogan Co., July 2, 1923, *Harold St. John* 7728 (type in Herb. State College of Washington); flowers pale lemon yellow, limestone shingle of alkaline pond, plateau n. w. of Riverside, Okanogan Co. July 1, 1923, *H. St. John* 7703; in meadows on the s. e. slope of mount Chopaca, alt. 4000 ft., Loomiston (Loomis), Okanogan Co., August, 1897, *A. D. E. Elmer* 595; common, sandy soil, south slope, open country, 1200 ft. alt., Osooyos Lake, Okanogan Co., *W. B. Anderson & G. V. Copley* 7944.

The specific name is taken from the Indian name Okanogan for the dry rolling country, much of which is drained by the Okanogan River. This name has been preserved by the white settlers on the Canadian side of the line, and also on the American side, where it is also the official name for the county. *O. okanoganea* is a member of the section *Euoxytropis* and the series *Orobia* according to Taubert's treatment in Engler und Prantl's Pflanzenfamilien, but by Rydberg's treatment it is of the section *Campestres,* The new species most closely resembles *O. gracilis* (A. Nels.) K. Schum., which has the stipules glabrous or glabrate on the back, leaflets 21–31 bright green and sparsely pilose. *O. okanoganea* has the stipules densely long pilose, leaflets 13–21 pale green and markedly appresed white pilose. *O. saximontana* A. Nels. has the scapes equaling the leaves, smaller more oblong leaflets, the flower 20–25 mm. long, and the pod oblong or ovoid twice the length of the calyx. *O. okanoganea* has the scapes distinctly exceeding the leaves, leaflets lanceolate, the flowers 15–20 mm. long, and the pod three to four times the length of the calyx.

Oxytropis olympica, n. sp.

Caespitose herbaceous perennial; tap root branching and bearing a few small crowns; leaves few and sparse, whitish green; stipules adnate to the base of the petioles, broad scarious, each half broadly deltoid and short acuminate, sparsely appressed white pilose over the back; petioles densely appressed white pilose, 2–3 cm. long; leaflets 23–27, odd pinnate the upper pairs opposite, the lower nearly so, lanceolate acute, the margins inrolled, densely appressed white pilose, 2–8 mm. long, 1–2 mm. wide; scapes several exceeding the leaves, densely white more or less appressed pilose; spike short cylindric 1.5–3.5 cm. long, 7–15–flowered; bracts lanceolate

greenish, appressed white pilose, exceeded by the calyx; calyx campanulate 9 mm. long, dark from the appressed black pilosity which predominates over the white hairs, sepal lobes linear lanceolate 2 mm. long; flowers apparently a clear yellow, 13–14 mm. long; standard oblanceolate-spatulate bisulcate and somewhat reflexed, shallowly emarginate at the broad tip; wings with a narrowly linear claw equaling the blade, the blade narrowly cuneate-oblong, with two broad rounded nearly equal slightly divergent lobes at the shallowly emarginate tip, the straight basal auricle oblong 2 mm. long, the saccate infolding linear and placed longitudinally above the basal sinus; keel 12 mm. long with a broad oblong claw, the blade folded, bent sharply upwards, concave shield-shaped with minute basal auricles and a prominent beak-like tip; legume sessile 10–13 mm. long, lanceolate in outline long beaked white or somewhat black appressed pilose, dorsal suture somewhat intruded.

Perennis acaulescens, stipulis sparse pilosis, foliolis 23–27, pinnatifidis, 2–8 mm. longis 1–2 mm. latis lanceolatis, scapis appresso-pilosis foliis longioribus, floribus flavis 13–14 mm. longis, legumine lanceolato piloso 10–13 mm. longo.

WASHINGTON: Olympic Mountains, July 20, 1897, *J. B. Flett* 134 (type in Herb. State College of Washington); loose stones and grass, alt. 6000 ft., summit Olympic Mts., Aug. 27, 1898, *J. B. Flett* 803.

The specific name, as is quite obvious, is taken from that of the Olympic Mountains, to which locality the plant seems restricted. *O. olympica* is a member, according to Taubert's treatment in the Pflanzenfamilien, of the section *Euoxytropis* and of the series *Orobia*. By Rydberg's treament, it is a member of the section *Campestres*. This new species is most closely related to *O. luteola* (Greene) Piper, which has oblong softly villous larger leaflets, and flowers 15–17 mm. long. *O. olympica* has appressed pilose lanceolate leaflets, and the flowers 13–14 mm. long.

Oxytropis luteola (Greene) Piper, emend., Fl. N. W. Coast 227. 1915.

Aragalus luteolus Greene, Proc. Biol. Soc. Wash. **18**: 17. 1905.

Caespitose herbaceous perennial; tap root stout, freely branching above, bearing numerous crowns; leaves abundant and ample, whitish green; stipules somewhat pilose on the back, at least towards the tip, adnate to the base of the petiole, each half scarious, ovate short acuminate; petioles appressed soft pilose, 1–3 cm. long; leaflets 21–25 the upper pairs opposite, the lower alternate, elliptic or lanceolate-elliptic appressed white villous, 5–15 mm. long, 1–4 mm. wide; scapes several, nearly twice the length of the leaves, somewhat appressed white villous; inflorescence short cylindric, rather loose, with 10–20 divergent or slightly ascending flowers; bracts lanceolate sparsely white villous, half the length of the calyx; calyx campanulate 9–10 mm. long appressed white or somewhat black pilose, the sepal-lobes narrowly deltoid 2 mm. long; flowers apparently a pale clear yellow, 15-17 mm. long; banner with a cuneate claw shorter than the blade, the blade oblanceolate, narrowly emarginate, bisulcate and strongly reflexed; wings with a slender linear claw as long

as the blade, the blade cuneate rhomboidal, diagonally truncate above, the basal auricle incurved 2 mm. long, a short infolded pocket placed longitudinally above the basal sinus; keel folded, the claw oblong twice the length of the blade, the blade bent slightly upwards concave shield-shaped, the basal auricles rather prominent, the caudate tip very prominent; legume white and black appressed pilose, mature pod unknown.

WASHINGTON: Clallam Co., July, 1900, *A. D. E. Elmer* 2532.

This species is related to *O. gracilis* (A. Nels.) K. Schum., which has the stipules glabrous or glabrate on the back, the bracts equaling and often exceeding the calyx, and the leaves bright green and sparsely appressed pilose. *O. luteola* has the stipules somewhat pilose on the back, the bracts villous half the length of the calyx, and the leaves whitish green with white villous pubescence. *O. saximontana* A. Nels. has the stipules densely long pilose, and the scapes equaling the leaves at anthesis. *O. luteola* has the stipules glabrous below, and the scapes at anthesis nearly twice the length of the leaves.

Oxytropis cascadensis, n. sp.

Caespitose acaulescent perennial; tap root branching above, bearing many crowns; leaves numerous pale green; stipules adnate to the base of the petioles, whitish nearly scarious, each half lanceolate, white pilose along the midrib near the tip; petioles appressed white pilose 2–3 cm. long; leaflets 18–21 odd pinnate, the upper pairs opposite, the lower nearly so, lanceolate to elliptic-lanceolate appressed white pilose, 6–13 mm. long, 2–5 mm. wide; scapes numerous equaling or slightly exceeding the leaves appressed white pilose below as well as more or less black appressed pilose above; inflorescence capitate or very short cylindric even in fruit, 8–12–flowered; bracts lanceolate white appressed pilose, more or less equaling the calyx; calyx campanulate black appressed pilose or with a few white hairs 7–8 mm. long, the sepal-lobes narrowly deltoid 2 mm. long; corolla yellowish 13–14 mm. long; standard spatulate bisulcate and well reflexed, the tip shallowly emarginate; wing with a slender linear claw nearly equaling the blade and at an obtuse angle with it, the blade slightly cuneate oblong with wavy sides, the apex wavy obliquely truncate with a prominent upper terminal lobe and a hint of a rounded sinus and a lower lobe, the basal auricle stout and strongly incurved, 1.5 mm. long, the saccate infolding somewhat diagonal above the base of the auricle, keel infolded with a broad oblong claw exceeding the blade, the blade broadly concave shield-shaped with prominent basal auricles, infolded and somewhat bent upwards, with a prominent caudate apiculate tip, and with large saccate outfoldings placed longitudinally above the base of the basal auricles; pods lanceolate in outline beaked, mostly black though sometimes partly white appressed pilose, 10–13 mm. long, the dorsal suture somewhat intruded, ovules numerous.

Perennis acaulis, stipulis pilosis, foliolis 18–21 lanceolatis pilosis, scapis foliis aequantibus, floribus ochroleucis 13–14 mm. longis, legumine atropiloso 10–13 mm. longo.

WASHINGTON: flowers yellowish, alpine slate ledges, 6700 ft., Grouse Ridge, Mt. Baker, Whatcom Co., Aug. 8, 1923, *Harold St. John* 5113 (type in Herb. State College of Washington); alpine slate ledges, 6700 ft., Grouse Ridge, Mt. Baker, Whatcom Co., Aug. 8, 1923, *Harold St. John* 5101.

This new species from the northern Cascade Mountains resembles *O. Cusickii* Greenm. of the highest Wallowa Mts., of eastern Oregon, which species has the stipules glabrous, plant very depressed and low, the leaves 4–8 cm. long, leaflets 7–19, scapes much exceeding the leaves, and the flowers capitate 5–8. *O. cascadensis* has the leaves 6–15 cm. long, leaflets 18–21, and the flowers 8–12. Dr. Piper determined several collections from Washington as *O. Cusickii* but the writer is unable to agree with this interpretation, and has seen characteristic *O. Cusickii* only from eastern Oregon. The various records for this State of *O. Lambertii* and *O. monticola* are also considered to rest upon misdeterminations. The new *O. cascadensis* is, according to Taubert's treatment in the Pflanzenfamilien, a member of the section *Euoxytropis* and the series *Orobia*. By Rydberg's treatment it falls into the section *Campestres*.

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PROCEEDINGS

OF THE

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THE CRINITE HEADED HIERACIUMS OF THE NORTHWEST.[1]

BY HAROLD ST. JOHN AND FRED A. WARREN.

In the Pacific Northwest are a number of species of *Hieracium* or hawkweed which have the heads long soft pilose, as well as being soft hairy on most other parts. In the attempt to identify a collection of one of these from Mt. Rainier, it has been necessary to study carefully and to revise this group. The diagnostic differences can best be presented in the following key.

A. Involucres sparsely pilose, mostly towards the base....*Hieracium griseum*.
A.′ Involucres conspicuously long pilose,
  B. Principal cauline leaves 10–25 cm. long with the winged petiole, linear-oblanceolate .....*H. albertinum*
  B.′ Principal cauline leaves 5–9 cm. long, ovate-lanceolate or broadly oblanceolate and sessile or nearly so,
    C. Stem long pilose throughout.....*H. Flettii*
    C.′ Stem glabrous above,
      D. Involucres copiously long pilose, the hairs copper-colored when dried, those of the base exceeding the bracts..*H. Scouleri*
      D.′ Involucres moderately pilose, the hairs blackish at base, drying fuscous, those of the base not equaling the bracts, the upper ones shorter and sparse.....*H. Piperi*

Hieracium griseum Rydb., Fl. Mont. 464. 1900. This species does not really belong with the crinite headed *Hieraciums*, but is included in this study because it might be confused with some of the other species. Usually the heads lack long pilose hairs, having only short white appressed stellate hairs and more or less blackish stipitate glandular ones. Not infrequently, however, the involucral bracts bear some long pilose hairs. These are mostly towards the base, and any borne above are much shorter.

[1]Contribution from the Botany Department of the State College of Washington, No. 11.

Dr. Rydberg in his original description listed the plant from Montana and Idaho. It is abundant also in British Columbia, Washington, and Oregon.

H. albertinum Farr, Ottawa Naturalist **20**: 109. 1906., *H. Scouleri* of Gray, Howell, Piper and other W. Am. authors, not of Hooker. The writers arrived independently at the conclusion that *H. Scouleri* Hook., based primarily on Dr. Scouler's collection from the mouth of the Columbia River, could not be the long-leaved plant of the arid interior called that species by many modern authors, for instance by Piper and Beattie in the Flora of South Eastern Washington 251. 1914. Later they discovered that Dr. Rydberg had already published this same interpretation.[1] Two authentic Scouler specimens in the Torrey Herbarium aided him in his study.

Hieracium Flettii, n. sp. Perennial with a thickened horizontal rootstock; stems simple below, long white pilose and somewhat short white appressed stellate pubescent, 15–20 cm. tall; basal leaves withered at anthesis; lower cauline leaves oblanceolate winged-petioled entire, long white pilose throughout, about 5 cm. long and 1 cm. wide; middle and upper cauline leaves lanceolate or ovate-lanceolate entire long white pilose and short white appressed stellate pubescent throughout, 2–5 cm. long, 5–12 mm. wide, well developed leaves running up into the inflorescence; inflorescence cymose, with from 7 to 20 or more heads; heads narrowly campanulate, densely white crinite; bracts linear in one series or nearly so, darkened along the middle and whitened near the scarious margins, short white stellate pubescent, as well as with the long white pilose hairs blackened at base, 10 mm. long; rays clear yellow; pappus barbellate whitish; achenes linear or slightly broadened above, longitudinally ribbed, reddish brown, about 3 mm. long.

Perenne caule erecto folioso piloso, foliis superioribus lanceolatis vel ovato-lanceolatis integris pilosis 2–5 cm. longis 5–12 mm. latis, involucris pilosis 10 mm. longis pilosis, floribus luteis, achaeneis rubro-castaneis sulcatis 3 mm. longis.

Washington: dry rocky slopes, fairly abundant, saddle between Iron Mt. and Crystal Mt., Indian Henry's, 5900 ft. alt., Mount Rainier National Park, Aug. 21, 1927, *F. A. Warren* 626 (type in Herb. State College of Washington).

The specific name is given in recognition of the years of thorough botanical exploration of Mt. Rainier by the former Park Naturalist, J. B. Flett.

A few specimens of *H. griseum* approach this new species, but not closely enough to cause any confusion.

H. Scouleri Hook., Fl. Bor. Am. **1**: 298. 1834. *H. longiberbe* Howell, Fl. N. W. Am. 395. 1901. Through the courtesy of Prof. L F. Henderson and Mr. J. W. Thompson the writers have borrowed two Howell collections of *H. longiberbe.* In the original description no type specimen is indicated, nor is either of these two specimens so marked. However, the specimen from the Herbarium of the University of Oregon, *Howell* 579, has its label so similarly worded to the statement of habitat in the pub-

[1] Fl. Mont. 464. 1900.

lished description, that we may safely conclude it to be the type. It has not been possible to determine whether the original Scouler collections from the mouth of the Columbia River were from Washington or Oregon. It may be inferred, though, that they were from the north bank of the river, as in 1825 at the time of Dr. Scouler's arrival, the Hudsons Bay Post was still near the mouth of the river on the north side, i. e., within the present boundaries of Washington. The following specimens have been examined:

OREGON: on a bluff along the Columbia River near the Cascades, July, 1880, *T. Howell* 579; Oneonta, June, 1886, *T. Howell;* on bluffs above Multnomah Falls, June 18, 1927, *J. W. Thompson* 2704.

Hieracium Piperi, n. sp. Probably a perennial but the root not seen; stem simple below, leafy up to and into the inflorescence, glabrate below, sparingly pilose along the middle, and glabrous above, purplish nearly throughout; basal leaves withered at anthesis; lower cauline leaves withered, but obviously oblanceolate and long petioled; middle and upper cauline leaves sessile, broadly lanceolate to ovate entire abruptly acute long yellowish pilose on the margins and on the principal nerves beneath, glabrous above, 2–8 cm. long, 1–3 cm. broad; inflorescence cymose with about 25 heads; heads narrowly campanulate; bracts linear in one series or nearly so, dark except on the white scarious margins, sparsely short white stellate pubescent as well as crinite with long pilose hairs, which are blackened below and dry fuscous, tip of peduncle also crinite, bracts 8–9 mm. long; rays apparently ochroleucous; pappus barbellate white; mature achenes not seen.

Perenne caule erecto folioso, foliis superioribus ovatis integris ad marginem pilosis; bracteis linearibus crinitis 8–9 mm. longis, ligulis ochroleucis.

WASHINGTON: Cape Horn, June 26, 1904, *C. V. Piper* 4977 (type in Herb. State College of Washington).

The specific name is given in honor of the collector, the late Dr. Charles Vancouver Piper. It is a pleasure to name a species for such a pioneer, who did so much botanical work and did it so well, that all succeeding generations of botanists in the Northwest will be in debt to him.

This new species adds another to the considerable number of local and unique plants that have been discovered in the deep gorge where the Columbia River cuts its way through the Cascade Mountain Range. It most closely resembles *H. Scouleri* Hook. Besides the characters used in the key, this latter species may be distinguished by having the stems densely pilose below, the leaves generally pilose beneath, the upper leaves lanceolate, and the rays yellow. *H. Piperi* has, on the other hand, the stem glabrate below, the leaves only sparingly pilose on the midrib or principal veins beneath, the upper leaves ovate, and the rays ochroleucous. The white flowered *H. albiflorum* Hook. has the bracts usually glabrous, but occasionally with a few pilose hairs. It has, in any case, a prominent rosulate cluster of leaves at the base, the leaves generally pilose above, and the upper leaves much reduced. *H. Piperi* is separated by having the few basal leaves withering, the leaves glabrous above, and the upper leaves prominent and scarcely reduced.

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PROCEEDINGS

OF THE

BIOLOGICAL SOCIETY OF WASHINGTON

FIVE NEW MANAKINS FROM SOUTH AMERICA.

BY W. E. CLYDE TODD.

The Manakins (Family Pipridae) are represented in the collection of the Carnegie Museum by 2033 specimens, belonging to 77 species and subspecies. Eight new forms have been already characterized as a result of preliminary studies in the group. In the course of a more thorough and systematic study of the birds of this Family, recently completed, five additional subspecies have been discovered, and are described in the present paper, which is the fifteenth of the seris to appeare in these Proceedings, and is uniform in treatment with the others. Acknowledgments are due to Dr. Frank M. Chapman of the American Museum of Natural History for the loan of specimens for use in this connection.

Manacus manacus purissimus, subsp. nov.

Similar to *Manacus manacus purus* Bangs, but under parts if anything purer white, and upper back more extensively white, with the black area correspondingly reduced.

None of the authors who have lately dealt with this specific group seem to have been aware that the form of the extreme lower Amazon was anything else than *purus*, described from Santarem. The series (eighteen specimens) examined in the present connection, however, puts the matter beyond doubt. Males from the vicinity of Pará average a little whiter below even than Santarem skins, but this would not suffice to separate them were it not for the greater extent of the white on the back, involving a narrowing of the black median area. Since the skins from both regions are by the same collector, and of similar style, this is not due to their makeup. The new race thus repeats the character which distinguishes the far-removed race *leucochlamys* of western Ecuador, from which it may of course be told by its whiter under parts.

Type, No. 68,969, Collection Carnegie Museum, adult male; Benevides, Pará, Brazil, August 19, 1918; Samuel M. Klages.

Cirrhipipra filicauda subpallida, subsp. nov.

Similar to *Cirrihipipra filicauda filicauda* (Spix) of the upper Amazon, etc., but posterior under parts of male paler yellow; tibiæ yellowish; and wing slightly longer.

Dr. Hellmayr, writing in 1912 (Archiv für Naturgeschichte, LXXVIII, A, 1912, 85–86), could find no reason for discriminating a Venezuelan race of this species. Comparison of a series of twelve adult males from northern Venezuela with seventeen from Brazil (Rio Purús and Rio Solimoës), however, brings out the difference between the two plainly enough. Brazilian skins are almost uniform below, while in the Venezuelan birds the throat and breast are obviously brighter yellow than the rest of the under parts, with which they are therefore in contrast. Moreover the tibiæ which in the Brazilian birds are nearly always black, are in the northern birds pale yellow, like the flanks. The wing, too, is longer in the latter (averaging 65 mm. in the male), and probably the other dimensions also. Females are not different in color.

For the present I restrict this new race to the northern part of Venezuela. Twenty-four specimens have been examined, from the following localities: Las Quiguas, El Hacha, Lagunita de Aroa, El Trompillo, and Sierra de Carabobo. Examples from the Maracaibo region I refer for the present to typical *filicauda,* but they may eventually have to be separated as a third subspecies.

Type, No. 34,880, Collection Carnegie Museum, adult male; Las Quiguas, Venezuela, September 23, 1910; M. A. Carriker, Jr.

Pipra iris eucephala, subsp. nov.

Similar to *Pipra iris iris* Schinz, but adult male with the opalescent feathers of the pileum continued over the forehead almost to the base of the bill. Adult female with the pileum decidedly bluish, in contrast with the back, instead of pure green.

Pipra iris (until recently called "*opalizans*") has been known heretofore only from the Pará region (Rio Tocantins and eastward) of Brazil. The specimens now in hand extend its range to the east bank of the Rio Tapajóz, where it meets that of *P. nattereri,* which stops on the west bank of that stream. It is not surprising, therefore, to find that it has developed racial characters of an obvious nature in this part, and that these characters show an approach to those of *nattereri* in the female sex at least. There is some variation in the series of females (six specimens), but all show a more or less decided bluish tinge on the pileum, not quite so deep, however, as in *nattereri,* but very different from the pure green pileum of typical *iris.* The bill is the same heavy bill as that of *iris,* as compared with *nattereri,* while the under parts (in both sexes) average more yellowish than in *iris.* The new form is based on a series of two adult males, one young male, and six adult females (from Santarem, Colonia do Mojuy, and Miritituba), while our series of true *iris* numbers thirty-three specimens.

Type, No. 77,534, Collection Carnegie Museum, adult male; Miritituba, Rio Tapajóz, Brazil, March 19, 1920; Samuel M. Klages.

Schiffornis turdinus steinbachi, subsp. nov.

Compared with specimens in the American Museum of Natural History from eastern Ecuador, identified by Dr. Chapman as *S. turdinus amazonus* (type from Chamicuros, eastern Peru), a series of five specimens from Bolivia is markedly distinct, although the differences are hard to express in exact terms. The upper and under parts are of a lighter color, with less brownish tone; the wings and tail are also lighter brown; and the brown of the throat and breast is more sharply defined from the greenish olive of the rest of the lower parts. In the Ecuador skins there is less contrast between these areas, and the whole effect is more saturated. If the eastern Ecuador bird is correctly referable to *amazonus*, as there is good reason to believe, the Bolivian form must be given a new name, as above.

Type, No. 51,170, Collection Carnegie Museum, adult male; Rio Yapacani, Provence del Sara, Bolivia; February 22, 1915; José Steinbach.

Schiffornis turdinus intercedens, subsp. nov.

Similar to *S. turdinus wallacii* (Sclater and Salvin) of the lower Amazon, but upper parts, pileum, wings, tail, throat, and sides of the head more rufescent brownish, less olivaceous. Similar to *S. turdinus amazonus* (specimens from eastern Ecuador), but much paler below, with more contrast between the brown of the throat and breast on the one hand and the rest of the under parts on the other; the upper parts, too, are not quite so dark, and the tail in particular is lighter brown.

When Dr. Hellmayr wrote his review of this group (Novitates Zoologicæ, XVII, 1910, 310–312) he had no specimens from the Rio Solimoës or Rio Purús available, although he noted that those from the Rio Madeira were scarcely different from *S. turdinus wallacii*. I find that our series of twenty-four skins from these regions differ slightly but constantly from another series from the type-locality of *wallacii* in their generally more brownish coloration, particularly in evidence on the pileum and wings externally. They thus approach *S. turdinus amazonus*, described from Chamicuros, Peru, but are easily separable from that form by the characters above specified. The facts will be best expressed, in my opinion, by relegating the Solimoës and Purús birds to a new race or subspecies.

Type, No. 87,725, Collection Carnegie Museum, adult female; Hyutanahan, Rio Purús, Brazil, February 3, 1922; Samuel M. Klages.

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OF THE

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NEW ASIATIC MAMMALS COLLECTED BY F. R. WULSIN.

BY A. BRAZIER HOWELL.

Among the more than two hundred Asiatic mammals collected by F. R. Wulsin while on the Central China Expedition of the National Geographic Society and presented by that organization to the United States National Museum, are specimens representing four undescribed subspecies, which may be known by the following diagnoses.

Arthur deC. Sowerby (Journ. Mamm., 1. 1920, p. 223) has stated that there has not heretofore been available any specimens of black bear from the forested country northeast of Peking, where the presence of this animal has been reported. It was to be expected that the bear of this area might represent a distinct race and the present material, consisting of an old and two younger females, in addition to a small cub, shows this to be the case. In recognition of the value of Mr. Wulsin's work in accumulating specimens of Chinese mammals this may be known as follows:

Selenarctos thibetanus wulsini, subsp. nov.

Type.—Female adult, skin and skull No. 240,668, U. S. National Museum, from the area of Eastern Tombs, Chihli, China; purchased in Peking by F. R. Wulsin: original No. 1140.

Diagnosis.—Similar to the race *ussuricus* but the white chin spot more restricted and size probably slightly smaller. The skull is relatively somewhat broader, with narrower interorbital; jugal consistently much more slender (9 to 10 vs. 13.5 mm. in height); and last upper molar longer.

Skin.—This specimen was selected as the type because it is the only one that is thoroughly adult. Although the skull shows that it is not an aged individual the skin appears somewhat senescent and is doubtless not entirely characteristic of the usual adult. It shows a very marked

grizzled graying of the face, and to a lesser extent, of the axillary region and about the groin. The chin also is lightly grizzled and the white mental spot is practically obsolescent. The crescent upon the chest is pinkish buff rather than pure white, which is probably the result of staining. In the two younger adults there is no grizzling whatever. The muzzle has a brownish tinge, which is less pronounced than in true *thibetanus*, and the white chin spot is about 35 mm. in diameter, being smaller than in *ussuricus*. In a juvenile of the race *moupinensis* there is a small white mental spot, but in an adult of *thibetanus* from the Himalayas this takes the form of a whitish border to the lower lips. The remainder of the pelage is of a shining black as usual.

Skull.—Fortunately the skull of the type is precisely the same size as one of a female *ussuricus* at hand. In the latter the nasal and premaxillary sutures are distinct, while in the type of *wulsini* they have become obliterated, suggesting that the latter race may be the smaller. In comparing these two skulls it is seen that the interorbital is narrower, the jugal is consistently and strikingly more slender in vertical dimension, and the last maxillary molar is both wider and longer—longer even in the subadult females than in a large adult male *ussuricus*. In the type the base of the rostrum is conspicuously narrower than at the canines, but this detail may be purely individual, for it is not a characteristic of the other skulls.

Measurements.—The skins lack measurements. The skull of the type measures: length, 293; width, 193; least interorbital width, 66; height through postglenoid process of the squamosal, 110; length of the last maxillary molar, 30.5; and greatest molar width, 16.5 mm.

Remarks.—These specimens were purchased from a taxidermist in Peking by Mr. Wulsin, who took pains to ascertain that they were killed in the Eastern Tombs district. Here I understand that the forests recently covered an area of some 4000 square miles, but that they are being rapidly destroyed.

In spite of the great number of races of pika already described from China and the adjacent territories, it is now necessary to add to the list two more, representing groups which heretofore have evidently not been detected so far south in this region as the province of Kansu.

Ochotona (Pika) alpina argentata, subsp. nov.

Type.—Female adult, skin, skull and skeleton No. 240,726, U. S. National Museum, from 15 miles north-northwest of Ninghsia, northern Kansu, China. Collected May 16, 1923, by F. R. Wulsin: original No. 1059.

Diagnosis.—A relative of *O. a. nitida* but winter (spring) pelage a paler silvery gray with the yellowish tinge over the back very much reduced. Head paler, and face, as well as the hinder rump, pronouncedly yellowish. Feet white above, grayish below, and longer than in *nitida*.

Skin.—The two specimens available were taken in May and are still in winter pelage that is almost unworn. The entire back is of a striking

silvery color, the hairs being a pale steel grayish with fine black tips. This is modified in the axillary region by a slight tinge of ochraceous, which occurs also over the nape in the type only. The hinder rump is strongly buffy and this color covers the muzzle also, more pronouncedly and palely than in *nitida*. The feet are white with a suggestion of buffiness and are much paler than in all but a very few specimens of *nitida*, and the soles, instead of being sooty, are grayish. The underparts are white tinged with buffy, and not strongly ochraceous as in *nitida*.

Skull.—Unfortunately neither skull is perfect, but that of the type lacks only the floor of the braincase and bullae Compared with *nitida* the orbit is markedly larger (in length, as 12.2 compares with 10, in skulls of equal size), and the posterior palatine foramina are longer.

Measurements.—Collector's measurements are: head and body, 220 (the type) and 208; foot, 32 and 35 (33.5 and 33 in the dried skins). The skull of the type measures: total length, 48; width, 24, and interorbital width, 5 mm.

Remarks.—The interrelationship of several of the more northern and western races of this subgenus has never been properly settled, but the above evidently constitutes a perfectly tenable form and is an interesting addition to the fauna of this portion of Kansu.

Ochotona (Ochotona) erythrotis vulpina, subsp. nov.

Type.—Male adult, skin and skull No. 240,723, U. S. National Museum, from 30 miles west of Sining, Kansu, China. Collected August 12, 1923, by F. R. Wulsin: original No. 1103.

Diagnosis.—A pika of the true *erythrotis* type with ears and back in summer pelage of the same bright reddish color, but size smaller. Orbits and posterior palatine foramina markedly smaller.

Skin—The two adults and one juvenile at hand are evidently in summer pelage (August), although this is as long and full as one would expect to occur in winter. The coloration is a bright and uniform reddish exactly as represented over the anterior half of the second figure of Buchner's plate 21 in his original description of *erythrotis*. This color covers the entire dorsal surface of the body, including the head and ears. The belly, chin, legs and feet are white, the hairs being plumbeous at base, but the throat is faintly tinged with reddish and there is a bit of this color upon the outer part of the hind legs. The ears are very large, and considerably larger than in the plate of *erythrotis* mentioned above, or in *alpina*, and their reddish color is characteristic of the former group.

Skull.—In comparison with that of *erythrotis typicus* the skull of *vulpina* has larger orbits, bullae a trifle smaller, and the posterior palatine foramina very much shorter (6 vs. 9 mm.). The frontal vacuities are of fair size.

Measurements.—Collector's measurements of the two adults are: head and body, 215 in both, and foot, 30 (the type) and 34, but these figures seem to be inaccurate for in the dried skins the foot measures 37.5 in both. The skull of the type measures: total length, 37.3, width, 13.4, interorbital width, 6.2, and length of posterior palatine foramina, 6 mm.

Remarks.—The discovery of this Chinese race with summer pelage exactly comparable to that of typical *erythrotis* causes me to question whether the relationship of the browner, darker forms of this subgenus such as *gloveri*, are closer to *erythrotis* than merely subgeneric.

Pseudois nayaur caesia, subsp. nov.

Type.—Male, young adult, skin and skull No. 240,683, U. S. National Museum, from Archuen, Minshan Mountains, 140 miles south of Lanchow, Kansu, China. Collected September 4, 1923, by F. R. Wulsin: original No. 1129.

Diagnosis.—A bharal with brown tints entirely suppressed in the summer coat: lateral black line of the body reduced and no blackish facial marks, at least in individuals of this age. Horn tips of males projecting rearward almost parallel to body axis.

Skin.—In the typical race the pelage is browner in summer and grayer in winter, but in *caesia* the summer pelage shows no trace of brown, while the winter coat is very faintly so tinged. The type is still in summer coat, with but little evidence of wear, and this is uniformly steel gray with fine whitish ticking caused by annulations of some of the hairs. As usual the tail is black, the black striping of the hind limb is continuous and that of the foreleg is interrupted by the white knee. The side stripe is not continuous with that of the hind leg and is restricted both in width and in length, and does not extend nearly to the axilla. In the type the hairs of the midbelly are extensively tipped with brownish gray, but this is not so in the case of the females. The hairs of the lower throat are white at base and, especially centrally, are so extensively tipped with black as to form an area solidly black; but more laterally many of these hairs are white practically to their tips. The hairs of the side of the face are coarsely annulated dark gray and whitish, while along the center of the nose the darker markings of the hairs greatly preponderate, making an illy defined line: but there is no black upon the face. May females from northern Kansu are still in the winter coat and are considerably browner than the type. Black body marks are limited to a small patch upon the brisket, which evidently extends into the axillary region, but the hair here is worn almost entirely away by the action of the forelegs. There is no vestige of the lateral black stripe which is present upon the body of females of the typical form, and the face is no darker than the back.

Skull.—The skull of the type indicates an animal perhaps four years of age, with nasal, lachrymal, and maxillary sutures entirely distinct. Unfortunately there is available no adult male skull of typical *nayaur* with which to make comparisons. Two weathered skulls from rams of good size (horns with basal circumference of 243 and 232 mm.) indicate that the form of the horns in *caesia* is somewhat different, for near the extremities the tips turn not only down, but directly backward parallel with the body axis and then slightly upward, which is a shape different from that shown in the numerous illustrations of *nayaur* throughout the literature.

Measurements.—Collector's measurements of the type are: head and body, 1620; tail, 150; hind foot, 350; and ear, 115 mm. The skull of the type measures: greatest length, 250; greatest width, 132; greatest length of nasals, 83 mm. The basal circumference of the horns is 212; length of horn over curve of ridge, 370; and distance between the horn tips, 540 mm.

Remarks.—Hodgson originally described the bharal under the name *nayaur*, subsequently changing it to *nahoor*. Under current nomenclatural usage such action is not permitted, for the older name did not constitute an obvious misprint for *nahoor*, and in consequence the former must stand. The comparative material in the National collection is not at all satisfactory in this instance, but I have no hesitation in naming this race as new, for there are so many excellent illustrations and descriptions of *nayaur* throughout the literature that the distinctiveness of the Kansu animal seems to be beyond question, a fact that has been predicted by more than one investigator. The new race is represented in the National Museum by a pair of winter yearlings or two-year-olds, a pair of summer adults, two lambs and two weathered rams' skulls.

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PROCEEDINGS

OF THE

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THE CLAPPER RAIL OF HISPANIOLA.[1]

BY ALEXANDER WETMORE.

The clapper rail of Hispaniola (a geographic name used here to cover the island divided, unequally, between the Republic of Haiti and the Dominican Republic) on careful comparison proves to be a distinct form that may be known as

Rallus longirostris vafer, subsp. nov.

Diagnosis.—Similar to *Rallus longirostris caribaeus*[2] but grayer, less brownish both above and below, fore-neck and upper breast more evidently cinnamon colored, and malar stripe, of same color, more prominent.

Characters.—Type, ♂ adult, U. S. Nat. Mus. No. 252,915, Etroite, Gonave Island, Haiti, collected March 18, 1920, by Dr. W. L. Abbott. Crown sepia; a superciliary stripe extending from frontal antiae to above eye dull buffy white; loral region and upper part of malar region dull sepia becoming brownish neutral gray on sides of head; hind neck somewhat paler; back, scapulars and rump sepia, each feather margined broadly with light grayish olive; wing coverts snuff brown, greater coverts barred and tipped slightly with buffy white; primaries and secondaries bister, margined externally with snuff brown; rectrices dark bister, changing externally to snuff brown, and finally to light grayish olive, throat white; lower part of malar region between pale pinkish buff and pinkish buff, forming a prominent malar stripe; center of fore-neck pinkish buff, side of neck neutral gray with a slight buffy wash; abdomen and center of lower breast white; remainder of breast with feathers cinnamon-buff internally, edged with pinkish buff externally; sides and flanks blackish, the feathers barred and tipped broadly with white; under tail coverts barred broadly with fuscous and white; under wing coverts fuscous, barred and tipped narrowly with white. Bill dull brown, tip paler, basal two-thirds of mandible and sides of maxilla below and behind nostril dull yellowish; tarsi and feet dull brown (from dried skin). Iris marked on label as "clear brown."

Measurements (in millimeters).—Males (2 specimens) wing 151.0–

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

[2] *Rallus longirostris* c. var. *caribaeus* Ridgway, Bull. Nuttall Orn. Club, vol. 5, July, 1880, p. 140. ("West Indies"—near Spanishtown, Jamaica.)

151.8[1] (151.4); tail 61.5–62.2[1] (61.8); culmen, 63.8[1]–64.4 (64.1); tarsus, 57.0–58.5[1] (57.7).

Females (6 specimens) wing, 134.5–144.5 (138.1); tail 54.4–58.3 (56.4); culmen, 53.6–63.0 (58.6); tarsus, 50.9–59.5 (53.8).

Range.—Coastal regions of Haiti, including Gonave Island, and the Dominican Republic.

Remarks.—There is decided variation in color in rails of this group, two distinct phases being evident, one being paler above, due to predominance of the lighter edgings of the dorsal feathers and restriction of the dark centers, and the other decidedly darker with the duller colors of the central parts of the dorsal feathers much extended, and the lighter margins correspondingly restricted. The darker appearance of the extreme of the latter type becomes much accentuated with plumage wear. The individual differences indicated need to be kept carefully in mind in segregating geographic races.

The Jamaican material before me in the present comparisons includes the type of *caribaeus* and one other specimen in the U. S. National Museum, and a third skin from the Museum of Comparative Zoölogy, loaned through the courtesy of Mr. Outram Bangs. These birds are all old and are more or less faded, having being collected in the sixth decade of the last century. In arriving at differential characters to distinguish the Hispaniolan race due allowance has been made for color change in the Jamaican series, particularly through study of differences evident between these three and specimens of comparable museum antiquity of other races of *longirostris*, with the result that the darker, duller, browner appearance of the series of *caribaeus* justifies the separation here proposed. In the three *caribaeus* examined two males have the wing 144.0 and 147.6 mm., the culmen 61.8 and 58.5 mm., and the tarsus (in both) 54.2 mm. while a female has the wing 139.8, culmen, 54.7, and tarsus 50.2 mm. There is indicated a slightly longer wing, and shorter culmen and tarsus than in *vafer*, a difference so slight, however, that it needs to be verified in a larger series before it is accepted.

The series of *vafer* now at hand includes two females from Caracol, on the northern coast of Haiti, and two males and four females from Etroite and Pikmi, Gonave Island. The specimens from Gonave do not seem to differ from those of the main island. One of the skins from Caracol is in somewhat melanistic phase as the cinnamon color, normal to the breast, is almost entirely obscured by dark gray.

The form is an inhabitant of mangrove swamps, and from present information is rare except in a few localities.

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[1]Type.

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AN APPARENTLY NEW HYLA FROM EL SALVADOR.

BY REMINGTON KELLOGG.

Among the frogs taken by R. A. Stirton in El Salvador under the auspices of Donald R. Dickey and the California Institute of Technology is a *Hyla* which presents a peculiar combination of characters. It seems to differ from other described hylas in having the forearm provided with a narrow tubercular fringe, tarsus with external dermal fringe and internal tarsal fold, in addition to the fringe or dermal fold above the vent. Although small, the collection made by Mr. Stirton contains several interesting eleutherodactylids which will be dealt with in a later paper. The tree frog, which has been presented to the United States National Museum by Mr. Dickey, may be called

Hyla euthysanota, new species.

Type.—Cat. No. 73296, Division of Reptiles, United States National Museum.

Type locality.—Los Esesmiles, Department of Chalatenango, El Salvador, C. A. Altitude 6400 feet. Collected by R. A. Stirton on March 6, 1927.

Description.—Vomerine teeth in two slightly oblique rows between small choanae, the interspace being approximately equal to interval between outer end of tooth row and corresponding choana; tongue subpyriform, notched behind; snout, short, broad, but not depressed, truncated anteriorly, and projecting very slightly beyond lower lip; distinct canthus rostralis; loreal region subvertical; the distance between the nostrils equals their distance from the corresponding eye, and is slightly less than the diameter of the latter; tympanum distinct, overhung by dermal fold, and with its greatest diameter equal to slightly more than half that of the eye; distance between eye and tympanum nearly equal to greatest diameter of the latter; interorbital space flattened, one and one-third times as wide as upper eyelid; forearm with narrow postero-internal tubercular dermal fringe; three outer fingers one-third webbed, with

vestigial web between first and second fingers; discs of fingers slightly larger than those of the toes, but smaller than the tympanum; toes three-fourths webbed, the incised membrane reaching the discs of toes II, III, and V, and continued along last phalanx of IV as a narrow dermal fringe; a dermal fringe extending from tibio-tarsal articulation along outer margin of tarsus and fifth toe as far as adhesive disc; a distinct tarsal fold from inner metatarsal tubercle to heel; inner metatarsal tubercle large and elongated, equal to three-sixteenths of the length of the first toe; outer metatarsal tubercle small and rounded; subarticular tubercles distinct; skin of upperparts, top of head, and upper eyelids finely shagreened; skin of underparts and ventral surfaces of thighs coarsely granulated; throat less coarsely granulated; fold across chest quite indistinct.

Color (in alcohol).—Ground color of upperparts brownish buff or light clay color, with irregularly spaced anastomosing blotches of Seal brown; a large indistinct lateral dark spot on each side posterior to fore limb; flanks with a few scattered fine dark specks; tibia and tarsus indistinctly cross banded; forelimb with dark splotches; underparts uniformly yellowish white.

Measurements of the Type.

Snout to vent	25. mm.
Breadth of head at level of posterior margin of tympanum	11.5 mm.
Length of tibia	18. mm.
Length of foot	24.5 mm.

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A NEW ORTHRIUS FROM SIAM (COL.: CLERIDAE).

BY EDWARD A. CHAPIN.

Among the numerous and interesting beetles collected in Siam by Dr. Hugh M. Smith is a single specimen of a peculiar species of the genus *Orthrius* Gorham. In body form and in the sculpture of the head and pronotum it is allied to such species as *O. binotatus* Fisch. Its greatly swollen femora and strongly arcuate tibiae are certainly modifications confined to the male sex; disregarding these points, the insect still appears distinct from all previously described species.

Orthrius crassipes, n. sp.

Elongate, subcylindrical, depressed. Piceous, antennae and underparts of body castaneous, elytra with three yellowish-white spots on each. Head smooth, finely and sparsely punctulate, front feebly bi-impressed between the eyes, transverse impression at base of clypeus well defined, supra-antennal crests distinctly and rather densely punctured. Eyes feebly emarginate opposite antennal insertions. Pronotum campanulate, equally as long as broad (by measurement), anterior transverse impression deep, obtusely angulate at middle, area in front of impression strongly punctured, disc sparsely and finely punctulate, feebly wrinkled at sides, base strongly constricted, basal impression deep, transverse, narrow basal margin strongly punctured. Scutellum transversely elliptical, densely punctulate. Elytra about two and one-half times as long as pronotum (ratio of pronotal length to elytral length 46:118), each with ten rows of punctures, which are coarse and very closely set. The 7th and 8th rows are slightly irregular, the 9th and 10th lie beyond the humeral callus and are incomplete basally. In apical third all rows are confused. The basal pale spot is angulate, its apex involves the humeral callus, one arm extends inward and backward ending on the 3d puncture row at basal fifth. The other and outer arm runs toward the margin and backward and is about half as large as the inner arm. The second spot, the largest of the three, is transverse. Its anterior margin is just beyond basal fourth, its

posterior margin at the middle of the length of the elytron. Both transverse margins of the spot are undulate, the inner longitudinal margin lies near the 1st puncture row, the outer follows the lateral margin of the elytron. The third spot is small, oval and subapical. Near the outer margin of the elytron it is prolonged basad a short distance, forming a spur. Side pieces of mesothorax strongly punctured, metasternum strongly wrinkled, otherwise the underparts finely and rather densely punctate. Front and hind femora greatly swollen, middle femora somewhat so. Front tibiae nearly straight, middle feebly curved, hind strongly curved and prolonged beyond the insertion of the tarsus into a stout curved hook. Tarsi of front and middle legs normal, second segment of hind tarsus twice as long as third, slender, curved. Claws simple, feebly dilated at base.

Length.—9 mm.

Type.—U. S. N. M., No. 40962, a male from Bangkok, Siam, Hugh M. Smith collector.

While, so far as I am aware, the tremendous development of the legs in the male sex has not been previously noted in the genus *Orthrius*, it is interesting to compare this case with that of *Trichodes crabroniformis* Fab. The modification of both is identical in its nature and practically so in its extent.

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THE IDENTITY OF WERNER'S DROMICUS W-NIGRUM.

BY DORIS M. COCHRAN.

The type of *Dromicus w-nigrum* Werner (Jahrb. Wiss. Anst. Hamburg, vol. 26, Beih. 2, 1909, p. 222) came from Port-au-Prince, Haiti, and was collected by Dr. Fritz Rauch. It was described as having 19 scale-rows; 189 ventrals; a divided anal; 101 subcaudals; 7 supralabials of which the third and fourth enter the eye; 1 prae- and 3 post-oculars; 1+2 temporals; 4 infralabials in contact with the first pair of chin-shields; the internasals are shorter than the prefrontals; the frontal is 1 4/5 times as long as broad, longer than its distance from the end of the snout, shorter than the parietals; the loreal is quadrangular, and longer than high. A male presumably having the same data as the type has 188 ventrals, while a young specimen from Sanchez has 189 ventrals and 105 subcaudals.

The most conspicuous feature of the coloration may be translated from Werner's description as follows: "On the parietals a dark chevron-shaped mark with the apex pointing forward, forming with the dark postocular bands a W-shaped mark."

Barbour (Mem. Mus. Comp. Zoöl., vol. 44, No. 2, 1914, p. 336) stated that he was inclined to believe that *Dromicus w-nigrum* was an *Alsophis melanichnus* Cope.

The presence of the W-shaped mark which is so striking in *Ialtris dorsalis* (Günther) led me to compare this species with the description of *Dromicus w-nigrum* and I find that the two agree in every character of scalation and coloration. I am confident that when the teeth of the type of *w-nigrum* in Hamburg are examined, they will be found to be the teeth of *Ialtris dorsalis* and not of the Alsophis (=Dromicus) type.

Thus Werner's *Dromicus w-nigrum* must go into the synonymy of *Ialtris dorsalis* (Günther).

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FURTHER DESCRIPTIONS OF NEW BIRDS FROM EL SALVADOR.[1]

BY DONALD R. DICKEY AND A. J. VAN ROSSEM.

In continuation of the systematic part of our report on Salvador birds, further undescribed forms have come to light. The four named below are from the Cordillera and were taken on or near the Honduras boundary. The interior mountains of Salvador form fingers or outposts of a great area of similar topographic and zonal features and in the absence of physical barriers there is strong probability that the new races will also be found in contiguous areas in Honduras.

Dactylortyx thoracicus salvadoranus, subsp. nov.

SALVADOR LONG-TOED PARTRIDGE.

Type.—Male adult, No. 17,610, collection of Donald R. Dickey; Volcan San Miguel, Department of San Miguel, El Salvador; altitude 4,000 feet; March 19, 1926; collected by A. J. van Rossem; original No. 10,685.

Subspecific characters.—Most closely resembling *Dactylortyx thoracicus chiapensis* Nelson, but differing in paler and more ashy coloration of the breast and flanks, and in strikingly smaller tarsi and feet

Range.—Highlands of the eastern portion of Salvador among the oaks and in the coffee fincas on Mt. Cacaguatique and Volcan San Miguel.

Remarks.—The range of this new form marks the southern limit attained by the species. The other forms of *Dactylortyx* differ so widely from *chiapensis* and *salvadoranus* as to need no comparison.

Specimens examined.—Dactylortyx thoracicus thoracicus, Mexico: Puebla, 1; Vera Cruz, 1. *Dactylortyx thoracicus sharpei,* Mexico: Yucatan, 1; Campeche, 3, including the type. *Dactylortyx thoracicus lineolatus,* Mexico: Oaxaca, 1. *Dactylortyx thoracicus devius,* Jalisco, 1, the type; Guerrero, 10. *Dactylortyx thoracicus chiapensis,* Mexico: Chiapas, 3, including the type. Guatemala, 5. *Dactylortyx thoracicus salvadoranus,* Salvador 9, including the type.

[1]Contribution from the California Institute of Technology.

MEASUREMENTS.

	Tarsus	*Middle Toe Minus Claw*
5 ♂ *Dactylortyx thoracicus chiapensis*	35.7–37.8 (36.5)	30.0–33.0 (31.4)
5 ♂ *Dactylortyx thoracicus salvadoranus*	31.2–34.0 (32.7)	28.0–29.7 (28.6)

Oreopeleia albifacies silvestris, subsp. nov.

SALVADOR WHITE-FACED QUAIL-DOVE.

Type.—Female adult; No. 19,044, collection of Donald R. Dickey; Cerro Los Naranjos, Volcan Santa Ana, Dept. Sonsonate, El Salvador; altitude 5,000 feet; semi-humid forest; May 7, 1927; "Laying"; collected by A. J. van Rossem; original No. 11,921.

Subspecific characters.—Nearest to *Oreopeleia albifacies albifacies* (Sclater) of Mexico and Guatemala, but coloration of underparts very much grayer and less reddish; pectoral region between drab and light grayish olive instead of buffy avellaneous or wood brown; flanks, sides and under tail coverts dull wood brown instead of clay color; chin and throat whitish instead of pale buff; wing coverts and upper parts slightly duller and less rufescent; forehead paler.

Range.—Humid mountain forest areas on Volcan Santa Ana, and probably in similar areas of the Cordillera of El Salvador.

Remarks.—While the three Guatemala specimens examined are redder on the nape than are southeastern Mexico specimens, as mentioned by Ridgway (U. S. Nat. Mus., Bull. 50, pt. 7, 1916, p. 494), there seem to be no other tangible differences. Considering the individual differences shown in this regard by *Oreopeleia albifacies rubida* (Nelson) we are not prepared to place any emphasis on this character at this time. In Guatemala the range of *Oreopeleia albifacies albifacies* extends south and west to Volcan Fuego. Ridgway noted no differences between Nicaragua birds from the Matagalpa region and Guatemala specimens. It therefore seems likely that the new form will not be found in Nicaragua at all and if present is probably confined to the Pacific drainage.

A dismembered bird found on Los Esesmiles apparently belongs to the new form.

Specimens examined.—Oreopeleia albifacies albifacies:[1] Mexico: Vera Cruz, 5. Guatemala: "Guat." 2; Volcan Fuego, 1. *Oreopeleia albifacies rubida:*[2] Mexico: Guerrero, 6. *Oreopeleia albifacies silvestris:* El Salvador: Sonsonate: Volcan Santa Ana, 5; Chalatenango: Los Esesmiles, 1 (?).

Antrostomus vociferus vermiculatus, subsp. nov.

SALVADOR WHIP-POOR-WILL.

Type.—Female adult; No. 18,448, collection of Donald R. Dickey; Los Esesmiles, Dept. Chalatenango, El Salvador; altitude 7,500 feet, 'cloud forest'; February 24, 1927; "laying"; collected by A. J. van Rossem; original No. 11,311.

[1]Collection U. S. National Museum.

[2]Collection Biol. Sur. in U. S. Nat. Mus.

Subspecific characters.—Nearest to *Antrostomus vociferus chiapensis* Nelson, but coloration lighter and more reddish and with black markings on scapulars reduced in size and extent; interscapular and lower pectoral regions conspicuously vermiculated with narrow transverse bars of rusty.

Range.—Pine and cloud forest region in the Cordillera in Dept. Chalatenango, El Salvador, from 6,000 to 7,500 feet.

Remarks.—The new form is a definite and probably significant step toward *Antrostomus saturatus* Salvin of Costa Rica and Panama, but is not sufficiently intermediate to link the two species.

Specimens examined.—Antrostomus vociferus chiapensis: Mexico: Chiapas: 20 miles S. E. of Teopisca, 2 ♀ ♀; Valley of Comitan, 1 ♂, the type (all in the collection of the Biological Survey, U. S. National Museum). *Antrostomus vociferus vermiculatus:* 2 ♀ ♀ from the type locality.

Colaptes mexicanoides pinicolus, subsp. nov.

SALVADOR FLICKER.

Type.—Male adult; No. 18,399, collection of Donald R. Dickey; Los Esesmiles, Dept. Chalatenango, El Salvador; altitude 8,000 feet, 'oak scrub'; February 22, 1927; collected by A. J. van Rossem; original No. 11,262.

Subspecific characters.—Resembling *Colaptes mexicanoides mexicanoides* Lafresnaye of Chiapas, but culmen shorter, crown and nape lighter and less rusty; light barring of back and wings avellaneous instead of mikado brown (Ridgway, Color Standards, 1912).

Range.—Pine and oak regions along the Cordillera in Dept. Chalatenango, El Salvador, from 3,600 to 8,000 feet.

Remarks.—Flickers have been recorded[1] from the Matagalpa region of Nicaragua and it is very possible that the range of the Salvador form will be found to extend south to that point. Unfortunately no specimens appear to be extant in available collections to determine this point.

Four specimens from Hacienda Chancol, Guatemala, are variously intermediate between the Chiapas and Salvador series, but are listed for the present under *mexicanoides.*

There are no females from Chiapas available; therefore comparison has been made on males only. By analogy the differences will be found to apply to both sexes.

Specimens examined.—Colaptes mexicanoides mexicanoides: Mexico: Chiapas: San Cristobal, 3. Guatemala: Hacienda Chancol, 4 (all in collection of Biological Survey, U. S. Nat. Mus.). *Colaptes mexicanoides pinicolus:* Salvador: Chalatenango: Los Esesmiles, 13; San Jose del Sacare, 2.

MEASUREMENTS.

	Culmen from base
4 ♂ ♂ *Colaptes mexicanoides mexicanoides*	42.4–44.6 (44.0)
7 ♂ ♂ *Colaptes mexicanoides pinicolus*	38.9–41.6 (40.1)

[1]Salvin & Godman, Ibis, 1892, p. 327.

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BORDERLINE APHID STUDIES.

BY F. C. HOTTES.

The family Aphididae presents a bewildering array of variation in its biological behavior. This lack of uniformity has usually been explained on the basis of the eccentricity of the individual species or genus, and the matter has often been dismissed as such without further inquiry, rather than to attempt to account for these apparent discrepancies as a result of some natural cause. The belief that certain of these biological characteristics indicate stages in the phylogenetic development of the family, and as such become of interest to the taxonomist, has led to their further consideration.

Aphid taxonomists have largely directed their attention to species where the presence of a large number of excellent morphological characters has made it unnecessary to consider carefully the meaning of any biological characteristics which may be present. Aphidology has now reached the place where considerable time may be profitably spent considering the family as a whole, or divided into groups. When considered in this manner the biological and ecological factors of the family heretofore considered as independent facts peculiar to certain genera or species, become ancient trail blazers to him who would go back of the present to gain some knowledge of the past. To the taxonomist interested in a natural classification this becomes a necessary procedure, for the phylogeny of a group can not be determined by the use of a single factor.

Aphids have departed widely from other insects biologically. The factor or factors responsible for this change have apparently received but little consideration, and few attempts have been made to retrace the path over which the aphids passed in going from the more generalized condition common to other insects to the derived condition which they represent. It is true that this path is no longer fresh; in places it has been obliterated by time so that it must be rebuilt in accordance with facts gathered from other sources. In other places this path lies beautifully preserved in the form of biological characteristics which have been known for a long time

but imperfectly interpreted, hence incorrectly evaluated. By the use of these biological characters, the fragments of the paleontologist, we should be able to reconstruct the various stages in the phylogenetic development of the family. The problem of the day for the aphidologist, and likely to be for many years in the future, is the weighing and evaluating of these biological characteristics in comparison to the value placed upon morphological characters. When this is done, and only when this is done, will we have a natural classification, which is the hope and aim of systematic work.

The fact that aphids have beaks in common with the order to which they belong, makes them admirably adapted to carry on a parasitic life. Leading this kind of an existence, all that is necessary for them to do is to remain attached until the host is sucked dry, or until its sap becomes unsuitable as a source of food. This parasitic habit undoubtedly was present before the Aphididae reached family rank. We would expect this, for it is one of the characteristics of the order Homoptera, although it has perhaps reached its highest development in that order in the family under consideration. Here we have reason to believe that feeding has become a continuous process by reason of the beak being attached at all times, and because of the copious amounts of honey dew produced per individual. The capacity to consume a large amount of easily obtained food and its availability in unlimited quantities, must have been one of the primary factors in bringing about viviparous reproduction. Certain it is that aphids would not be as successful as they are were it not for the fact that their hosts have proven suitable to provide an abundant source of food upon which to develop the large numbers of young per individual, and to mature them in so short a time. The strength of these insects and their success, lies largely in their power to reproduce rapidly; a condition which their method of reproduction and early maturity favors.

Sexual reproduction with the subsequent laying of the eggs by the female is the common method of reproduction in the class Insecta; the progenitors of the family Aphididae undoubtedly reproduced in this manner, for parthenogenetic viviparous reproduction certainly represents a derived condition. The sexual generation which in aphids usually occurs only once a year, where it occurs, must therefore be looked upon as the last vestige of the original method of reproduction of the family, and consequently may be viewed as one of the few biological characteristics that aphids have in common with generalized insects. The dependence of species in northern latitudes upon at least one sexual generation a year indicates that these species have gone as far as they dare in the suppression of the sexual generations. In fact the suppression of the sexual forms has gone so far in northern latitudes, that winter sometimes actually sets in before the sexual forms are produced. Consequently, a year following an early fall or a fall unfavorable to aphids in general, may see many species practically annihilated. Perhaps in such cases winter sets in so suddenly that the physical and biological factors which determine the production of the sexes do not have time enough to act. Such a condition may explain why certain species such as *Toxoptera graminum* (Rondani) migrate northward each spring from their breeding grounds in the south

instead of overwintering in the egg stage in the more northern limits of their range where under natural conditions the sexual forms are not produced. In other words I assume that either a physical or biological impulse acting through a period of time is necessary to bring about the production of the sexual forms, and that in case unfavorable conditions prevent the reaction time being carried to completion that the aphid dies before the sexual forms are produced.

An aphid species completing its cycle of generations upon a single host species must of necessity confine its range within the range of its host. A species having a primary host upon which the sexual forms are produced, and a secondary host upon which the summer generations occur, may extend its permanent range without reference to the range of its primary host as long as it is able to reproduce viviparously parthenogenetically throughout the year within the range of its secondary host. Considering the scarcity of distributional records for the family Aphididae it is quite remarkable that Mordwilko was able to list several species which have extended their range beyond the range of their primary hosts.

Aphid species in the tropics have established complete independence from the sexual forms, for here parthenogenetic viviparous reproduction may be carried on throughout the year. Because of this well known fact, weather conditions have been thought to influence the production of the sexual forms so that the species may be carried through periods in the egg stage which otherwise would be unfavorable to them or their hosts. Aphids are not indigenous to the tropics. The question naturally arises as to how long species in the tropics retain the ability to produce the sexual forms when called upon to do so by a radical change in their environment which threatens them with destruction, due to their inability to maintain themselves further by parthenogenetic means. This question is difficult to answer without subjecting such species to the environmental factors which produce the sexual forms. This can not be done until the environmental factors themselves are known. There are indications, however, that the period of time necessary to bring about the total suppression of the sexual forms is considerable, for apparently not enough time has elapsed since the aphids invaded the tropics to make this suppression complete. Takahoshi has listed several species which still produce one or the other of the sexual forms but never both. This fact indicates very strongly that such species are in what may be called a transitional stage. In this connection it is interesting to note that two of the species listed by Takahoshi as producing only males are cosmopolitan species probably native to Europe.

That the weather and other physical factors are not entirely responsible for the occurrence of the sexual forms at specified periods of the year is evident, for some species produce the sexual forms intermittently throughout the year. Such a habit is to be looked upon as very primitive for it indicates an intermediate step between the time when aphids reproduced wholly by sexual means and the present. Near Taihoku, Formosa, according to Takahoshi, the leaves of young Celtis trees remain green throughout the year. Aphids feeding upon such trees fail to produce the sexual forms. However, older Celtis trees growing in the same locality shed

their leaves and it is upon such trees that the sexual forms are produced. Such a condition as this, and the intermittent production of the sexual forms mentioned previously, would appear sufficient to question physical factors such as temperature and light as factors *directly* influencing the production of the sexual forms.

The capacity to pass through a large number of generations in a given year is a derived condition peculiar to most aphids. Certain species of aphids, however, such as *Mindarus abietinus* Koch and *Georgiaphis ulmi* (Wilson) have not developed this capacity, the number of generations for these species being greatly reduced. These species spend the greater portion of the year in the egg stage, a harking back, as it were, to a time when there were but few generations a year for the class, a condition which is even now the most prevalent.

The problem of aphid migration is extremely interesting, for it is here that many of the apparent discrepancies in the biological behavior of the family Aphididae occur. We shall not concern ourselves with the question whether insects were first monophagous or polyphagous for it would appear to be better to base such conclusions upon the habits of insects lower in the scale of development than the Aphididae, for such a fundamental function as the procuring of food must have been firmly established before these insects reached family rank. As far as aphids are concerned, the evidence is quite conclusive that the direct progenitors of the family were monophagous.

Largely upon morphological grounds the series Lachnea has been looked upon as the oldest series of the family, and there is ample biological evidence to substantiate this view. The series Lachnea has not been a progressive group. It is represented by comparatively few species which show but slight variation in their morphological and biological characteristics. Hence, particular attention may be directed to a study of the biological characteristics of the tribe Lachnini which is considered to be the oldest tribe belonging to the series Lachnea. All of the species belonging to this tribe are intimately associated with species belonging to the family Pinaceae which is an old family of plants—thus fulfilling a necessary condition—for the association of an old species with a comparatively new host would not have the significance that may be attached to the association of an old species to an old host. A few species belonging to the tribe Lachnini, it is true, are not monophagous but there is nothing suggestive of a formal migration from one host species to another. The species which are not monophagous develop equally well in all their stages upon two or three hosts which are hardly ever more distantly related than specifically.

A species which confines its feeding to species belonging to a single host genus, or at most to species belonging to a family would appear to represent a very primitive polyphagous condition. This is precisely the condition that is commonly met with in many of the tribes belonging to the family and is particularly true of the tribes closely associated to the Lachnea. Polyphagous aphids must not be regarded as omnivorous in any sense of the word, for species in which the polyphagous habit has reached its

highest development are still highly restricted in their choice of food plants when compared with more generalized polyphagous insects. The polyphagous habit appears not to be well developed or established in the sexual forms which still confine their feeding and oviposition to a very narrow range of hosts if they show any tendency towards a polyphagous habit at all. The tendency of the sexual forms to be monophagous suggests again the original feeding habit.

If one accepts the theory that aphids first reproduced wholly by sexual means, further evidence that aphids were originally monophagous may be brought forth which is even more direct and convincing than the evidence furnished by the tribe Lachnini. The evidence is quite conclusive that an aphid species is either monophagous in the sense that it does not migrate from a primary host to a host distantly related to it, or that the primary host upon which the sexual forms are produced is older than the secondary host. For an aphid species to have been originally polyphagous, the secondary and primary hosts would have had to exist at the same time and to have had the same range. Such a condition is not met with by the plants which aphids having a formal migration have chosen for hosts, for usually a wide gap exists between the relationship of the primary and the secondary host plants. This can only be explained by their having originated at different times. However, there are exceptions to the rule that the secondary host is always younger than the primary; these exceptions may, however, for the most part be ruled out, for the secondary hosts in such cases are grasses upon which the complete cycle of generations can not occur, due to the fact that the eggs can not pass the winter on the roots.

The fact that some aphid species migrate from an overwintering primary host to a secondary summer host and back is an extremely interesting phenomenon, and one which immediately challenges the curiosity of the naturalist. The factors responsible for the production of alate individuals have been the object of a great deal of research, but the fact remains that the factors thought to be responsible for the production of wings (without which there could be no migration), do not explain why it is necessary for a species having a formal migration to migrate from its primary host to an entirely unrelated secondary host. The development of wings in species having a formal migration must, therefore, be looked upon as a taxic response to food, a response not directly associated with the function of distribution, as is the case with the development of wings in non-migrating species. It may be suggested that perhaps the sap of the primary host undergoes some change in its osmotic concentration or in its chemical nature which is unfavorable to the aphids which feed upon it. This reason will not explain why species, perhaps belonging to the same genus, and having similar feeding habits may remain upon such a host throughout the year; nor will it explain why such a migrating species may occasionally be collected throughout the year upon the primary host; neither will it explain why a species may feed upon the same host in the fall from which it was caused to migrate in the spring without any harmful effects. Perhaps the continued feeding upon a given host for a few generations has an

accumulative effect upon certain species of aphids so that the sap of that particular host becomes toxic to them and a migration to an unrelated host necessary. Such a condition as that just referred to could not arise until the family had developed the capacity to pass through a number of generations a year, and would not arise in a species capable of counteracting the toxic effect. This hypothesis is not without its objections, but in the absence of experimental evidence contrary to it and the preceding hypothesis, it would appear to be better to delay judgment until such evidence as may be gathered is at hand.

Wings are perhaps the most characteristic structures insects have, and have always been so. The absence of wings is a derived condition which aphids have gone a long way to establish. The factor responsible for bringing about the apterous condition in aphids has undoubtedly been their parasitic habit. It is easy to see that such small delicate insects as the Aphididae, at the mercy of every gust of wind and highly restricted in regard to hosts, would be greatly benefited by any condition tending to lessen the danger of becoming lost from suitable food sources. The wings of the oviparous females (where they are a positive detriment and add only to the possibility of them becoming lost from a suitable host for the young, which are to hatch from their eggs) have all but disappeared, there being but few species where they have been retained, indicating a very primitive condition. The males of many species are apterous (a derived condition) other species have both apterous and alate males (an intermediate condition) while still other species have all of the males alate (a primitive condition). In regard to wings, species belonging to the tribes *Callipterini* and *Calaphidini* are decidedly more primitive than the Lachnini, for in these tribes the summer generations invariably acquire wings before reproducing.

The close continuous relationship that aphids have established with their hosts is not without its phylogenetic significance and in the future this relationship is bound to receive careful consideration from the aphid taxonomist. The narrow range of plants that almost all groups of aphids have selected as hosts, furnishes convincing evidence that aphids have kept up with the evolutionary pace set by their hosts—the plants. Such evidence as this when carefully considered may indicate the approximate time that certain groups of aphids originated. Such evidence, however, must either be based upon monophagous aphids or upon the primary hosts which the species as a group have selected. The position of the secondary host in its botanical classification is not without its special significance, for the relative position of the secondary host in relation to the position of the primary host should indicate the approximate time in which the species became polyphagous. The divisions already made between the *Chaitophorini* and the *Callipterini* and between the Aphidini and Macrosiphini on morphological grounds are substantiated biologically by the hosts which they as groups have selected for food. The host relationships may in the future suggest the association of the tribe Hormaphidini with the tribes Calaphidini and Callapterini in the subfamily Aphidinae.

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A NEW GRINDELIA FROM TEXAS.

BY S. F. BLAKE.

Several years ago the writer received from Mr. Paul C. Standley a sheet of Grindelia collected in southern Texas by Mr. Robert Runyon which could not be referred to any described species. Further specimens from the same region now received from Dr. J. N. Rose demonstrate that the plant is new and one of the most distinct of its genus, in which the species are for the most part very closely allied and difficult to distinguish.

Grindelia oolepis Blake, sp. nov.

Perennial, several-stemmed, decumbent at base, obscurely puberulous on the peduncles, otherwise glabrous, not at all viscid; leaves small and narrow, narrowly oblanceolate to linear or lanceolate, entire or subremotely and saliently toothed; heads small, discoid, solitary at tips of stem and branches; involucre about 5–6-seriate, graduate, 6–7 mm. high, the phyllaries lance-ovate or lanceolate (outermost) to ovate or broadly oblong, appressed, with abruptly subherbaceous, deltoid to triangular, flat, merely acute tips; achenes truncate at apex; pappus awns 2, smooth, straightish, slightly longer than the achene.

Stems 20–35 cm. long, erect from a more or less decumbent base, slender, simple or in age branched, leafy; basal tufts not seen; lower leaves narrowly oblanceolate, about 2.5 cm. long (in smaller specimens), 4 mm. wide, entire, thick, obtuse, pale green; stem leaves linear to lanceolate, 1.5–4.5 cm. long, 2–4.5 mm. wide, acute, mucronulate, sessile and subclasping; peduncles (naked tips of branches) 0.7–2.5 cm. long, sparsely puberulous or pilosulous; heads (as pressed) 6–8 mm. high, 9–14 mm. thick; involucre hemispheric, the outer phyllaries about 1 mm. wide, the middle and inner 1.5–2 mm., with subscarious margin below and ciliolate punctate tips, those of the outer phyllaries about equaling the indurate base, those of the inner much shorter, all appressed or the outermost slightly loose but not squarrose; flowers slightly resinous, the involucre not so; corollas yellow, glabrous, 4–4.8 mm. long; achenes oblong, 2.5–3

mm. long, 1–1.5 mm. wide, yellow brown, weakly striate, in age sometimes obscurely rugulose; pappus awns subequal, 4 mm. long, caducous.

TEXAS: In crawfish lands, gumbo soil, El Jardin to Point Isabel road, Cameron Co., alt. 10 m., 5 Aug., 1923, *R. Runyon* 506 (type no. 1,119,563, U. S. Nat. Herb.); northeast of Brownsville, 24 Oct., 1927, *J. N. Rose & P. G. Russell* 24208.

A species well characterized by its lack of viscidity, its narrow, entire or rather remotely and saliently toothed leaves, its small discoid heads solitary at tips of the peduncles, and its lance-ovate to broadly oblong, flat-tipped, almost or quite completely appressed phyllaries. It is related to *G. decumbens* Greene, a species of somewhat different habit, with somewhat larger, cymose-panicled, viscid, radiate heads, and narrower, mostly linear or lance-linear phyllaries, at least the middle or outer of which are spreading-tipped; to *G. oxylepis* Greene, an annual or at most biennial single-stemmed Mexican species with somewhat larger radiate heads, short but definitely squarrose flattened-subulate herbaceous tips to the outer and middle phyllaries, and pappus awns twice as long as the smaller achenes; and to *G. platylepis* Greene, known to me only from description, a subalpine species of Wyoming, with broader and larger leaves, broad rays, and barbellulate pappus awns.

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A NEW KANGAROO RAT FROM SONORA.

BY E. A. GOLDMAN.

The range of Merriam's kangaroo rat (*Dipodomys merriami*) embraces the varied territory extending from northern Nevada south to such distant points as Cape San Lucas, Lower California, and over the tableland of Mexico east of the Sierra Madre to southern Coahuila. The species is subdivisible into about a dozen subspecies or geographic races each distinguished by a peculiar combination of color and cranial characters. An arm of the range of the species extends southward on the Mexican mainland, west of the Sierra Madre, approaching the Tropical Zone in southern Sonora. Specimens from the more southern localities in this region are referred to a new subspecies described as follows:

Dipodomys merriami mayensis,[1] subsp. nov.

ALAMOS KANGAROO RAT.

Type from Alamos, Sonora, Mexico. No. 96437, ♂ adult, U. S. National Museum (Biological Survey Collection), collected by E. A. Goldman, December 19, 1898. Original number 13302.

General characters.—A rather dark-colored form, most closely allied to *Dipodomys merriami merriami*, but upper parts darker, tail blacker; skull differing most prominently in greater expansion of maxillary arches. Hind foot with four toes as usual in the species.

Color.—Type (fresh pelage): Upper parts in general near cinnamon-buff of Ridgway, moderately mixed with black, the dark hairs giving a finely lined appearance, especially on top of head and over back; under parts, fore limbs, hind feet above, supraorbital and postauricular spots, usual hip stripes and tail at extreme base all around pure white; tail beyond extreme base slaty blackish along upper and lower median stripes to near tip where the lengthening hairs are blackish all around, the sides

[1]Named for the Mayo Indians, who inhabit the region of the type locality.

white passing gradually into dusky subterminally, the lighter under color persisting to extreme tip; outer sides of ankles and soles of hind feet distinctly blackish; dark facial markings rather broad and conspicuous.

Skull.—Similar to that *D. m. merriami*, but maxillary arches broader, the lateral angles more everted and hook-like; rostrum slightly heavier, the nasals slightly broader anteriorly than usual in *merriami;* mastoid and audital bullae about the same. Resembling that of *D. m. melanurus* in development of maxillary arches, but mastoid and audital bullae decidedly smaller.

Measurements.—Type: Total length, 240 mm; tail vertebrae, 138; hind foot, 37. *Skull* (type): Greatest length (on median line), 34.3; greatest breadth (between outer sides of audital bullae), 23; breadth across maxillary arches, 20.5; least width of supraoccipital (near interparietal), 1.6; maxillary toothrow, 3.8.

Remarks.—While this kangaroo rat is closely allied to the widely ranging typical subspecies it is easily distinguished by the rather well-marked combination of color and cranial characters pointed out. It somewhat resembles *D. m. melanurus* of southern Lower California, but is darker and cranial distinctions have been mentioned.

Specimens examined.—Total number, 20; from localities in Sonora as follows: Alamos (type locality), 4; Camoa, 16.

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A NEW HARE FROM THE MOUNTAINS OF CHINA.

BY A. BRAZIER HOWELL.

Further study of the Chinese hares in the United States National Museum indicates the necessity of a new name for one of the series. In appreciation of the work of Rev. David C. Graham, who has made available so many rare vertebrates of this interesting country, this form may be known as follows:

Lepus grahami, sp. nov.

Type.—Female adult, skin and skull no. 239,875, U. S. National Museum, from Ulongkong, about 10 miles south of Tatsienlu, Szechwan, China; altitude about 10,000 feet. Collected by David C. Graham, date unknown but evidently in late July or early August, 1923; original number 8.

Diagnosis.—A large, long-eared, boreal hare allied to *L. comus*, but face and especially ears grayer and blacker. The black areas of the hairs of the dorsum are much more extensive and the light areas less ochraceous. The lower rump is markedly dark steel gray and the tail is variable, being either pale gray and black, or white and dark gray.

Skin.—There is some variation in the color of the head. The cheeks are always grayer and the frontal region blacker than in *comus*, but in some specimens the cheeks are clear gray without ochraceous and the forehead almost black. The backs of the ears are pure gray and the front, blackish and ochraceous, while there is much solid black below the tips and the borders are pure white instead of buffy white. The nape is not black as in *nigricollis* but is darker and less ochraceous than in *comus*. The dorsum is grayer and with a much greater proportion of black to the hairs. They are steel gray at base, but whereas in *comus* this is restricted and then succeeded by a broad band of ochraceous, the latter feature is almost lacking in *grahami*, there being but a faint suggestion of this color proximal to the black annulation. The rump is strikingly bluish steel gray tending toward black medially. The tail is narrowly dark middorsally, either black or dark gray, while below this member is either pale gray or white. There is nothing distinctive about the feet or the underparts, the latter being white with the usual ochraceous throat patch.

Skull.—Unfortunately there is no skull of *comus* at hand. The skull of *grahami* is, however, more massive than those of the *tolai* group, this being especially noticeable in the width of the rostrum and braincase. The supraorbital processes are larger and their anterior fissures more extensive. The postero-inferior part of the audital bullae is also smaller, thus affecting the inclination of the paroccipital processes.

Measurements.—None of the skins are accompanied by measurements. In the case of the dried specimens the length of the ear "from skull" is from 115 to 125 mm., while that of the hind foot is about the same. The skull of the type measures: greatest length, 105; width, 43; length of nasals, 40; width of nasals, 21 mm.

Material.—Ten: five (including the type) from Ulongkong and Tatsienlu, and five—not typical—from the Yellow Dragon Gorge, near Sungpan, Szechwan.

Remarks.—Of the alpine hares of this section of Asia, the group to which belong the forms *tibetanus, hypsibius, oriostolus, pallipes* and *stoliczkanus* is very distinctive and has nothing to do with *grahami.* Satunin states that his *L. kozlovi* also belongs to this group and deWinton says the same of his *L. sechuenensis,* although his figure does not indicate the fact. Rather does it show a type of hare more on the order of *L. europaeus.* But at least it is very different from *grahami.* G. M. Allen has kindly loaned me the paratype of *L. comus,* and although this and *grahami* undoubtedly belong to the same group and their relationship may well prove to be subspecific, the Szechwan series is so distinct that it must be separated. The coloration of the latter is closer to typical *nigricollis* than is that of *comus,* the chief points of difference being the dorsal tone and lack of black upon the nape. The five specimens from Yellow Dragon Gorge vary in the direction of *comus* but are nearer *grahami.* By the use of the binomial it is not meant to imply that the latter is believed to be a full species, but this course is followed pending a better understanding of the highland hares of this part of Asia.

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NOTES ON THELESPERMA.

BY S. F. BLAKE.

The genus *Thelesperma* includes about 10 species, ranging over the plains of western North America from South Dakota and Missouri to Texas, west to the Rocky Mountains, and south to northern Mexico. A single species, which appears to be identical with the commonest species of the western United States, occurs on the pampas of Argentina and Uruguay. The conspicuously whitish- or yellowish-margined inner phyllaries, connate into a cup for usually about half their length, render the genus one of the most readily recognized of the *Bidens* group. The disk corollas of some and perhaps all the species show a peculiarity that does not seem to have been described hitherto. They are more or less strongly zygomorphic in the manner of *Pectis*, the incisions separating one of the teeth (the outermost) being deeper than the others. The following notes are based on material in the U. S. National Herbarium and on a number of sheets from the Gray Herbarium kindly lent for study by Dr. B. L. Robinson.

Thelesperma subaequale Blake, sp. nov.

Perennial; leaves once or twice ternatisect, the segments usually filiform; heads radiate; outer phyllaries narrowly subulate, 4–7 mm. long, about equaling the inner; achenes trigonous, wing-margined; pappus of 2 short stout teeth; teeth of disk corollas much shorter than throat.

Herbaceous perennial, 55–85 cm. high, glabrous throughout except for the slightly ciliolate petioles, glaucescent; stems about 2, remotely leafy, slightly branched above, bearing 2–7 heads; leaves opposite; lower leaves ternatisect, about 5.5 cm. long (including petiole, this about 2 cm. long), the terminal lobe about 3-parted, the segments narrowly linear or linear-filiform, acuminate, 0.8–1.3 mm. wide; middle stem leaves similar, pin-

nately 3- or 5-sect, the terminal and often the lateral lobes again 3-sect; upper leaves usually 3-sect, only those of peduncles and sometimes one of the uppermost pair at base of peduncles simple; heads 2–7, 2–3 cm. wide, on peduncles 9–15 cm. long; outer phyllaries 8, narrowly subulate, acuminate, herbaceous, 4–7 mm. long, from two-thirds as long as the inner to equaling them; inner phyllaries united for one-third to two-fifths their length, with broad whitish margins (these 0.5–1 mm. wide); rays 8, golden yellow, shallowly 3-lobed, the lamina broadly cuneate, about 12 mm. long, 7 mm. wide; disk flowers numerous, their corollas golden yellow or orange (when dried), sparsely pilose at base of throat, 4.2–5.2 mm. long (tube 1.5–2.2 mm., throat oblong-cylindric, 1.8–2.5 mm., teeth unequal, the 4 shorter ones deltoid or ovate-deltoid, acute, slightly hispidulous at apex, 0.6–0.8 mm. long, the fifth triangular-ovate, 1–1.2 mm. long); pales oblong, rounded, broadly scarious-margined, about 5 mm. long; achenes meniscoid, blackish at maturity, about 4 mm. long, 1–2 mm. wide, coarsely blunt-muricate on the rounded back, the lateral angles and the central face each with a broad blunt corky wing-like margin, the inner achenes narrower and with thinner wings; pappus of 2 stout, triangular, denticulate or sparsely retrorse-hispidulous teeth 0.2 mm. long or less; style tips broadened and hispid above, then subtruncate and abruptly terminated by subulate hispid appendages 0.4 mm. long.

Nuevo León: Limestone ledges of the Sierra Madre above Monterey, alt. 915 meters, 5 June 1906, *Pringle* 10192 (type no. 462236, U. S. Nat. Herb.; duplicate in Gray Herb.).

The type collection was distributed as *T. filifolium* Gray (= *T. trifidum* (Poir.) Britton), which belongs to another group of the genus characterized by having the teeth of the disk corollas longer than the throat. The relationship of the species is rather with *T. simplicifolium* A. Gray, which has normally several pairs of undivided upper leaves, much shorter outer phyllaries (less than half as long as the inner), and unwinged achenes.

Thelesperma burridgeanum (Regel) Blake.

Cosmidium burridgeanum Hort.; Regel, Ind. Sem. Hort. Petrop. **1857**: 40. 1858.

Cosmidium burridgeanum atropurpureum Van Houtte, Fl. Serres **13**: 55. *pl. 1321*. 1860.

Thelesperma hybridum Voss in Vilmorin's Blumengärtnerei ed. 3.**1**: 484. fig. 1896.

Thelesperma hybridum f. *atropurpureum* Voss, l. c. 485. 1896.

The history of this species is of considerable interest. Well described by Regel in 1858 under the garden name *Cosmidium burridgeanum*, with the habitat "Texas ?", it seems not to have been mentioned again in botanical literature, aside from a horticultural note by Van Houtte, until Dr. Gray[1] in 1884 briefly disposed of it with the following remark: "Cosmidium Burridgeanum of the gardens is a hybrid of *T. filifolium* and *Coreopsis tinctoria*, acquiring its brown-purple rays from the latter."

[1]Syn. Fl. **1**[2]:301. 1884.

Since then the species has apparently disappeared from consideration as a native American plant, although it still figures in gardening literature. Voss, in the work cited above, describes it under the new name *Thelesperma hybridum* (citing *Cosmidium burridgeanum* "Hook." as a synonym), calls it a hybrid of *T. trifidum* and *Coreopsis tinctoria*, and gives a small figure representing well enough the habit of the plant. He describes the rays as "orangegelb am Grunde braun-gefleckt," and mentions a much more beautiful "f. *atropurpureum*," in which the rays are dark purple with only a narrow golden margin. The plant figured by Van Houtte in 1860 as *Cosmidium burridgeanum atropurpureum* appears to have been slightly different from Voss's. The plant is also briefly described and figured in Bailey's Standard Cyclopedia of Horticulture,[1] the description and figure being taken over from his Cyclopedia of American Horticulture.[2]

To Miss Ellen D. Schulz of San Antonio, Texas, belongs the credit for the rediscovery of this plant in a wild state and the acquisition of material which has made it possible to establish its specific distinctness. Among some specimens sent to the U. S. National Herbarium by her in 1926 was a specimen of this species collected near Pleasanton, Atascosa County, Texas, in May, 1926. Later Miss Schulz sent more specimens collected in sandy loam 2 miles south of Pleasanton on 24 April 1927, with the information that the plant seemed to be confined to sandy regions and was not found in limestone areas (in which *Thelesperma trifidum* grows). Neither of the supposed parent species grew in the vicinity. Additional specimens were grown for the writer in the Department of Agriculture greenhouses from seed supplied by Miss Schulz. An earlier specimen collected by Miss Schulz at "San Antonio, July, 1921," has been found by the writer in the *Thelesperma trifidum* cover at the National Herbarium.

Although the species had been quite lost sight of as a wild plant and is almost unknown in herbaria[3] (there is no specimen at the Gray Herbarium, and only those supplied by Miss Schulz in the National Herbarium), it is far from being an extinct species, and any one who cares to invest five cents in a packet of seeds of "Cosmidium" as sold by Northrup, King & Co. can easily obtain an abundance of specimens. On the cover of the packet from which my specimens were grown in 1928 three color forms are depicted—one with deep red rays, one with orange rays, and one with rays of a clear light yellow; in no case is a lighter margin shown. Specimens grown from these seeds were of two quite distinct color forms. In one the rays were deep velvety red-brown, with golden tip and very narrow golden margin (the golden color visible only on the upper surface); in the other the red-brown was replaced by deep orange tinged with brown. In both cases the disk corollas were of essentially the same color as the darker part of the rays. These two forms evidently correspond to the two forms first mentioned as represented in the chromo-like

[1]Stand. Cycl. Hort., 6:3329. *f.* 3792. 1917.

[2]Cycl. Amer. Hort. 4:1792. *f.* 2495. 1902.

[3]In addition to the specimens sent by Miss Schulz and those grown from seed, I have examined only one specimen. This is a sheet in the Schultz Bipontinus Herbarium at Paris, sent by Alexander Braun from the Berlin Garden in 1857, and labeled "Cosmidium Buridgianum."

seedman's illustration, in which the golden margin of the rays was omitted; the third form there figured, with light yellow rays, is probably a pure invention of the artist. All the specimens grown from seed sent by Miss Schulz were of the dark reddish brown form, which is also the one described by Regel ("ligulis . . . atrofuscis, superne luteo-marginatis"). The lighter colored one is apparently the one taken by Voss as the typical form of his *T. hybridum*.

Thelesperma burridgeanum is clearly not a hybrid. All its characters, including the all-important ones of achenes and involucre, are constantly those of *Thelesperma*, and there is no suggestion in any of the specimens I have seen or grown of *Coreopsis tinctoria*. The purple-brown base of the rays, which is of course the source of the belief that *Coreopsis tinctoria* is one of its parents, is a feature that occurs in a number of species of *Coreopsis* and might be expected to recur in the related genus *Thelesperma*, although it is not known in any other species of that genus. The most distinctive feature of the species is the more or less densely hispidulous outer involucre, which is not found in either of the putative parents and is otherwise unknown in *Thelesperma*. The plant should be looked for by collectors in other parts of Texas. It may be recognized by the following short diagnosis:

Annual with the habit, foliage, involucre, flowers and fruit of *Thelesperma trifidum* (Poir.) Britton; outer phyllaries more or less densely hispidulous on back and margin; rays with purple-brown or orange-brown base and broad or narrow golden tip and margin. Definitely known in the wild state only from specimens collected in Bexar and Atascosa Counties, Texas, by Ellen D. Schulz.

THELESPERMA MEGAPOTAMICUM (Spreng.) Kuntze, Rev. Gen. Pl. **3**²:182. 1898, as *Thelespermum.*

Bidens megapotamica Spreng. Syst. Veg. **3**:454. 1826.
Tagetes flosculosa Spreng. Syst. Veg. **3**:571. 1826.
Bidens gracilis Torr. Ann. Lyc. N. Y. **2**:215. 1828.
Thelesperma scabiosoides Less. Linnaea **6**:512. 1831.
Bidens paradoxa D. Don; Hook. & Arn. Journ. Bot. Hook. **3**:319. 1841, as synonym.
Thelesperma gracile A. Gray, Journ. Bot. & Kew Gard. Misc. Hook. **1**:252. 1849.
Bidens leyboldi Phil. Anal. Univ. Chil. **27**:338. 1865, fide Baker.
Isostigma megapotamicum Sherff, Bot. Gaz. **81**:252. 1926, as to name-bringing syn. only.

The North American *Thelesperma gracile* (Torr.) Gray, which ranges from Nebraska and Wyoming to Texas, Arizona, Nuevo León, and Coahuila, has been universally regarded as distinct from *T. megapotamicum*[1] of the pampas of Argentina and Uruguay. Apparently the only author who attempted to assign differential characters was Dr. Gray, who stated[2]

[1] Usually known as *T. scabiosoides* Less.; see Sherff, Bot. Gaz. **76**:91. 1923.
[2] Syn. Fl. **1**²:301. 1884.

that *T. scabiosoides* "closely represents *T. gracile*, but has more filiform foliage and longer-awned pappus." Comparison of the half-dozen sheets of *T. megapotamicum* (*T. scabiosoides* Less.) in the National Herbarium, presumably comprising much more material than was accessible to Gray, with very abundant specimens of *T. gracile* shows that these characters do not hold, and the most careful comparison has failed to bring out any other differences. In habit, glaucescence, and foliage, in occasional ciliation of petioles, in involucre, flowers, and fruit the South American specimens can not be separated from the North American by any characters, and it seems necessary to unite them under the older name. *Thelesperma megapotamicum* appears to be unique in the details of its distribution among all North American Asteraceae, but is nearly matched by *Malacothrix coulteri* A. Gray, which occurs in southern California and southwestern Utah, and again in Argentina, without known intermediate stations. An interesting comparison of the floras of New Mexico and Argentina, with lists of identical and representative species, was published some years ago by Mr. Standley.[1]

The types of *Bidens megapotamica* and *Tagetes flosculosa* Spreng., mounted on the same sheet in the Schultz Bipontinus Herbarium at Paris, were examined and photographed by the writer in 1925. The identity of *Tagetes flosculosa* does not seem to have been recorded previously. Dr. E. E. Sherff, who had not seen the true type of *Bidens megapotamica* Spreng., has recently based the name *Isostigma megapotamicum* on a supposedly authentic specimen of *B. megapotamica* in the Delessert Herbarium. My photograph of the real type of Sprengel, preserved in the Schultz Bipontinus Herbarium, shows that this course was erroneous.

Baker's[2] figure of the involucre is very poor, and his description of the flowers as "purpurascentes," which would indicate a difference from the North American plant, is incorrect. The corollas are golden with brown or purple-brown nerves, as shown both by the specimens and by Kuntze's notation ("gelb") on one of his labels.

THELESPERMA SUBNUDUM A. Gray, Proc. Amer. Acad. **10**:72. 1874.

In his treatment[3] in 1900 of the Rocky Mountain species, which is copied in his "Flora of the Rocky Mountains and Adjacent Plains,"[4] Dr. Rydberg has chosen for his primary character in dividing the genus the presence or absence of rays, and has placed *T. subnudum* in the radiate group. In the writer's key[5] to the two species of Thelesperma occurring in Utah and Nevada, *T. subnudum* was also treated as a radiate species. The species was described by Gray as with "radiis nullis," and the type, *Parry 109* in the Gray Herbarium, from southern Utah, shows no sign of rays. In the original description Gray stated that *T. subnudum* "re-

[1] P. C. Standley, "Comparative notes on the floras of New Mexico and Argentina," Journ. Washington Acad. Sci. **6**:236–244. 1916.

[2] In Mart. Fl. Bras. **6**[3]:249. *pl. 73, f. I.* 1884.

[3] Bull. Torrey Club **27**:630–632. 1900.

[4] Page 936–7. 1917.

[5] In Tidestrom, Contr. U. S. Nat. Herb. **25**:586. 1925.

sembles *T. subsimplicifolium* var. *scaposum*, which was also collected by Dr. Parry." The latter name was apparently never published accompanied by a description. The specimens (*Parry* 108, from southern Utah) on which it was based were referred to *T. subnudum* by Gray in revising his material for the "Synoptical Flora," and the description of *T. subnudum* was amplified[1] to include radiate forms. Parry's plant (no. 108) is radiate (rays about 7–10 mm. long), but in all other respects so similar to the type of *T. subnudum* that it seems correctly treated by Dr. Gray as a radiate form of that species. With the exception of the type, all the material of this species seen (from Utah, New Mexico, and Arizona) is radiate.

Thelesperma marginatum Rydb.[2] of Montana and adjacent Canada is very closely allied to *T. subnudum*. The stem usually bears 2 or 3 smaller, always discoid heads, and the bracts are less broadly white-margined than those of *T. subnudum*. Several collections from Montana have been examined, including two cited in the original description. Parry's Green River plant, referred to in the Synoptical Flora under *T. subnudum*, is *T. marginatum*.

THELESPERMA SIMPLICIFOLIUM A. Gray, Journ. Bot. & Kew Gard. Misc. Hook. **1**:252. 1849, as *T. simplicifolia.*

Cosmidium simplicifolium A. Gray, Mem. Amer. Acad. II. **4**:86. 1849.
Thelesperma subsimplicifolium A. Gray in Torr. Bot. U. S. & Mex. Bound. 90. 1859.

When redescribing this species in 1859, Dr. Gray altered the name to *T. subsimplicifolium* "to bring it nearer the fact," and has been almost universally followed in this respect by later writers.[3] The rule of priority necessitates, of course, the use of the original name *simplicifolium.*

[1]Syn. Fl. **1**[2]:302. 1884.

[2]Mem. N. Y. Bot. Gard. **1**:421. 1900.

[3]In his "Catalogue of North American Plants" (1898, p. 148), A. A. Heller used the name *T. simplicifolium*, citing *T. subsimplicifolium* as a synonym.

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A NEW VIOLET FROM COLOMBIA.

BY WILHELM BECKER.

Among several specimens of *Viola* from South America, recently submitted to the writer for determination, one represents a new species. It may be described as follows:

Viola colombiana W. Becker, sp. nov.

E sect. "Leptidium" Ging. emend. W. Becker; *V. heinbachii* W. Becker affinis, foliis basi truncatis in petiolum angustatis non cordatis apice acutiusculis non acuminatis crenato-serratis diversa.

Rhizoma repens, caules circ. 20–30 cm. altos ±dense foliatos emittens. *Caules* ±ramosi, glabri, circ. 2 mm. crassi, adscendentes. *Stipulae* ±virides, lanceolatae, potius elliptico-lanceolatae, adversus basim angustatae, circ. 1 cm. longae, aequaliter fimbriatae; fimbriae circ. 1–1.5 mm. longae. *Folia* basi truncata, in petiolum angustata, ovata, acutiuscula, non acuminata, circ. 3 cm. longa, 2 cm. lata, glabra, distincte tamen non profunde crenulato-serrulata; petioli circiter 1–1.2 cm. longi. *Flores* dilute violacei, obscure violaceo-striati; petala 11–13 mm. longa, oblongo-obovata; pet. infimum latum, brevissime calcaratum; sepala 5 mm. longa, lanceolata, non acuminata; stylus apice non curvatus, acutus.

Colombia, Eastern Cordillera, Dept. Santander; mountains east of Las Vegas, open hillsides, 3000–3300 meters, December 20, 21, 1926, collected by E. P. Killip and Albert C. Smith, no. 15779 (U. S. Nat. Herb. no. 1,351,604;—Becker Herb. Viol.).

V. scandens Willd. folia basi subcordata brevius petiolata plane crenata et *stipulas paullum fimbriatas* habet.

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DESCRIPTIONS OF THREE NEW SUBSPECIES OF BIRDS FROM MEXICO AND GUATEMALA.

BY E. W. NELSON.

The collections of birds made for William Brewster many years ago in western Chihuahua and southern Sonora, Mexico, has yielded numerous types of previously unknown birds. Two of the subspecies here described are from this same source. The long, deep, north and south canyons along the western slope of the Sierra Madre in Chihuahua and bordering parts of Sonora have their heads toward the Arizona border and the small rivers flowing southerly down them turn westerly and flow into the Pacific through southern Sonora. The southern parts of these canyons reach the border of the tropical zone, and a considerable number of tropical species of birds from the western basal slopes of the Sierra Madre to the south extend their range northward up these deep hot canyons. The *Aratinga* and *Hesperiphona* here described are both of tropical origin and must have arrived at this northern extremity of range along this route, for their nearest relatives are known only from the eastern coastal slope of Mexico, on the far side of the Mexican tableland. So far, however, there appears to be no record of either of these forms having been taken elsewhere in western Mexico, although work has been done in that region by a number of good collectors. It appears obvious from the material secured by Brewster's collectors that further work in western Chihuahua, southern Sonora, and eastern Sinaloa would be fruitful in valuable additions to our knowledge of the bird life of a most interesting region. In the 80's when Brewster's collectors visited this region it was difficult of access, but to-day a railroad extending from

Chihuahua City to Jesus Maria, one of Brewster's main localities, and the Southern Pacific extending from Arizona south through middle Sonora and Sinaloa render work in that entire region very simple. I know of no better opportunity for American ornithologists who desire to work south of our borders. It is a wonderfully picturesque region with a healthy climate.

I take pleasure in acknowledging the courtesy of the Museum of Comparative Zoology, through Outram Bangs, for the opportunity of using the material from the Brewster collection, and to Dr. Charles W. Richmond, of the U. S. National Museum, for the material in that collection.

Aratinga holochlora brewsteri, subsp. nov.

BREWSTER PAROQUET.

Type from Hacienda de San Rafael, western Chihuahua, Mexico. No. 24700, ♂ adult, Museum of Comparative Zoology (Brewster collection), collected May 5, 1888, by M. Abbott Frazar.

General characters.—Similar in size to typical *holochlora* from eastern Mexico but with smaller bill and much clearer, less yellowish, green on upper and underparts, with a wash of bluish on crown and breast.

Color of type.—Upperparts of head, body, tertiaries, and outer parts of secondaries bright chromium green of Ridgway, with top of head slightly darker and washed with bluish; upper side of primaries and tail feathers darker, more bluish green than back; sides of head and neck clearer, paler green than back; underparts from chin to crissum cosse green of Ridgway, lacking nearly all of the oil-green suffusion so strong in typical *holochlora* and washed with bluish on breast; underside of wings and tail lighter and more greenish than in latter; outer edges of primaries and primary coverts more bluish.

Measurements of type.—Wing, 168 mm.; tail, 134; culmen, 24.5; tarsus 16.

Measurements of typical holochlora, ♂ adult, from Hacienda Mirador, Vera Cruz.—Wing, 167; tail, 138; culmen, 25; tarsus, 17.

Specimens examined of A. h. brewsteri.—8, all from the type locality, in Museum Comparative Zoology: Specimens of *A. h. holochlora* 6, 1 from Mirador, Vera Cruz, Mexico; 5 from Forlon, Tamaulipas, Mexico.

Remarks.—This well marked geographic race is separated by the breadth of the Mexican tableland from its nearest relative, typical *holochlora*, in the tropical parts of western Vera Cruz and Tamaulipas. No records are known to the writer of its occurrence elsewhere, than at the type locality, in western Chihuahua.

Three specimens of typical *holochlora* out of six examined, one from Mirador and two from Forlon, have scattered red or orange feathers about the sides of the head and neck; no such colors appear on any of the

specimens of *brewsteri*. This subspecies is named in honor of William Brewster.

Hesperiphona abeillii pallida, subsp. nov.

CHIHUAHUA GROSBEAK.

Type from Jesus Maria, Chihuahua, Mexico. No. 22053, ♀ adult, Museum Comparative Zoology (Brewster collection). Collected June, 1883, by R. R. McLeod.

General characters.—This subspecies much paler and grayer than the females of either typical *abeillii* or *H. a. cobanensis* described below from Guatemala; upperparts of body dull grayish brown with only a trace of the conspicuous greenish suffusion in both other forms; underparts nearly uniform pale grayish brown with only a slight trace of the strong buffy brown shade in the others and lacking the greenish yellow mixture on breast; wing longer than in other forms.

Colors of type.—Top of head dull black; sides of head, sides and top of neck and upperparts of body dull brownish thinly suffused with dull greenish, strongest on sides of head and on neck; lower rump much duller than in *abeillii;* underparts from chin to abdomen nearly uniform dull drab gray, becoming paler posteriorly to under tail coverts, with only slight traces of greenish on breast; axillaries much paler yellow than in typical *abeillii.*

Measurements of type.—Wing, 107; tail, 63; culmen, 21; tarsus, 20.5. Measurements of typical ♀ adult, of *abeillii,* No. 158336, U. S. National Museum (Biological Survey collection) from Huachinango, Puebla, Mexico: Wing, 103; tail, 63; culmen, 22; tarsus, 22.

Remarks.—As in the case of *Aratinga holochlora brewsteri* the present subspecies appears to be widely separated from its nearest relative, typical *holochlora,* by the entire breadth of the Mexican tableland. Possibly both these geographic races may be found ranging far south of their known habitats along the mountains of Sinaloa, but so far none of the various collectors in that region appear to have found them.

Although this subspecies is based on a single specimen, an adult ♀, in breeding plumage, it differs so strongly from the females of both the other forms examined, and differs along the usual lines of paler coloration due to the more arid character of its habitat, combined with its extraordinarily wide separation from the habitat of its nearest relative leaves no doubt as to the meaning of its characters.

Specimens examined.—H. a. pallida, 1 adult ♀. Type of subspecies; *H. a. abeillii,* 7 specimens, 3 adult ♂s, 4 adult ♀s, all from Huachunango, eastern Puebla, Mexico.

Hesperiphona abeillii cobanensis, subsp. nov.

GUATEMALAN GROSBEAK.

Type from Coban, Vera Paz, Guatemala, no. 30747, ♂ adult, U. S. National Museum, from Salvin and Godman collection.

General characters.—Entire body of male clearer, brighter yellow than

in typical *abeillii*, specially on the breast; the female much more strongly suffused with buffy brown on underparts; in both sexes bill broader and heavier.

Colors of type.—Entire head and upper neck all around black; upper parts of body nearly uniform dark sulphine yellow shading into lemon chrome over lower rump feathers; underparts nearly uniform chrome yellow, most intense on upper breast and palest on under tail coverts and axillaries; top of wings black with pale parts of tertials more whitish and less gray than in *abeillii*.

Color of female.—Top of head and nape black; upper parts of body dark citrine suffused with sulphine yellow, becoming paler, more yellowish on rump; throat and under parts of body sayal brown, lightest on throat and darkest on flanks; breast and sides of neck suffused with sulphine yellow.

Measurements.—Adult ♂, type, wing, 105; tail, 63; culmen 22; tarsus, 20. Adult ♀, Dueñas, Guatemala, no. 30748, U. S. National Museum. Wing, 105; tail, 63; culmen, 25; tarsus, 21.

Remarks.—In Birds of North and Middle America, part I, p. 45, Robert Ridgway, in a footnote, sets forth the most salient characteristics of the present subspecies but fails to give it a name. In studying the series of *Hesperiphona abeillii* available the male and female specimens from Guatemala referred to by Ridgway differ so strongly from the 3 males and 4 females of typical *abeillii* the evidence appears conclusive that they represent a different and easily recognizable geographic form.

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PROCEEDINGS

OF THE

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NEW SPECIES OF GRASSES FROM THE UNITED STATES.

BY A. S. HITCHCOCK.

In the course of the preparation of a Manual of Grasses of the United States several new species were found. It also became necessary to make a few changes of names. The new species and the new binomials are given below.

Bromus laeviglumis (Scribn.) Hitchc.

Bromus ciliatus laeviglumis Scribn.; Shear, U. S. Dept. Agr. Div. Agrost. Bull. 23:32. 1900.

Glyceria striata (Lam.) Hitchc.

Poa striata Lam. Tabl. Encycl. 1:183. 1791.
Poa nervata Willd. Sp. Pl. 1:389. 1797.
Glyceria nervata Trin. Mém. Acad. St. Pétersb. VI. Math. Phys. Nat. 1: 365. 1830.
Panicularia nervata Kuntze, Rev. Gen. Pl. 1:783. 1891.

Puccinellia parishii Hitchc., sp. nov.

Annual; culms cespitose, ascending from a decumbent base, 3 to 10 cm. tall; ligule thin, decurrent, 1 to 1.5 mm. long, obtuse, slightly toothed; blades flat or somewhat involute, less than 1 mm. wide; panicle narrow, few-flowered, 1 to 4 cm. long, the short branches appressed, slightly scabrous; spikelets 3 to 6-flowered, 3 to 5 mm. long, the rachilla glabrous; glumes acutish, 3-nerved, 1.5 to 2 mm. long; lemmas about 2 mm. long, obtuse to truncate, scarious and somewhat erose at the tip, pubescent on the mid and lateral nerves nearly to the apex, on the intermediate nerves about half way; palea a little shorter than the lemma, ciliate on the keels; anthers about 0.5 mm. long; grain turgid, pyriform, narrowed below, about 0.6 mm. long.

Type in the U. S. National Herbarium, no. 906,851, collected at Rabbit Springs, San Bernardino County, California, April 24, 1915, by S. B. Parish (no. 9799). Known only from the type collection.

Peculiar in the pubescent nerves of the lemma. The type sheet had an intermixture of *P. simplex* and the plate accompanying the description of *P. simplex* in Abrams's Flora of the Pacific States (1:215. 1923) shows *P. parishii* instead of *P. simplex.*

Poa remissa Hitchc., sp. nov.

Plants perennial, tufted, with slender creeping rhizomes; culms slender, retrorsely scabrous, 100 to 120 cm. tall; sheaths slightly retrorse-scabrous; ligule of the culm leaves oblong-acute, 3 to 5 mm. long, of the innovations somewhat shorter; blades flat, lax, 2 to 4 mm. wide, elongate, the uppermost culm blade as much as 10 cm. long; panicles loose and open, nodding or drooping at the summit, 10 to 15 cm. long, the main axis scabrous at least toward the summit, the scabrous, flexuous branches in rather distant whorls (2 to 3 cm. apart), the lowermost mostly 3 or 4, spreading or drooping, as much as 7 cm. long, bearing 2 to 4 spikelets toward the end; spikelets 3- or 4-flowered, 5 to 6 mm. long, compressed; glumes acuminate, scabrous on the keel, about 2.5 and 3.5 mm. respectively; lemmas oblong-acute, about 4 mm. long, webbed at base, rather sparsely pubescent on the lower half of the keel and the lower third of the marginal nerves, otherwise glabrous, the nerves rather distinct; palea narrow, nearly 1 mm. shorter than the lemma, very minutely scabrous on the keels; anthers about 1 mm. long.

Type in the U. S. National Herbarium, no. 1,299,175, collected in moist boggy place in deep timber, Sol Duc Hot Springs, Olympic Mountains, Washington, July 14, 1927, by A. S. Hitchcock (no. 23468). Known only from the type collection.

This species is related to *Poa pratensis* L. but differs in the tall slender retrorsely scabrous culms and the large open panicles with long drooping branches.

Poa marcida Hitchc., sp. nov.

Perennial in small tufts, the foliage lax; culms slender, 40 to 100 cm. tall, glabrous; sheaths glabrous; ligule very short, the uppermost on the culm scarcely 1 mm. long; blades flat, thin, 1 to 3 mm. wide; panicle drooping, narrow, 10 to 18 cm. long, the somewhat distant branches scabrous, capillary, solitary or in pairs, ascending or appressed; spikelets mostly 2-flowered; glumes narrow, about 3 mm. long; lemmas narrowly lanceolate, acuminate, 4 to 5 mm. long, glabrous, long-webbed at base.

Type in U. S. National Herbarium, no. 1,299,172, collected in moist place in deep timber at Sol Duc Hot Springs, Olympic Mountains, Washington, July 14, 1927, by A. S. Hitchcock (no. 23466). Other specimens are: Vancouver Island, *Henry* 681, *Rosendahl* 1591, *Macoun* 82447; Olympic Mountains, Challam County, Washington, *Elmer* 1919; coast mountains near Tillamook, *Howell* in 1882.

This species is allied to *Poa alsodes* A. Gray, *P. languida* Hitchc., and *P. saltuensis* Fern. & Wieg., but differs in the narrow drooping panicle and acuminate spikelets.

Poa involuta Hitchc., sp. nov.

Plants perennial in dense pale tufts without rhizomes; culms slender, glabrous, 30 to 40 cm. tall; sheaths glabrous; ligule about 0.5 mm. long; blades involute, slender, glabrous or slightly scabrous, 15 to 25 cm. long, about 0.5 mm. thick, somewhat lax or soft, the younger ones sulcate; panicles open, 10 to 15 cm. long, the branches in pairs, spreading, flexuous, scabrous, distant, few-flowered toward the apex, the lower 2 to 3 cm. long; spikelets pale, mostly 3- or 4-flowered, 5 to 6 mm. long, the florets rather distant; glumes 2 and 2.5 mm. long, acute, the border hyaline; lemmas about 3 mm. long, oblong, scabrous, especially on the keel and marginal nerves, not webbed at base.

Type in the U. S. National Herbarium, no. 1,125,239, collected on the upper slopes of hills, Chisos Mountains, first ridge southwest of Juniper Canyon, Brewster County, Texas, 2200 meters altitude, July 15 to 18, 1921, by Roxana S. Ferris and Carl D. Duncan (no. 2811). Also collected in the Chisos Mountains by J. R. Swallen (no. 1110).

This species is referred to the group Epiles because of the glabrous lemmas but differs from all the other species of this group from the United States because of the involute blades.

Poa languida Hitchc.

Poa debilis Torr. Fl. N. Y. 2:459. 1843. Not *P. debilis* Thuill. 1799.

Eragrostis acuta Hitchc., sp. nov.

An erect, cespitose perennial 40 to 60 cm. tall; sheaths glabrous, pilose at the throat; blades flat, becoming more or less involute, 2 to 4 mm. wide; panicle open, spreading, more than half the entire height of the plant; spikelets long-pediceled, several-flowered, 8 to 12 mm. long, 3 mm. wide, pale or stramineous; lemmas acuminate, 3 mm. long. Resembling *E. elliottii* but the spikelets larger and the lemmas longer.—Low pine woods and moist sandy soil, Florida.

Type in U. S. National Herbarium, no. 7,311,236, collected at Punta Rassa, Florida, July, 1900, by A. S. Hitchcock (no. 263). Other specimens are: Grasmere, *Combs & Baker* 1166; Dunedin, *Tracy* 7024; Fort Myers, *Chase* 4195; Gainesville, *Combs* 716; Bartow, *Combs* 1217.

Triodia multinervosa (Vasey) Hitchc.

Melica multinervosa Vasey, Bot. Gaz. 16:235. 1891.
Distichlis multinervosa Piper, Proc. Biol. Soc. Washington 18:147. 1905.

Agropyron richardsonii vulpinus (Rydb.) Hitchc.

Elymus vulpinus Rydb. Bull. Torrey Club 36:540. 1909.

Agropyron saundersii (Vasey) Hitchc.

Elymus saundersii Vasey, Bull. Torrey Club 11:126. 1884.
Elymus saxicola Scribn. & Smith, U. S. Dept. Agr. Div. Agrost. Bull. 11: 56, pl. 15. 1898.

Sitanion flexuosum Piper, Erythea 7:99. 1899.
Sitanion lanceolatum J. G. Smith, U. S. Dept. Agr. Div. Agrost. Bull. 18: 20. 1899.
Agropyron sitanioides J. G. Smith; Piper, Proc. Biol. Soc. Washington 18: 149. 1905.

Hordeum jubatum caespitosum (Scribn.) Hitchc.

Hordeum caespitosum Scribn. Proc. Davenport Acad. 7:245. 1899.

Sitanion hanseni anomalum (J. G. Smith) Hitchc.

Sitanion anomalum J. G. Smith, U. S. Dept. Agr. Div. Agrost. Bull. 18: 20, pl. 4. 1899.

Trisetum spicatum congdoni (Scribn. & Merr.) Hitchc.

Trisetum congdoni Scribn. & Merr. Bull. Torrey Club 29: 470. 1902.

Trisetum canescens montanum (Vasey) Hitchc.

Trisetum montanum Vasey, Bull. Torrey Club 13:118. 1886.

Trisetum interruptum hallii (Scribn.) Hitchc.

Trisetum hallii Scribn. Bull. Torrey Club 11:6. 1884.

Danthonia californica americana (Scribn.) Hitchc.

Danthonia americana Scribn. U. S. Dept. Agr. Div. Agrost. Circ. 30:5. 1901.

Agrostis capillaris aristulata Hitchc., var. nov.

Differs from *A. capillaris* in having awned lemmas, the awn usually geniculate and exceeding the glumes, arising from near the base of the lemma. Fields and open woods, Nova Scotia and Quebec to North Carolina; Alaska to northern California. This form appears to be native at least in the northern part of its range.

Type in the U. S. National Herbarium, no. 838,295, collected on lowland clay soil in shade of bushes, at Alexandria, Virginia, July 4, 1905, by Agnes Chase (Amer. Gr. Nat. Herb. no. 344).

Agrostis blasdalei Hitchc., sp. nov.

Culms short, 10 to 15 cm. tall, densely cespitose; blades narrow and rigid, conduplicate or filiform, scabrous on the margins, 2 to 4 cm. long, scarcely more than 1 mm. wide; panicles strict and narrow, 2 to 3 cm. long, branches closely appressed, scabrous, not more than 1 cm. long; spikelets 2.5 to 3 mm. long, the first glume a little longer than the second, both acute and scabrous on the back, especially on the keels, pale and of firm texture; lemma about 1.8 mm. long or a little less, awnless or with a very short awn just above the middle; palea minute, about 0.3 mm. long, nerveless.

Type in the U. S. National Herbarium, no. 556,266, collected on cliffs near Fort Bragg, Mendocino County, California, in 1899, by Davy and Blasdale (no. 6159). Also *Bolander* 6466. Known only from the vicinity of Fort Bragg.

This has previously been referred to *A. breviculmis* Hitchc. of Peru (*Trichodium nanum* Presl, *Agrostis nana* Kunth, not *A. nana* Delarbre).

Muhlenbergia arsenei Hitchc., sp. nov.

Plants perennial, loosely tufted, without rhizomes; culms slender, wiry, decumbent or spreading at base (the decumbent part sometimes appearing like a rhizome), 10 to 30 cm. tall, branching below, the branches erect; leaves crowded on the lower part of the culm, the sheaths glabrous, the ligule about 1 mm. long; blades slender, involute, sharp-pointed, 1 to 3 cm. long, sometimes longer on vigorous shoots; panicles long-exserted, narrow, 2 to 10 cm. long, the branches ascending, floriferous from base, 1 to 3 cm. long; spikelets about 4 mm. long, the pedicels scabrous-pubescent; glumes 2 to 2.5 mm. long, somewhat hispidulous toward the awnless and rounded tip; lemma narrow, somewhat pubescent on the lower part, the awn 5 to 10 mm. long.

Type in the U. S. National Herbarium, no. 1,298,444, collected at Sulphur Springs, Sandoval County, New Mexico, altitude 2400 meters, August 17, 1926, by Bro. G. Arsène and Bro. A. Benedict (no. 16405).

This species is related to *M. polycaulis* from which it differs in the numerous short erect branches with crowded fine involute blades, and in the awnless glumes. The only other specimen seen is *Rydberg & Garrett* 9498 from Armstrong and White Canyons, near the Natural Bridges, altitude 1600 to 1800 meters, southeastern Utah.

Muhlenbergia arenacea (Buckl.) Hitchc.

Sporobolus arenaceus Buckl. Proc. Acad. Phila. 1862:89. 1863.
Sporobolus auriculatus Vasey, Contr. U. S. Nat. Herb. 3:64. 1892.

Sporobolus minutissimus (Steud.) Hitchc.

Agrostis minutissima Steud. Syn. Pl. Glum. 1:171. 1854.
Sporobolus confusus Vasey, Bull. Torrey Club 15:293. 1888.

Sporobolus asper pilosus (Vasey) Hitchc.

Sporobolus pilosus Vasey, Bot. Gaz. 16:26. 1891.

Sporobolus tharpii Hitchc., sp. nov.

A densely cespitose perennial; culms 60 to 100 cm. tall; sheaths glabrous, the lower firm, loose, and shining; ligule a very short membrane; blades glabrous, involute, flexuous, about 1 mm. thick, tapering to a long fine point, the base long-pilose at the margin on each side of the ligule; panicle open, as much as 30 cm. long, the branches ascending, the lower as much as 15 cm. long, glabrous in the axils; spikelets appressed along the main

branches and larger branchlets, about 3 mm. long, glabrous; first glume narrow, acuminate, about half as long as the spikelet; second glume as long as the lemma and palea.

Type in the U. S. National Herbarium, no. 1,299,827, collected on Padre Island, Texas, September 4, 1927, by B. C. Tharp (no. 4772). Another specimen from the same locality is *Tharp* 4774.

This species is allied to *S. palmeri* Scribn. and *S. wrightii* Munro, in both of which the second glume is shorter than the spikelet.

Hilaria belangeri longifolia (Vasey) Hitchc.

Hilaria cenchroides longifolia Vasey; Beal, Grasses N. Amer. 2:69. 1896.

Ctenium floridanum (Hitchc.) Hitchc.

Campulosus floridanus Hitchc. Amer. Journ. Bot. 2:306. 1915.

Chloris chloridea (Presl) Hitchc.

Dineba chloridea Presl, Rel. Haenk. 1:291. 1830.
Chloris clandestina Scribn. & Merr. U. S. Dept. Agr. Div. Agrost. Bull. 24:25. 1901.

Digitaria texana Hitchc., sp. nov.

Plant branching and decumbent at base, rooting at the lower nodes, apparently annual; culms about 0.5 meter tall; sheaths of the innovations pubescent, of the culms glabrous; ligule membranaceous, truncate, glabrous, about 1 mm. long; blades flat, those of the innovations velvety-pubescent, of the culms glabrate, 3 to 5 mm. wide; racemes 6 to 8, slender, pale, ascending, or erect, along an axis of 3 to 4 cm., 5 to 10 cm. long; rachis without wings, triangular, scabrous, the pedicels slender, triangular, the longer ones about 2 mm. long; spikelets about 2.3 mm. long, softly pubescent; first glume wanting; second glume and sterile lemma as long as the pale, acute fertile lemma.

Type in the U. S. National Herbarium, no. 927,604, collected in sandy oak woods at Sarita, Texas, June 27, 1910, by A. S. Hitchcock (no. 5479). Known only from the type collection.

Resembles *D. velutina* (DC.) Hitchc. which has larger spikelets with stiff appressed pubescence and dark fruit.

Digitaria pauciflora Hitchc., sp. nov.

Plant perennial; culms erect or somewhat decumbent at base, 0.5 to 1 meter tall, very slender; sheaths and blades grayish-villous; racemes 2 or 3, ascending or erect, 5 to 11 cm. long, the filiform rachis naked for 1 to 5 cm. at base; spikelets rather distant, elliptic, about 3.2 mm. long, glabrous; first glume minute with a hyaline erose margin; second glume and sterile lemma finely nerved, as long as the grayish fertile lemma.

Type in the U. S. National Herbarium, no. 927,603, collected between Jenkins and Everglade, southern Florida, November 10, 1903, by A. A. Eaton (no. 207). Known only from the type collection.

Digitaria floridana Hitchc., sp. nov.

Plants annual; the foliage glabrous except for a few long hairs around the mouth of the sheath; culms tufted, decumbent at base, 20 to 30 cm. tall; blades flat, 4 to 7 cm. long, 3 to 6 mm. wide; racemes 3 or 4, somewhat spreading and rather distant on the axis, 3 to 6 cm. long, the rachis wing-margined, the wings wider than the central rib; spikelets about 1.7 mm. long, rather sparingly pubescent; first glume wanting; second glume and sterile lemma equal, about as long as the light-brown fruit.

Type in the U. S. National Herbarium, no. 741,824, collected in sandy pine woods, Hernando County, Florida, July, 1898, by A. S. Hitchcock (Florida plants no. 2517). Known only from the type specimen.

The inflorescence resembles that of *D. filiformis*, but the rachis is winged; the spikelets are smaller than those of *D. ischaemum*.

Eriochloa michauxii simpsoni Hitchc., var. nov.

Plants with the aspect of the narrow-leaved forms of *E. michauxii;* racemes few, appressed; sterile lemma empty.—Moist places, Fort Myers to Cape Sable, Florida.

Type in the U. S. National Herbarium, no. 928,353, collected at Cape Romano, Florida, May, 1891, by J. H. Simpson (no. 262).

Eriochloa contracta Hitchc.

Helopus mollis C. Muell. Bot. Zeit. 19:314. 1861. Not *Eriochloa mollis* Kunth.

Open ground, ditches, low fields and wet places, Kansas to Texas and New Mexico; introduced in Missouri. Differing from *E. acuminata* in the pubescent foliage, narrower blades, cylindric panicle and awned fruit.

Setaria scheelei (Steud.) Hitchc.

Setaria polystachya Scheele, Linnaea 22:339. 1849. Not *S. polystachya* Schrad. 1824.

Panicum scheelii Steud. Syn. Pl. Glum. 1:51. 1854.

Chaetochloa polystachya Scribn. & Merr. U. S. Dept. Agr. Div. Agrost. Bull. 21:37. f. 22. 1900.

Chaetochloa scheelei Hitchc. Contr. U. S. Nat. Herb. 22:207. 1920.

Andropogon scoparius neomexicanus (Nash) Hitchc.

Andropogon neomexicanus Nash, Bull. Torrey Club 25:83. 1898.

Andropogon exaristatus (Nash) Hitchc.

Amphilophis exaristatus Nash in Small, Fl. Southeast. U. S. 65. 1903.

Rottboellia tuberculosa (Nash) Hitchc.

Manisuris tuberculosis Nash, Bull. N. Y. Bot. Gard. 1:430. 1900.

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PROCEEDINGS

OF THE

BIOLOGICAL SOCIETY OF WASHINGTON

THE SHORT-EARED OWLS OF PORTO RICO AND HISPANIOLA.[1]

BY ALEXANDER WETMORE.

The short-eared owl of Porto Rico was first recorded in the seventies of the Nineteenth Century by Gundlach who examined several specimens taken by Blanco and Stahl, but through lack of comparative material did not observe that they were specifically different from the wide ranging *Asio flammeus*. In 1882 Mr. Ridgway differentiated the Porto Rican bird as *Asio portoricensis*, taking as his type a skin collected by George Latimer. This owl has remained rare in collections as, though it is not extinct, it is found infrequently. Specimens collected by Gundlach have come to the American Museum of Natural History, and to the Museum of Comparative Zoölogy, while in the Carnegie Museum there is one taken at Utuado, May 20, 1912, by W. W. Worthington. The most recent specimen is a female forwarded to the National Museum by F. A. Potts, who collected it near Fortuna, April 8, 1927.

On March 19, 1922, Dr. W. L. Abbott, during his zoological explorations in Hispaniola, secured a female short-eared owl at Laguna Rincon, near Cabral, in the southwestern part of the Dominican Republic. Though of the general appearance of the bird of Porto Rico, it was evidently different, but for various reasons its definite allocation has been postponed until the present time, when it comes up for review in the course of preparation of a general account of the birds of Hispaniola, projected originally in collaboration with the late B. H. Swales and now to be completed by me.

In the meanwhile Mr. James Bond has secured a second specimen in Haiti for the Academy of Natural Sciences, which has been sent to me for examination through the courtesy of Mr. Bond and Dr. Witmer Stone. The necessary comparisons have entailed the assembling of available specimens of *Asio portoricensis*, of which I have five individuals before me,

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

three, including the type, in the collections of the National Museum, one loaned by Mr. W. E. Clyde Todd from the Carnegie Museum, and one through the courtesy of Mr. J. L. Peters of the Museum of Comparative Zoölogy. A sixth skin, which I examined some years ago, is in the American Museum of Natural History and is not available at present writing, and there is one other in the Field Museum.

On careful comparison it develops that the bird from Hispaniola differs from *Asio portoricensis* Ridgway in slightly longer wing, less rounded tail, more extensive light markings on the forehead, and slightly heavier, broader dark markings on the breast and foreneck. There appear, then, to be two forms so similar as to be classed as geographic races, which will stand as follows:

Asio domingensis domingensis (Müller).

HISPANIOLAN SHORT-EARED OWL.

Chouette ou grande Chevêche de Saint-Domingue, Buffon, Hist. Nat. Ois., vol. 1, 1770, pp. 392–393. ("Saint-Domingue.")

Strix domingensis P. L. S. Müller, Volst. Naturs. Suppl. Reg.-Band, 1776, p. 70. (Hispaniola; based on Buffon.)

Strix dominicensis Gmelin, Syst. Nat., vol. 1, pt. 1, 1788, p. 296. ("S. Dominica"; based on Buffon.)—Shaw, Gen. Zool., vol. 7, pt. 1, 1809, p. 261. (Based on Buffon.)

That the account indicated above in Buffon refers to the short-eared owl of the type here under discussion is unquestionable, as his description is careful and with sufficient detail to demonstrate certainly that he was considering the species of the eastern Greater Antillean islands, though that his account referred to a distinct species has been overlooked by later writers since the days of Müller and Gmelin who named it as indicated above, Müller's name having priority.

From the two skins now in hand it appears that this form differs from that of Porto Rico in more nearly square tail, a longer wing, which measures 294 mm. in the one male and 297 mm. in the single female seen, broader, more prominent white markings on the forehead, and heavier, more extensive dark markings on the breast and foreneck.

This form is confined to the Dominican Republic and Haiti.

Asio domingensis portoricensis Ridgway.

PORTO RICAN SHORT-EARED OWL

Strix brachyotus, Sundevall, Öfvers. Kongl. Vetensk.—Akad. Förh., 1869, p. 60 (Porto Rico).

Brachyotus cassinii, Gundlach, Journ. für Ornith., 1874, p. 310 (listed).

Asio portoricensis Ridgway, Proc. U. S. Nat. Mus., vol. 4, 1882, p. 366. (Porto Rico.)

The present bird is closely allied to *A. d. domingensis* but differs in more strongly rounded tail, somewhat shorter wing which in the four skins at hand in which the wing can be measured ranges from 274 to 281 mm. (average 277 mm.), darker forehead, and less heavily marked chest.

It is restricted in range to Porto Rico.

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PROCEEDINGS
OF THE
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A NEW SPECIES OF PICULET FROM GONAVE ISLAND.[1]

BY ALEXANDER WETMORE.

On recent examination of the series of birds of the genus *Nesoctites* in the National Museum collections, it is apparent that there is a distinct species on Gonave Island, a division of the Republic of Haiti, which may be known as

Nesoctites abbotti, sp. nov.

Characters.—Similar to *Nesoctites micromegas* (Sundevall)[2] but very much paler both above and below; under surface white, with only a very faint tinge of yellowish on the breast; upper surface much grayer; yellow of crown in male more restricted; white of sides of neck more extended.

Description.—Type, U. S. Nat. Mus. No. 251,504, male, collected on Gonave Island, Haiti, February 24, 1918, by Dr. W. L. Abbott. Dorsal surface varying from deep grayish olive on sides of crown, hind neck and upper back to light Andover green on rump and upper tail-coverts; center of crown orange rufous, surrounded by an area of olive yellow, somewhat paler anteriorly with tips of some of the feathers flecked with dusky; rectrices and remiges dusky externally edged broadly with a wash of light yellowish olive; auricular region white, streaked with deep grayish olive; sides of neck and hindneck flecked obscurely with whitish to form an indistinct broken collar; lores, ramal region, and under surface, white; throat immaculate, remainder of under parts streaked (brokenly) and spotted with blackish; breast with a very faint tinge of yellow; inner margins of under surface of wing feathers washed with cream buff to cartridge buff. Bill blackish, becoming deep olive gray at the base; tarsus and toes castor gray (from dried skin).

Measurements (in millimeters).—8 males, wing, 65.9–68.4 (67.7); tail, 36.5–42.8 (39.5); culmen from base, 15.8–17.2 (16.5); tarsus, 17.0–18.3 (17.4).

6 females, wing, 69.3–73.2 (71.2); tail, 37.0–41.5 (39.9); culmen from base, 17.0–17.7 (17.5); tarsus, 17.3–18.5 (17.8).

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

[2] *Picumnus micromegas* Sundevall, Consp. Av. Pic., 1866, p. 95. ("Rio de Janeiro"= Hispaniola.)

Type, male, wing, 68.0; tail, 42.8; culmen from base, 16.5; tarsus, 17.9.

Range.—Gonave Island, Haiti.

Remarks.—This species is described from a series of fourteen skins from Gonave Island, collected by Dr. W. L. Abbott from February 21 to 27, 1918, and March 8 to 14, 1920. It is distinguished at a glance from the bird of the main island of Hispaniola of which there is a series of twelve, all taken by Dr. Abbott, at hand for comparison. The females differ as do the males.

While the Gonave bird is representative of *micromegas*, the differences separating it seem sufficient to warrant designating it as a distinct species. I take pleasure in naming it for Dr. W. L. Abbott in recognition of his contributions to our knowledge of the Hispaniolan avifauna.

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A SECOND SPECIES OF DEIROPTYX FROM CUBA.

BY DORIS M. COCHRAN.

Out of a collection of nearly a hundred reptiles and amphibians made on the island of Cuba by Dr. Paul Bartsch while travelling on the Walter Rathbone Bacon Scholarship Fund, a second species of *Deiroptyx* has turned up. It lives on rocks at the mouth of limestone caves and presents many features which distinguish it readily from *Deiroptyx vermiculata*, the only other known species of the genus.

Deiroptyx bartschi, n. sp.

Diagnosis.—Tail cylindrical; one row of scales between the supraorbital semicircles; four large scales in the supraocular disk.

Type.—U. S. N. M. No. 75805 (collector's number 80), an adult male from Baños San Vicente, Pinar del Rio Province, Cuba, collected on June 25, 1928, by Dr. Paul Bartsch.

Description of the type.—Head rather large, somewhat less than twice as long as broad, slightly longer than the tibia; forehead distinctly concave medially, this median channel connecting with the occipital depression; top of head covered with flat, medium-sized scales which give place to some very small ones just behind the nostrils; frontal ridges fairly well developed; supraorbital semicircles composed of five scales, the second from anterior end very large, separated by one row of small flat scales; occipital scale in a depression, small, scarcely one-sixth as large as ear-opening, separated from the last scale of the supraorbital semicircle by about three flat, polygonal scales; supraocular disks well defined, composed of four large scales and a few smaller ones, separated from the superciliaries by three rows of scales and from the semicircles by two rows; canthus rostralis not especially prominent, composed of a single row of seven scales, decreasing in size from eye to below the nostril; a superciliary ridge of three scales, the second quite long, the last very minute; seven loreal rows; suboculars eight, fairly well developed, the last five in contact with the labials; nine or ten supralabials, the seventh under the center of the eye; temporals small, round and flat, uniform in size, excepting on the supratemporal

line where they become enlarged; dorsal scales almost granular, slightly larger than laterals, the two middorsal rows largest; ventrals smooth, very small posteriorly, becoming larger on the breast, squarish on the median area, in regular rows, very slightly imbricate; a heavy transverse gular fold; scales of anterior aspect of fore and hind limbs slightly enlarged, smooth, faintly imbricate; body not elongate, neither depressed nor compressed; no dorsal fold; a weak nuchal fold; limbs well developed; the hind legs very long, reaching to the nostril when adpressed; about 46 lamellae on the fourth toe (28 of these under phalanges II and III); tail very long, round, with verticils feebly indicated at about eleven-scale intervals; no enlarged post-anals.

Dimensions.—Tip of snout to posterior edge of tympanum, 23 mm.; width of head, 13 mm.; snout to vent, 69 mm.; tail, 175 mm.; tibia, 21 mm.

Color (in alcohol).—Head and body sage-green above, becoming olive-green on the sides and on the tail; sides with heavy, wavy sulphur-yellow vertical bars, edged with dark, almost fading out on the middle of the back, continuing on top of the tail, however, as pea-green cross-bands. Lips pale, the sutures of upper and lower labials sulphur-yellow; a ring of dirty yellow around the ear; in front of the ear a large squarish indigo-blue spot, with a suffusion of this color on the posterior part of the eyelid and also in front of the shoulder; limbs light olive, the fore-arm faintly banded with yellow; entire ventral surface straw yellow, a deeper tone of this on the edge of the gular fold.

Paratypes.—There are nine other paratypes (Nos. 75797–75804 and 75806) from Baños San Vicente; fifteen specimens (Nos. 51820 and 51825–38) from Vinales collected on May 30, 1914, by J. B. Henderson and Paul Bartsch; and two from Luis Lazo taken in 1916 by the same collectors.

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GENERAL NOTES.

THE GENERIC POSITION OF THE PORPOISE DESCRIBED BY PHILIPPI AS TURSIO? PANOPE.

Reviewing, in these Proceedings,[1] the South American porpoises which Dr. R. A. Philippi had described in 1893 and 1896,[2] Dr. F. W. True was unable to reach any satisfactory conclusion with regard to the animal designated under the name *Tursio? panope* (1896, p. 14, pls. 4–6, fig. 2). He says (pp. 141–142): "I confess I am unable to determine even the genus to which this singular species belongs. . . . If the drawings of the skull are correct . . . the species probably represents a genus hitherto unknown. Further study of the type-specimen can alone resolve the problem." Thus the matter rested until the autumn of 1926, when Dr. Waldo L. Schmitt visited the National Museum of Chile and very kindly made photographs for me of the enigmatical skull. These show beyond question that the drawing of the side view published by Philippi on plate 6 is, unlike the sufficiently good representations of the dorsal and ventral aspects (pls. 4 and 5), grossly inaccurate. The extraordinary upward bending of the expanded proximal portion of the maxillary, recognized by True as a character unknown in any porpoise with which he was acquainted, has no existence in fact. The animal, whatever its specific relationships may eventually prove to be, is a member of the genus *Cephalorhynchus*.

—*Gerrit S. Miller, Jr.*

THE POLLACK WHALE IN THE GULF OF CAMPECHE.

The United States National Museum owes to the kindness of Professor A. L. Herrera, director of the National Museum of Mexico, several photographs of two skeletons of *Balænoptera borealis*. Both specimens (Nos. 257 and 289, Nat. Mus. Mexico) are labeled as having been taken at Campeche. In reply to my inquiry Professor Herrera wrote, under date of September 20, 1927, that he was unable to give the dates of capture, and that the skeletons were on exhibition at the time when he took charge of the museum in 1915. These specimens are of interest as considerably extending the known range of the species and as representing captures which antedate that of the individual from Florida which I recorded four years ago.[3]

—*Gerrit S. Miller, Jr.*

[1] Proc. Biol. Soc. Washington, vol. 16, pp. 133–144, November 12, 1903.

[2] An. Mus. Nac. Chile, Zool., No. 6, pp. 1–18, pls. 1–5, 1893, and No. 12, pp. 1–20, pls. 1–6, 1896.

[3] Proc. U. S. Nat. Mus., vol. 66, art. 9, December 11, 1924.

PROTHONOTARY WARBLER BREEDING IN THE WASHINGTON REGION.

The presence of the Prothonotary Warbler (*Protonotaria citrea*) during summer months in the vicinity of Washington, D. C., has been recorded by other observers. Miss May T. Cooke in her paper "Birds of the Washington Region,"[1] sums up the data then available, and concludes with the statement: "Twice noted in June, possibly breeding."

It is a pleasure to announce that this species may be now definitely added to the list of breeding birds, through the collection of a set of four eggs, on June 9, 1928.

On May 30, 1928, Dr. Alexander Wetmore, Ernest P. Walker, and the author were slowly paddling up the inlet at "the dyke," near the station of "Dyke" on the Washington-Mt. Vernon electric railway, when a flash of vivid orange-yellow across our bows announced a male Prothonotary. The bird flew to the bank, within 15 or 20 feet of our boat, and for several minutes it gathered nesting material as we watched. It then recrossed the stream and disappeared in a small clump of bushes and snags, emerging a few minutes later with empty bill. Convinced that we had located the nesting site, we made plans to return about June 10. The absence of Doctor Wetmore from the city and other engagements of Mr. Walker, left this duty to the author.

The nest was found, as expected, in a maple snag about five feet high and about five inches in diameter at the base. It was hollow for its entire length, although still sufficiently alive to support one vertically ascending branch. Several more or less connected cracks or holes extended on one side from the top to within about two feet of the base, the nest being placed just below the lowest aperture. Apparently the birds had succeeded in plugging the hollow and had placed their nest on top of the plug. Moss and fine rootlets were used in the nest structure. The cup is shallow and about two inches in diameter. The entire snag (which had at one time served as a fence post, as shown by several projecting ends of well-rusted wire) was cut off and, with the set of eggs, deposited in the U. S. National Museum.

Both parent birds were shot, although the male, falling into the water, was seized and apparently swallowed by a large fish, probably a bass.

—*Frederick C. Lincoln.*

[1] Proc. Biol. Soc. Wash., vol. 34, p. 12.

THE MOURNING DOVE IN JAMAICA.

Recent examination of records of the mourning dove, *Zenaidura macroura macroura* (Linnaeus), for the Greater Antilles indicate that this bird is abundant in Cuba and common in Hispaniola (including Haiti and the Dominican Republic), but on examination of lists of the birds of Jamaica no mention whatever is found of it. So far as known there is only one record for Jamaica, that given by Ridgway in Part 7 of the Birds of North and Middle America (1919, p. 343) where that island is mentioned in the geographic range assigned to this form. On looking up the basis of Mr. Ridgway's report it is found to be a skin in the National Museum (Cat. No. 55099) taken by W. T. March and labeled Spanishtown, Jamaica, without date. This specimen was entered in the Museum catalogue May 4, 1869, and was received apparently during that year, as there is record in the Annual Report of the Smithsonian Institution for the year 1869, published in 1871, on page 56, of a box of birds received from Jamaica from W. T. March. March makes no mention of the mourning dove in his Notes on the Birds of Jamaica, published in the Proceedings of the Academy of Natural Sciences of Philadelphia, 1863, pp. 150–154, 283–304, indicating that he secured the specimen after that date.

The specimen in question has the following measurements (in millimeters): wing, 138.7; tail, 120.5; culmen with cere, 12.8; tarsus, 19.5. The sex is not marked but the bird appears to be a male. It is identified as *Zenaidura macroura macroura* and must be considered as of accidental occurrence on the island. —*Alexander Wetmore.*

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NOTES ON SPIDERS FROM SOUTHEASTERN UTAH.

BY R. V. CHAMBERLIN AND W. J. GERTSCH.

This is a report primarily upon a collection of spiders secured by members of a field party from the Department of Zoology of the University of Utah during ten days of April, 1928. While the major part of the arachnids were taken by the authors, who gave special attention to them, other members of the party from time to time added specimens secured incidentally to their own particular work, as credited hereafter under locality records for the various species. The zoologically little known San Juan County was the chief field of the expedition, but on the return journey the San Rafael Desert region of Emery County received attention and collections were also made at several points in Wayne County. Types are in the collection of R. V. Chamberlin.

DICTYNIDAE.

Amaurobius americanus (Emerton).

Localities.—San Juan Co.: Monticello, Verdure and Bluff; Grand Co.: Moab; Emery Co.: Mounds and San Rafael River; Wayne Co.: Fruita.

Dictyna completa Chamberlin.

Locality.—Grand Co.: Moab. One female taken by A. M. Woodbury, April 15.

Dictyna uintana Chamberlin.

Locality.—San Juan Co.: Bluff. A male taken by Mr. Gertsch, April 16, is referred with a little doubt to this species. It was known previously from the Uintah Mts.

Dictyna eutypa Chamberlin.

Locality.—San Juan Co.: Bluff. A female was secured by J. R. Chamberlin.

SCYTODIDAE.

Plectreurys tristis Simon.

Localities.—San Juan Co.: Bluff, Devil's Canyon, and Blanding; Emery Co.: Straight Wash. Only females were taken.

Loxosceles rufipes Lucas.

Locality.—San Juan Co.: Two females, not fully mature, seem to be this species.

CAPONIIDAE.

Orthonops gertschi Chamberlin.

Locality.—Emery Co.: Straight Wash. A male, the type of the species, was taken by Mr. Gertsch on April 20. This specimen seems to be the only member of the family thus far recorded from within the United States, although several species are known from Lower California and adjacent parts.

DYSDERIDAE.

Ariadna bicolor (Hentz).

Locality.—San Juan Co.: Verdure. One female.

GNAPHOSIDAE.

Herpyllus vasifer (Walckenaer).

Localities.—San Juan Co.: Bluff, Valley City (Morrison); Emery Co.: San Rafael River; Wayne Co.: Hanksville.

Herpyllus hesperolus Chamberlin, nom. nov.
Herpyllus validus Banks (nom. preoccup).

Localities.—San Juan Co.: Bluff (A. M. Woodbury), Big Indian Rock and Valley City; Grand Co.: Moab (E. L. Seule); Emery Co.: San Rafael River (E. L. Soule); Wayne Co.: Hanksville, Fruita (A. M. Woodbury); Piute Co.: Marysvale (R. V. Chamberlin, 1927).

Herpyllus propinquus (Keyserling).

Locality.—La Sal Mts. (V. M. Tanner, 1927). A specimen referred with some doubt to this species.

Herpyllus atopophysis Chamberlin, new species.

A species readily distinguishable from others previously described by the form of the tibial apophysis. This in ectal form appears laminate, clavately widened distad, a little obliquely truncate at end and with a two-pronged process beyond the truncate surface, one prong directed ventrad and the other dorsad. The cymbium is characteristically excavated from base to middle for reception of the apophysis. Cephalothorax,

legs and dorsal scutum of abdomen light brown, the abdomen elsewhere gray. Posterior median eyes oblique, approximately their radius apart and about the same distance from the laterals. Tibia I and II beneath with a pair of spines at apex and a pair near middle, those of each pair close together. Tibia III with a pair of spines close together at base above. Metatarsus I and II with a pair of spines at a base beneath.

Length, 6 mm.

Type locality.—San Juan Co.: Valley City. One male taken April 19 (R. V. Chamberlin).

Sergiolus fruitanus Chamberlin, new species.

Male.—This species is characterized by the form of the tibial apophysis of the palpus. This is somewhat longer than the tibia, its distal margin in lateral view appearing excavated, with dorsodistal corner extended into a chitinous process bent at right angles and acutely pointed, the point directed mesad into a depressed portion of cymbium. Integument of carapace dusky, black marginally, apparently clothed throughout with white hair in life. Femora of all legs black, the other joints yellow. Integument of abdomen nearly black, clothed above with white hair, this apparently over the whole dorsum though the latter in the type is partially rubbed. Area of median eyes wider behind than in front. Tibia I with a single spine at distal and beneath; tibia II with one at distal end and one toward middle. Metatarsus I and II with a single spine at base beneath.

Length, 5 mm.

Type locality.—Wayne Co.: Fruita. One male taken April 21 by A. M. Woodbury.

Callilepis eremellus Chamberlin, new species.

Male.—This is a small form in which the carapace is yellow with lateral margins narrowly bordered with black, the eye area black, and a broken black V-shaped mark at posterior border of head; sternum and mouthparts yellow, and the legs yellow excepting that the patella and tibia and distal end of femur are suffused with black. The abdomen is black clothed in general with smooth black hairs but with numerous plumose white hairs above, especially in a band at base and a spot each side of its pointed caudal tip. Tibiae I and II with two pairs of ventral spines. In the palpal organ there are two apical apophyses of which one runs transversely outward over the other and bears on its caudal edge a number of short spines; the embolus runs from middle obliquely forward and outward to nasal edge of alveolus and curves forward. The tibia of palpus lacks any distinct tooth at distal end such as occurs in *C. clara*.

Length, 2.33 mm.

Locality.—Utah: Wayne Co., Cainesville. One male taken April 21 by A. M. Woodbury.

Gnaphosa brumalis Therell.

Localities.—San Juan Co.: La Sal Mts. (one male, Tanner, 1927); Verdure (one male, R. V. Chamberlin).

Gnaphosa hirsutipes Banks.

Localities.—San Juan Co.: Verdure (E. L. Soule); Emery Co.: San Rafael River; Wayne Co.: Fruita (an aberrant female taken by Gertsch); also found at Salt Lake City.

Gnaphosa gigantea Keyserling.

Locality.—Tooele Co.: The Pass, in the Oquirrh Mts. One female taken by R. V. Chamberlin. Not uncommon in Salt Lake County.

Gnaphosa gosoga Chamberlin, new species.

Male.—Related to *texana* Chamberlin in the structure of the palpus but the embolus simple, whereas in *texana* there is a slender subsidiary branch lying against the principal one. It also may be distinguished in the different form of the tibial apophysis which is longer than the tibia and is decidedly narrower in the basal portion, laminate, distally acuminate and a little bent. Carapace and sternum brown, the legs more fulvous, and the abdomen nearly black. Posterior median eyes more than their radius apart and a little less than twice their diameter from the laterals. Differing from *texana* in lacking a median dorsal spine on tibiae III and IV. Tibiae I and II with three pairs of ventral spines.

Length, 7 mm.

Localities.—Emery Co.: Straight Wash (male holotype, Woodbury); Piute Co.: Marysvale (Chamberlin, 1927.)

Drassodes neglectus (Keyserling).

Localities.—San Juan Co.: Bluff, Verdure, La Sal Mts.; Piute Co.: Marysvale (Chamberlin, 1927).

Rachodrassus flavus Chamberlin and Woodbury.

Locality.—Grand Co.: Moab. One female taken by Gertsch on April 19.

Haplodrassus signifer (C. Koch).

Localities.—San Juan Co.: Bluff, Blanding; Grand Co.: Moab; Emery Co.: Straight Wash.; Wayne Co.: Noton; Piute Co.: Marysvale (Chamberlin, 1927); Salt Lake Co. (K. M. Richards).

Haplodrassus bicornis (Emerton).

Localities.—San Juan Co.: Blanding (Woodbury); Salt Lake Co.: City Creek Canyon (E. L. Soule).

Zelotes subterreaneus (C. Koch).

Localities.—San Juan Co.: between Bluff and Blanding (Soule, Gertsch);

Blanding, Verdure; Tooele Co.: north of Grantsville (Chamberlin); Salt Lake Co.

Zelotes lasalanus Chamberlin.

Locality.—San Juan Co.: La Sal Mts. (Tanner).

Drassyllus apachus Chamberlin

Localities.—San Juan Co.: Bluff, Valley City; Grand Co.: Moab; Emery Co: Straight Wash.; Salt Lake Co.

Many specimens of this species, both males and females, were taken. The species was previously known from the female only, the type, an Arizona specimen. It would seem to be probably the most abundant gnaphosid in southeastern Utah.

Drassyllus notonus Chamberlin, new species.

Female.—Most readily characterized by the epigynum. In this the lateral rims are widely separated, evenly curved, and continuous with the anterior rim which is short, semicircular and enclosing a deeper depression; median septum beginning anteriorly at the depression mentioned, very narrow except caudally where it expands in deltoid form in front of the paired spermathecal areas. Carapace dusky over fulvous, legs and sternum with more yellow; abdomen dusky gray. Posterior row of eyes only weakly provurved; median eyes only a little enlarged, elliptic and oblique, less than their diameter apart and nearly the same distance from the laterals. Lateral eyes on each side not more than their radius apart. Tibiae I and II and metatarsi I and II unarmed beneath.

Length, 3.5 mm.

Type locality.—Wayne Co.: Noton. One male taken April 21.

PHOLCIDAE.

Psilochorus utahensis Chamberlin.

Localities.—San Juan Co.: Verdure, Devil's Canyon; Grand Co.: Moab; Emery Co: Straight Wash. Only females were taken. These are referred with some question to the present species.

THERIDIIDAE.

Latrodectus mactans Fabr.

Localities.—San Juan Co.: Bluff; Grand Co.: Moab; Carbon Co.: Price.

Asagena americana.

San Juan Co.: Verdure (male, not quite mature); Wayne Co.: Fruita (male and females).

Theridion placens Keyserling.

Locality.—Emery Co.: Straight Wash.

Robertus eremophilus Chamberlin, new species.

Female.—Carapace, chelicerae, sternum and legs brown. Abdomen throughout immaculate light gray. Anterior median eyes their radius apart, farther from the larger lateral eyes. Eyes of the posterior row equal in size and nearly equidistant. The epigynum is depressed at the middle leaving a transverse ridge across the caudal end and a semicircular one anteriorly; in the depression is a strongly chitinous piece with narrower anterior or ventro-anterior end free and the caudal portion clavately widened.

Length, 4 mm.

Type locality.—San Juan Co.: Devil's Canyon. Two females.

Distinct from previously known species in the form of the epigynum.

LINYPHIIDAE.

Linyphia tauphora Chamberlin.

Locality.—San Juan Co.: Bluff. Also occurring in Zion National Park, Washington Co.

This is a small form with a black dorsal stripe set off by a white stripe on each side; a solid black venter; the sides behind crossed by white lines from the dorsal side stripes. Characterized by the strongly chitinous epigynum which presents an inversely T-shaped septum much as in *L. lineata* of Europe, with a dark circular impression in front of each arm.

Pocadicnemis pumila (Blackwall).

Locality.—San Juan Co.: Verdure (several males and females); Tooele Co.: west of St. Johns.

Prosopotheca sp.

Locality.—Wayne Co.: Fruita. One female not to be safely determined specifically in the absence of the male.

Spirembolus vallicolens Chamberlin.

Locality.—San Juan Co.: Verdure. Several males and females secured by sifting are this species or very close to it.

ARGIOPIDAE.

Tetragnatha laboriosa Hentz.

Locality.—Grand Co.: Moab.

Pachygnatha xanthostomata Keyserling.

Localities.—San Juan Co.: Bluff (one female); Grand Co.: Moab (one male).

Aranea (Zilla) teika Chamberlin.

Localities.—Grand Co.: Moab; Carbon Co.: Price; Emery Co.: San Rafael River. Only females were taken.

THOMISIDAE.

Tibellus sp.

Locality.—Grand Co.: Moab. Females not fully mature and hence not determinable with certainty as to species.

Philodromus inquisitor.

Locality.—Sevier Co.: Salina. One female taken by Gertsch.

Philodromus hoples Chamberlin, new species.

Female.—Carapace brown, with a broad median dorsal band, the clypeus, and a narrow marginal stripe on each side yellow. Legs yellowish, the spines mostly on small brown spots. Sternum yellow to whitish. Dorsum of abdomen yellowish, with a median sagittate dark mark on anterior portion and two converging, irregularly edged dark stripes behind, much as in *pernix;* sides brown, flecked with darker spots; venter light yellow, unmarked. Median eyes of posterior row smaller than the laterals and considerably farther from each other than from the laterals. Eyes of anterior row equal in size. Tibiae I and II with three pairs of spines beneath; I with three single spines on anterior face. The septal plate of the epigynum is broad excepting at anterior end where it is strongly and abruptly narrowed; at or just in front of middle the plate is angularly extended on each side, the part behind this then gradually clavately widening to the caudal end.

Length, 7.4 mm.

Male.—Similar in color to the female but darker; the light areas of dorsum of abdomen much reduced; spots and dark areas on legs more pronounced and, in general, more elongate. In the palpus the tibia presents two apophyses at distal end, that on the ectal side showing two acute prongs; the ventral apophysis with upper distal corner extended into a spine-like process, the other distal corner rounded.

Length, 5 mm.

Localities.—San Juan Co.: Bluff; Grand Co.: Moab; Emery Co.: San Rafael River. Also occurs in Zion National Park, Washington Co. The male was taken at Moab, the type locality, all other specimens being females.

Close to *P. pernix* Blackwall, with which easily confused. The male may be distinguished by the different form of the ectal process of tibia of palpus which, instead of having the distal end square with upper corner slightly hooked, is strongly bifid, with the two processes pronounced The epigynum is similar to that of some specimens of *pernix* (e. g. that figured by Emerton, Trans. Conn. Acad. Sci., vol. 8, 1892, pl. 31, fig. 1f) but with anterior neck narrower and lateral expansions back of it more pronounced and characteristically angular.

Philodromus crenifer Chamberlin, new species.

Female.—Carapace yellowish gray, the sides brownish usually quite to

the margin, the pars cephalica also commonly darker with median longitudinal darker stripe extending from between the posterior median eyes to, or sometimes down, the posterior declivity. Sternum gray. Legs brownish gray, without darker spots or annuli. Dorsum of abdomen gray, with a sagittate dark mark on anterior half, the posterior end dusky; sides dark, crossed by darker, short oblique bands; venter clear gray. Cephalothorax and legs characteristically granular. Anterior lateral eyes scarcely larger than the medians. Posterior median eyes also nearly equally the laterals, eyes nearly equidistant. Epigynal area wide in front, the sides converging caudad, the marginal rim more elevated and chitinized over posterior portion; the septal piece moderately clavately widening from the anterior end caudad and then contracted a little in front of the caudal end which bends down ventrad and shows on its free caudal face three crenuli of which the median is largest.

Length, 7.8 mm.

Male.—Coloration corresponding closely in general to that in the female, the dark coloration of pars cephalica with the deeper median stripe extending caudad from between eyes seeming to be characteristic. Posterior median eyes farther from each other than in the female. In the palpus the ectal tibial apophysis is minute, rather slender and pale, extending straight distad excepting the pointed tip, which is curved or somewhat hooked; embolus rather stout, arising at middle of inner side of bulb and ending at anterior end of alveolus; exterior apophysis on apical region of bulb with one forwardly directed and one caudally directed prong.

Length, 5 mm.

Localities.—Grand Co.: Moab (type loc.); San Juan Co.: Verdure, Blanding and Bluff (male allotype and females).

The specimen from Blanding is a female showing the characteristic epigynum though this seems to lack one moult of maturity. This specimen shows dark spots and traces of annuli on the legs.

Philodromus agamus Chamberlin, new species.

Male.—Carapace yellow, with sides from the wide median stripe to the margin darkened; clypeus also darkened but with a median vertical yellow line and a clear yellow line on each side running caudad just outside of the eyes; carapace also with a dark area at caudal end of pars cephalica and interruptedly extending down the posterior declivity. Sternum yellow. Legs yellow, marked with dark dots and indistinct annuli, these best developed on tibia where there is one at base and one at distal end. Abdomen brownish yellow above with sagittate basal mark and two interrupted converging dark stripes behind. Venter immaculate yellow. Eyes of posterior row nearly equal, the medians scarcely farther from each other than from the laterals, the row considerably recurved. In the palpus the embolus arises on inner side and makes three-fourths of a turn about the bulb; the tibial apophysis is short and rather stout, strongly chitinized, pointed, with lower apical edge oblique, the upper straight, close against

its ventral side a paler, less chitinous process separated distally from the principal apophysis by a distinct shallow notch.

Length, 4 mm.

Locality.—Grand Co.: Moab (two males, E. L. Soule); San Juan Co.: Bluff (3 males, Gertsch and Soule).

Coriarachne versicolor Keyserling.

Localities.—Grand Co.: Moab; Emery Co.: Green River. Males only taken.

Xysticus gulosus Keyserling.

Locality.—San Juan Co.: Blanding. One not quite adult female.

Xysticus ferox Hentz.

Localities.—San Juan Co.: Bluff; Emery Co.: San Rafael River (Woodbury); San Rafael Desert (Woodbury); Grand Co.: Moab; Carbon Co.: Price; Wayne Co.: Fruita.

Xysticus nervosus Banks.

Locality.—Emery Co.: Straight Wash.

Xysticus ancistrophor Chamberlin.

Locality.—San Juan Co.: Verdure (male holotype).

AGELENIDAE.

Cicurina utahana Chamberlin.

Locality.—San Juan Co.: Bluff (Woodbury).

Agelena hola Chamberlin, new species.

Female.—Agreeing with *curta* in general but differing in the form of the epigynum which, however, is of the same general type. The epigynum is proportionately somewhat longer and is characterized particularly in having its floor, with the medians eptal fold, more or less level from the caudal end forward to middle of anterior cavity where it is bent or depressed abruptly upward, forming thus a transverse ridge with a deeper pit or, sometimes, pair of pits in front of it. In *curta-* the floor curves evenly from caudal edge to deepest part of cavity. The septal fold commonly presents a narrower, elevated median longitudinal fold on the septal elevation.

Length, up to 12 mm.

Localities.—San Juan Co.: Verdure, Blanding and Devil's Canyon; Grand Co.: Moab; Wayne Co.: Noton.

CLUBIONIDAE.

Phrurolithus alarius (Hentz).

Localities.—Emery Co.: San Rafael River; Grand Co.: Moab; Wayne Co.: Caineville. All females excepting immature males from Moab.

Trachelas tranquillus (Hentz).

Locality.—San Juan Co.: Bluff.

Trachelas deceptus (Banks).

Localities.—San Juan Co.: Verdure (male and female, Chamberlin); Grand Co.: Moab (six females, Chamberlin and Gertsch); Wayne Co.: (four females, Chamberlin and Woodbury).

Clubiona abbotti Koch.

Locality.—Grand Co.: Moab. Three males were taken April 19 by Chamberlin and Woodbury.

Clubiona mimula Chamberlin, new species.

Female.—The entire body above and the legs immaculate yellow, or the abdomen somewhat darkened and posteriorly with lighter transverse chevron lines; the sternum and the venter of abdomen clear pale yellow or yellowish white. Anterior row of eyes straight, close to clypeal margin, the median eyes their diameter apart, three-fourths as far from the laterals. Posterior row of eyes slightly procurved, longer than the anterior row by about twice the diameter of an anterior lateral eye; median eyes widely separated, about three-fourths as far from the laterals. Lateral eyes on each side separated by about the diameter of a posterior one. Area of median eyes trapeziform, much wider behind than in front. Lower margin of furrow of chelicera with three teeth and with some weak granulations distad of these. Tibiae I and II with two pairs of spines beneath, one at base and one median, slightly overlapping. Metatarsi I and II with a pair of very long spines at base. Epigynum suggesting much that of *C. abbotti* but the openings instead of being more or less convergent and anteriorly narrowly connected by a transverse furrow are elliptic and widely divergent anteriorly; the spermatheca, which show so conspicuously and characteristically in *abbotti*, lie deeper and farther caudad in the present form.

Length, 6 mm.

Male.—Coloration as in the female but in type specimen with abdomen darker, more rufous, with transverse chevron lines or rows of light dots more numerous and better developed. Posterior row of eyes straight. In the palpus the distomesal apophysis of bulb geniculate at middle, with caudal arm transverse and bearing at mesal end a distally finely acute process which projects caudomesad. Embolus shorter than in *abbotti*, ending opposite ectal end of the before-mentioned apophysis. The tibial apophysis laminate, sub-geniculate near middle with the distal portion extending ectad and bending down ventrad, the ventral end in ectal view appearing truncate with the distal end extending forward as a conspicuous, finger-like, process; the distal margin above this process straight and even, without trace of incisions or teeth.

Length, 5 mm.

Locality.—Wayne Co.: Fruita. One male (holotype) and one female

(allotype), and one adult female and three immature females (paratypes) taken April 21 by R. V. Chamberlin.

Gayenna saniuana Chamberlin, new species.

Male.—Carapace pale yellow with a dusky band on each side of pars thoracica and four longitudinal dusky lines or narrow stripes on pars cephalica, one line running caudad from each eye of posterior row, the eye area black excepting where a median yellow line projects forward between posterior median eyes; pars thoracica margined laterally with black. Sternum light yellow, somewhat dusky at sides. Legs light, without darker markings. Abdomen dark reddish above and laterally, with black markings on sides and lateral portions of dorsum and dorsum posteriorly with paired oblique dark marks tending to form chevrons; veter paler, without dark markings. Abdomen narrow, widest at middle, the anterior end elevated. Anterior row of eyes projecting forward over clypeus, straight, the median eyes decidedly smaller than the laterals, their radius apart, nearly contiguous with the laterals; laterals separated from margin of clypeus by a little less than their diameter. Posterior row of eyes slightly procurved, the medians scarcely their diameter apart, slightly closer to the laterals. Lateral eyes on each side about their radius, or scarcely more, apart. Legs unusually long. Tibia I and II with two pairs of spines beneath, basal and submedian in position; metatarsi I and II also with two pairs of spines beneath, those of each pair at somewhat different levels. In the palpus the swelling at base of tibia on meso-ventral side not large; the distal apophysis in the form of an undivided chitinous lamina and narrowing distad but with apex subtruncate and weakly notched at middle.

Length, 5.5 mm.

Type locality.—San Juan Co.: Verdure. One male only taken by R. V. Chamberlin, April 18.

LYCOSIDAE.

Pardosa sternalis (Thorell).

Localities.—San Juan Co.: Verdure, Blanding and Valley City; Grand Co.: Moab; Wayne Co.: Fruita; Carbon Co.: Price. Many specimens of this form which is so abundant in the intermountain region.

Pardosa lapidicina Emerton.

Localities.—San Juan Co.: Bluff and Blanding; Grand Co.: Moab; Emery Co.: Green River, San Rafael River, Straight Wash.; Wayne Co.: Hanksville and Fruita.

Pardosa groenlandica (Thorell).

Localities.—San Juan Co.: Devil's Canyon, Verdure, Valley City, and Monticello; Grand Co.: Moab; Emery Co.: Green River, San Rafael River; Carbon Co.: Price.

Pardosa atra Banks.

Localities.—San Juan Co.: Blanding, and Devil's Canyon.

Pirata montana Emerton.

Locality.—Wayne Co.: Fruita. One male taken April 21.

Arctosa littoralis (Hentz).

Localities.—Grand Co.: Moab; Emery Co.: Green River.

Lycosa avida Walckenaer.

Localities.—San Juan Co.: Bluff, Valley City; Grand Co.: Moab; Emery Co.: Straight Wash.; Wayne Co.: Fremont River, Caineville, and Fruita.

Lycosa gosiuta Chamberlin.

Localities.—San Juan Co.: Devil's Canyon and Verdure; Emery Co.: San Rafael River; Wayne Co.: Fruita.

Lycosa kochii Keyserling.

Locality.—Lasal Junction, San Juan Co.

Lycosa rafaelana Chamberlin, new species.

Female.—This is a member of the burrowing group named Geolycosa by Montgomery. As with other members of this group the females lack median dorsal spines on legs III and IV. Tibiae I and II with a pair of spines at distal end beneath preceded by two spines seriate with the outer of these. It differs from other species of the group, excepting *pikei*, in having all joints of legs I and II black beneath, and it differs from *pikei* in having legs III and IV also black beneath excepting the tarsal joints or, in very young specimens especially, the tibiae may also lack the black color; coxae, femora and patellae of all legs black above and laterally as well as beneath. Carapace dusky brown to nearly solid black, clothed with gray hair. Chelicerae black, clothed with white hair. Sternum solid black. Abdomen also nearly black above and solid black beneath. Lower margin of furrow of chelicera armed with three stout teeth. The epigynum is not fully mature in the types.

Length, 12 mm.

Localities.—San Juan Co.: Big Indian Rock; Emery Co.: San Rafael Desert (type locality). The burrows are common in the sand in several places investigated on the desert, but no male and no wholly mature female was secured.

ATTIDAE.

Phidippus johnsoni Peckham.

Localities.—Emery Co.: Mounds, San Rafael River, and Straight Wash.

Phidippus formosus Peckham.

Locality.—Emery Co.: Mounds. One male.

Phidippus pruinosus Peckham.

Localities.—San Juan Co.: Bluff and Blanding. Three females referred with some doubt to this species.

Pellenes griseus Peckham.

Locality.—Carbon Co.: Price. One female.

Pellenes clypeatus B.

Localities.—San Juan Co.: Verdure (two males and one female); Grand Co.: Moab (one male).

Pellenes candidus Peckham.

Locality.—San Juan Co.: Verdure. Five females.

Pellenes oregonense Peckham.

Locality.—San Juan Co.: Valley City. A female referred with doubt to this species.

Pellenes viridipes Hentz.

Locality.—San Juan Co.: Verdure. One male.

Marpissa californica Peckham.

Locality.—Emery Co.: San Rafael River. One female.

Neon nelli Peckham.

Locality.—San Juan Co.: Verdure. One male.

Metacyrba taeniola Hentz.

Locality.—Grand Co.: Moab. A female and some young specimens.

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PROCEEDINGS
OF THE
BIOLOGICAL SOCIETY OF WASHINGTON

A NEW SUBSPECIES OF MYIOBORUS AND A NEW SPECIES OF CHLOROSPINGUS FROM EL SALVADOR.[1]

BY DONALD R. DICKEY AND A. J. VAN ROSSEM.

The two proposed forms are from the cloud forest (Upper Tropical Zone) of the Cordillera of El Salvador, the same region which has produced several other new races of both birds and mammals. The locality in question being on the southern boundary of Honduras it is certain that, like those previously described, the two here presented will be encountered within the borders of that country also.

Myioborus miniatus connectens, subsp. nov.

ORANGE-BELLIED REDSTART.

Type.—Male adult; No. 18,544, collection of Donald R. Dickey; Los Esesmiles, Dept. Chalatenango, El Salvador; altitude 8,000 feet, in cloud forest of Upper Tropical Zone; March 5, 1927; collected by A. J. van Rossem; original No. 11,407.

Subspecific characters.—Almost exactly intermediate between *Myioborus miniatus flammeus* Kaup of Guatemala and *Myioborus aurantiacus* (Baird) of Costa Rica. Median underparts varying from "orange chrome"[2] to "bittersweet orange" instead of "grenadine red" or "scarlet" as in *flammeus* or "cadmium yellow" as in *aurantiacus.*

Range.—Cloud forest (Upper Tropical Zone) regions on Los Esesmiles and Volcan Santa Ana. Vertical range from 6,500 to 8,500 feet on Los Esesmiles and from 5,500 to 7,000 on Volcan Santa Ana.

Remarks.—This form apparently marks the southern limit of the *miniatus* chain, and the nearest known approach to the yellow-bellied group extending southward from Costa Rica into South America. If any further links connecting the two series occur they must necessarily be found in Nicaragua, but we are not at present aware of any records for that country.

[1]Contribution from the California Institute of Technology.

[2]Quoted color names are those of Ridgway, Color Standards and Color Nomenclature, 1912.

Specimens examined.—Myioborus miniatus flammeus: Series from Guatemala in the Dwight Collection in the American Museum of Natural History. *Myioborus miniatus connectens:* El Salvador: Los Esesmiles, 12; Volcan Santa Ana, 3. *Myioborus aurantiacus:* Series from Costa Rica in the U. S. National Museum.

Chlorospingus schistaceiceps, sp. nov.

GRAY-HEADED CHLOROSPINGUS.

Type.—Male adult; No. 18,428, collection of Donald R. Dickey; Los Esesmiles, Dept. Chalatenango, El Salvador; altitude 8,000 feet; February 23, 1927; collected by A. J. van Rossem; original No. 11,291.

Specific characters.—This species is of the *olivaceus-postocularis* group. Resembles *Chlorospingus postocularis* Cabanis of Guatemala and Chiapas in body coloration in general, but whole top of head, nape and auricular region "mouse gray" to "deep mouse gray" instead of "blackish mouse gray" or "sooty black;" post-ocular streak involving posterior half of lower eyelid as well as of upper. Resembles *Chlorospingus olivaceus* (Bonaparte) of Guatemala and Chiapas, but pectoral band, sides, flanks and under tail-coverts brighter green; whole top of head unicolor, with no suggestion of lateral crown stripes and with post-ocular streak extending on to posterior half of lower eyelid as well as on the upper.

Description of type.—Whole top of head between "mouse gray" and "deep mouse gray," unicolor from bill to nape; auricular region anteriorly similar to pileum, but lightening to "mouse gray" on sides of neck; lores "pale mouse gray"; white post-ocular streak present, involving posterior half of both upper and lower eyelids and extending backward for about 7 mm. behind eye; malar region, chin and throat grayish white, indistinctly streaked with dusky; lower breast and abdomen grayish white; dorsal plumage (posterior to nape), including outer webs of wing and tail feathers, plain olive green; pectoral band, sides, flanks and under tail-coverts "light yellowish olive." Iris reddish brown; bill plumbeous black; tarsi and feet plumbeous horn. Wing 72.0 mm.; tail 63.0; culmen from base 14.1; tarsus 20.5; middle toe minus claw 12.2.

Range.—Cloud forest from 7,000 to 8,700 feet on Los Esesmiles, Dept. Chalatenango, El Salvador, and probably adjacent portions of Honduras.

Remarks.—The status of most of the Central American and Mexican forms of *Chlorospingus* is uncertain. Those which the writers have examined at one time or another (*regionalis, novicius, olivaceus, postocularis, ophthalmicus* and *schistaceiceps*) are all seemingly of common origin and possibly to treat them as subspecies would more accurately express relationships. On the other hand, the differences are apparently constant, and as these birds occupy, for the most part, isolated mountain peaks intergrades are not likely to occur.

Specimens examined.—Chlorospingus postocularis: Mexico:[1] Chiapas: Pinabete, 2; Chicharros, 1. *Chlorospingus olivaceus:* Mexico:[1] Chiapas: Tumbala, 4. Guatemala,[2] (Volcan San Lucas, Nebaj, Barrillos and San Mateo) 28. *Chlorospingus schistaceiceps:* El Salvador: Los Esesmiles, 19.

[1]Collection of Biological Survey.

[2]Dwight Collection in American Museum of Natural History.

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PROCEEDINGS
OF THE
BIOLOGICAL SOCIETY OF WASHINGTON

NEW AND NOTEWORTHY NORTHWESTERN PLANTS.[1]

Part 1.

BY HAROLD ST. JOHN, CARL S. ENGLISH, JR., GEORGE NEVILLE JONES, ROCELIA PALMER, RODERICK SPRAGUE, FRED A. WARREN, AND GLADYS WEITMAN.

The late Dr. Charles Vancouver Piper, when a professor at the State College of Washington, published a number of botanical articles under the title "New and Noteworthy Northwestern Plants." His successors at the State College have decided to revive this useful title, and under it to publish the various facts concerning northwestern plants that are discovered by the workers in their Herbarium. The name of the author responsible for each new species, or each new observation, is given at the appropriate place.

Polystichum munitum (Kaulf.) Presl, forma **inciso-serratum** (D. C. Eaton) St. John, comb. nov.

Aspidium munitum Kaulf., var. *inciso-serratum* D. C. Eaton, Ferns N. Am. **1**: 188. 1878. *Polystichum munitum* (Kaulf.) Presl, var. *inciso-serratum* (D. C. Eaton) Underw., Our Native Ferns, 6th ed. 116. 1900.

Prof. Eaton and his contemporaries were accustomed to recognize only one subdivision under the species. The consensus of most of the present-day botanists is to maintain the varietal category, and when necessary to recognize additional categories inferior to the species. For instance the cut-leaved variant of *Polystichum acrostichoides* (Michx.) Schott., is known as forma *incisum* (Gray) Gilbert, the similar variant of *Asplenium platyneuron* (L.) Oakes, as forma *serratum* (E. S. Miller) Hoffm., and other similar examples might be listed. It is felt that a plant growing with the typical species, having no distinct range, and no other characters than the deeply cut margins of the pinnae, should be treated as a minor variant, the forma.

[1]Contribution from the Botany Department of the State College of Washington, No. 16.

Thelypteris oregana (C. Chr.) St. John, comb. nov.

Aspidium nevadense D. C. Eaton, Ferns N. Am. **1**: 73. pl. 10. 1878, not Boiss. 1838; *Dryopteris nevadensis* Underw., Nat. Ferns, ed. 4, 113. 1893; *Dryopteris oregana* C. Chr. Ind. Fil. 84. 1905. As has recently been pointed out, *Thelypteris* is the oldest generic name for the Shield-ferns. This species was first described as *Aspidium nevadense* by D. C. Eaton, but the name had previously been used for a Spanish species by Boissier. C. A. Weatherby has kindly helped the writer in looking up this European species. Many botanists reduce it to synonymy, but some maintain it as a species or variety, as does Kuemmerle. Hence it can not be said that *Aspidium nevadense* Boiss. is universally regarded as a synonym. Consequently Eaton's name *nevadense* is not available for our western American plant. The combination under *Thelypteris* seems never to have been made.

It was interesting to find in the Piper Herbarium, which was recently purchased by the State College of Washington, the first collection of this for Washington. It is sterile and was undetermined, but is certainly this species. It was found on the Ohanapecosh Trail about two miles from Hot Springs, Mt. Rainier, Pierce Co., July 24, 1919, *J. B. Flett* 3279.

Ginannia mollis (L.) St. John, comb. nov.

Holcus mollis L., Syst. Nat. ed. 10., **2**: 1305. 1759.

As F. T. Hubbard has pointed out in Rhodora **18**: 233. 1916, the correct generic name for this group under the International Rules is *Ginannia* of Bubani. The above combination seems never to have been made. This European plant has recently been collected at Port Townsend, Washington, by W. O. Passmore.

Calochortus selwayensis St. John, n. sp.

Corm small and ovoid, covered with reticulate brown coats; basal leaf unknown; cauline leaf single, linear and grass-like, 10–20 cm. long, 4–11 mm. wide, glabrous and shining; stem 5–10 cm. tall slender; peduncle very slender ascending and flexuous, 3–4 cm. long; bracts two, foliaceous lanceolate or ovate-lanceolate, the lower 14–28 mm. long, the upper 10–20 mm. long; umbels 1–4-flowered; pedicels slender ascending but more or less deflexed at tip, 2–5 cm. long; flowers open campanulate, apparently somewhat nodding; sepals broadly elliptic-lanceolate, thin white and membranaceous, strongly green-veined, usually more or less purple-spotted near the base, 15 mm. long, 6 mm. broad; petals elliptic-ovate sub-acute, 16–20 mm. long, 8–11 mm. broad, whitish or ochroleucous, strongly ciliate to above the middle, swollen and somewhat glandular from the base up to the oblong transverse superficial inconspicuous gland, which is completely covered by a large oblong fimbriate-margined scale, from there nearly to the tip the upper surface of the petals is hairy with long violet or violet-tipped hairs; filaments broad, thin and petaloid, narrowly deltoid or lanceolate, 4 mm. long; anthers narrowly lanceolate, long acuminate, white, 4–8 mm. long, 1 mm. broad; ovary wingless narrowly elliptic-

lanceolate, 6.5 mm. long, 1.8 mm. wide; stigmas linear recurved 3 mm. long; immature fruit angled, 17 mm. long, 8 mm. wide.

Foliis caulinibus linearibus, pedunculis filiformibus 3–4 cm. longis, floribus campanulatis, sepalis elliptici-ovatis 15 mm. longis, petalis subacutis albis ciliatis valde pilosis, antheris lanceolatis acuminatis, capsulis lanceolatis exalatis.

IDAHO: Moist shady place beside Paradise Creek, 4000 ft. elevation, R. 14 E., T. 32 N., Idaho County, June 29, 1927, *Kenneth Baker* (type in Herb. State College of Washington); also June 24, 1928. This locality is near the headwaters of the Selway River, and within ten miles of the summit of the Bitterroot Mountains, which form the boundary between Idaho and Montana.

It does not seem necessary to contrast this new species with any of the known species. None of these seem to be similar to or closely related to this new plant. If any resemble it in their flowers, they have an utterly different fruit and vice versa.

Asarum caudatum Lindl., f. **chloroleucum** Rocelia Palmer, forma nova.

Floribus viridi-albis.

This new form of the species differs only by having the flowers white with a pale greenish tinge, while the flowers of the species are a medium purplish brown.

WASHINGTON: Moist swamp, Mt. Pilchuck, Snohomish Co., August 7, 1927, *Rocelia Palmer* 20 (type in State College of Washington Herbarium).

This plant was found growing with the species in moist swampy woods near a spring. It was near the trail at about 2500 feet elevation on Mt. Pilchuck. The two plants were growing together, both equally abundant. They covered an area of about a square meter.

Aconitum columbianum Nutt., f. **ochroleucum** (A. Nels.) St. John, comb. nov.

A. Columbianum Nutt., var. *ochroleucum* A. Nels., First Rept. Fl. Wyo., Wyo. Exp. Sta., Bull. **28**: 79. 1896; *A. lutescens* A. Nels., Bot. Gaz. **42**: 51. 1906; *A. ochroleucum* (A. Nels.) A. Nels. acc. to Rydb. in Rydberg, Fl. Colo., Colo. Exp. Sta., Bull. **100**: 139. 1906; *A. columbianum* Nutt., subsp. *pallidum* Piper, Piper & Beattie, Fl. S. E. Wash. 110. 1914; *A. ochroleucum* (A. Nels.) Rydb., in synonymy, Rydberg, Fl. Rocky Mts., 315. 1917.

It will be seen that the form with pale colored flowers of our common western species has received plenty of names in the varietal and specific categories. The variety *ochroleucum* was described as with "light yellow flowers," while *A. lutescens* was said to have "the flowers a pure cream-color, becoming nearly white or pinkish in drying." These plants seem to occur in all shades of greenish, through yellowish, to a pure white. There seems to be no segregation between these, so they are here treated as one color form.

In the Blue Mountains of Washington only the forma *ochroleucum* is known. For this reason the plants were compared critically with the blue-flowered *A. columbianum* in search for additional characters, but none were found. *A. columbianum* occurs not far away in the Craig Mountains of Idaho, and further exploration may reveal it in the Blue Mountains. A similar abundance of the color form and absence of the species has been reported by J. F. Macbride.[1] He writes that in the vicinity of Cape Horn, Custer Co., Idaho, the form with light-colored flowers seems to entirely replace the typical state, which occurs fifty miles to the south near Alturas Lakes.

The specimens in the Rocky Mountain Herbarium, University of Wyoming, have been carefully compared. To the writer there seems no other course than to treat all of these plants as a single color form.

Rosa megalantha G. N. Jones, sp. nov.

Young stems usually tall, 1.5–2.5 m. high, erect glabrous, glaucous, with 1–2 straight slender spines about 5 mm. long at each node; floral branches 1–3 dm. long, glabrous and somewhat glaucous, unarmed; stipules adnate to the petioles, 1–2 cm. long, glandular-dentate, the free portion lanceolate acuminate; petioles and rachises glabrous below, furrowed above, the margins of the furrow with a few stalked glands, the depression somewhat pilose, especially near the leaflets; leaflets normally 7, thin, terminal ones obovate, lateral ones elliptic or oblanceolate, all sharply serrate above, entire and cuneate at the base, petiolulate, paler beneath, reticulate with subpellucid veins, glabrous on both sides or sparsely appressed-pubescent on the veins beneath, 2.5–5 cm. long; flowers solitary or in pairs; pedicels glabrous, 3–4 cm. long; sepals 2.5–3.5 cm. long, cuneate at base, narrowly linear to or beyond the middle, the terminal portion linear-lanceolate, entire, glabrous on the back, villous-tomentose within, villous-tomentose, and sometimes with a few gland-tipped hairs on the margins; petals rose-colored, 2.5–3.5 cm. long; hypanthium glabrous, in fruit globose without a neck, 2 cm. in diameter; sepals persistent erect; achenes inserted in the bottom and on the sides of the hypanthium, asymmetrically ovoid 6–8 mm. long and 3–4 mm. wide, sparsely appressed-hairy on the back.

Caulibus erectis 1.5–2.5 m. altis glabris glaucinis, aculeis rectis teneribus, ramis florentibus inermibus, stipulis glabris glanduloso-dentatis, petiolis rachidibusque glabris, foliolis 7 glabris, floribus grandis odorosis subsolitariis, hypanthio glabro, sepalis 2.5–3 cm. longis perdurantibus erectis, fructibus globosis vel conicis 2 cm. latis sine collo, seminibus in partis inferioribus lateralibusque affixis oblongis ca 8 mm. longis et 4 mm. latis dorso pilis sparsis depressisque instructo.

This rose grows in open yellow pine, *Pinus ponderosa* Dougl., woods at an elevation of about 2000 feet, in a suburb of Spokane, known as Lincoln Park, a district on which the city is encroaching but which yet contains much wild natural woodland.

WASHINGTON: Spokane, June 17, 1927 (in flower), October 10, 1927 (in

[1]Contrib. Gray Herb., n. s. **49**:62. 1917.

fruit), *Geo. N. Jones* 614 (type in Herbarium of State College of Washington).

Rosa megalantha is conspicuous for its numerous large, fragrant flowers which appear about June 10. From its nearest relative, *R. Spaldingii* Crépin, it differs in the unarmed floral branches, glabrous stipules, petioles and rachises glabrous except in the upper groove, leaflets glabrous except for a sparse appressed pubescence on the main veins beneath, and the terminal ones obovate. In *R. Spaldingii* the floral branches are usually somewhat prickly, the stipules are finely puberulent with the margins often glandular-toothed, the petioles and rachises grayish-puberulent, and the leaflets are finely and densely puberulent beneath, terminal ones elliptic or roundish-ovate.

Lathyrus pedunculatus St. John, n. sp.

Perennial from freely branching slender rhizomes; stems one from each rhizome, but many appearing near together, 1.5–2.5 dm. high, slender and wingless, strongly ridged, finely pilose; leaves 5 or 6, all but the lower well developed; stipules semisagittate finely pilose, small, less than half as long as the leaflets; leaflets in 2, 2½, or 3 pairs, bright green and glabrous above, pale green and pilose beneath, elliptic, slightly cuneate at base, more rounded and apiculate at tip; tendril a minute undivided pilose bristle; peduncles much exceeding, commonly twice the length of the rachis of the subtending leaf, slender, sparsely pilose, 3–5-flowered; pedicels very short; calyx finely pilose, about 6 mm. long, the teeth shorter than the tube, the two upper broad and incurved, the lower lanceolate and forward pointing; corolla 12–17 mm. long, bluish, sharply up-curved; fruit not seen.

Perennis humilis, foliis 2–3-jugis, foliolis ellipticis subtus pilosis, cirrhis integris brevissimis, pedunculis duplo foliis superantibus, floribus 2–4 caeruleis.

Idaho: Turner Creek, 2500 feet altitude, Lake Coeur d'Alene, Kootenai Co., April 25, 1926, *H. St. John, Vona Gessell, G. N. Jones, Lucile Ridout, E. W. Woods*, 4281 (type in Herbarium of the State College of Washington).

The closest relative of this new plant is *Lathyrus bijugatus* White, which may be distinguished by having the foliage glabrous or glabrate, the leaflets in 1–2 pairs, the peduncle about equaling the rachis of the subtending leaf, the petioles yellowish and cartilaginous. *L. pedunculatus* has the herbage, except the upper leaf surface, finely pilose, the leaflets in 2–3 pairs, the peduncle much exceeding, commonly twice the length of the rachis of its subtending leaf, and the petioles foliaceous.

Geranium viscosissimum Fisch. & Mey., f. **album** (Suksd.) St. John, comb. nov.

G. viscosissimum Fisch. & Mey., var. *album* Suksd., Werdenda **1**: 24. 1927. This is the variant of *G. viscosissimum* with albino flowers. According to the standards followed by the writer, this is not worthy of

recognition in a category higher than the forma. One additional specimen can be cited.

WASHINGTON: Dry south bank of Almota Canyon, near fork of two branches, Whitman Co., May 30, 1922, *Charles S. Parker* 437.

Lomatium Gormani (Howell) C. & R., f. **purpureum** St. John, forma nova.

Ut in *Lomatium Gormani* sed petalis roseo-purpureis.

Resembling *Lomatium Gormani* but having the petals bright rose-purple.

WASHINGTON: Rocky hillside, Pullman, Whitman Co., March 5, 1926, *H. St. John & Bessie V. Pickett* 3714 (type in Herb. State College of Washington).

Frasera albicaulis Griseb., f. **alba** St. John, forma nova.

Petalis albis. It differs from the typical plant in having white petals.

WASHINGTON: Along dry bluff above highway from Pullman to Moscow, Whitman Co., June 2, 1922, *Charles S. Parker,* 446 (type in Herb. State College of Washington).

Navarretia pilosifaucis St. John & Weitman, n. sp.

Annual erect simple or branched above, 10–21 cm. high; stems sparsely white pilose, toward the summit markedly so and the hairs appressed; lower leaves entire, the upper alternate pinnately parted but scarcely spinose, glabrous; bracts of inflorescence closely resembling leaves but more divided, segments ending in colorless spiny tips, pubescent at base, glabrous above; calyx glabrous but with a dense tuft of hairs at throat, tube cylindric tapering below, 4 mm. long, teeth 5 unequal spine-like entire or divided divergent, 2.5–4 mm. long; corolla white 5 mm. long. tube very slender inverted funnelform below and narrowly funnelform above; stamens shortly exserted equally attached, anthers oval versatile larger in diameter than the filaments; style equalling the corolla tube; ovary two-celled, 2–6 ovules in each cell; seeds mucilaginous when moistened, oblong-cylindric or irregular, wingless, opaque dark brown with raised reticulate ridges, about 1.5 mm. long, 0.5–0.7 mm. wide; embryo green straight, cotyledons 2 undivided slightly exceeding the radicle; capsule oblanceolate in outline, transparent septicidal 2.5–3 mm. long, 1–1.7 mm. wide.

Annua tenuis 10–21 cm. alta, foliis inferioribus oppositis, superioribus alternis pinnatis glabris, calycibus glabris, in fauce pilosis tubis 4 mm. longis lobis simplicibus vel partis rigidis, corollis albis 5 mm. longis, antheris exsertis, seminibus brunneis subaqua spirilliferis.

WASHINGTON: Rocky, sandy soil, Rock Lake, Whitman Co., June 23, 1927, *Gladys Weitman* 312 (type in Herbarium State College of Washington); and Aug. 8, 1928, *Gladys Weitman* 439.

The specific name is taken from the Latin *pilosus,* meaning hairy, and *faux,* meaning of the throat. These terms are descriptive of the calyx, which is glabrous except for the dense tuft of pilose hairs at the throat.

This new plant is most closely related to *N. pubescens* (Benth.) H. & A.,

a native of north and middle California, where it occurs in high dry woods. The latter belongs to the section *Eunavarretia* in the treatment of *Navarretia* by A. Brand in Vol. IV Family 250 of the Pflanzenreich. It was found growing in sandy alkaline soil close to the edge of the lower end of Rock Lake. *N. pilosifaucis*, a member of the section *Mitracarpium*, differs principally in that the calyx is cylindric and glabrous except for the tuft of hairs at the throat, the corolla white with the tube much longer than the lobes, the locules 2–6-ovuled, the cotyledons 2 undivided, and the ovary oblanceolate in outline. *N. pubescens*, on the other hand, has the calyx obconic oblong, glandular villous, the corolla blue or purple with the tube scarcely longer than the lobes, the locules 1–2-ovuled, the cotyledons 3 parted nearly to the base, and the ovary ovoid.

In the section *Mitracarpium*, where this new species should be placed, there is but one species at all resembling it. This is *N. nigelliformis* Greene of California. It can be separated by having the stems appressed cinereous tomentose, the leaves bipinnatifid tomentose at the base, the two longer calyx lobes pinnatifid, the corolla yellow with brown spots in the throat 10–12 mm. long and the tube sparsely glandular, the capsule oblong indehiscent at apex, the seeds transparent and unchanged when moistened. On the other hand, *N. pilosifaucis* has the stems white pilose, the leaves pinnately parted glabrous, all of the calyx lobes entire, the corolla white 5 mm. long and the tube glabrous, the capsule oblanceolate in outline dehiscent from the apex, the seeds opaque and gelatinous spiriliferous when moistened.

Collinsia parviflora Dougl., f. **rosea** F. A. Warren, forma nova.

Floribus roseis. Flowers rose-mallow, according to Robt. Ridgway's "Color Standards and Color Nomenclature," Pl. XII, 67 f. 1912.

WASHINGTON: Moist hillsides, Armstrong, three miles west of Pullman, Whitman County, April 23, 1928, *F. A. Warren* 745. (type in Herbarium Washington State College.)

This color form was first observed on a collecting trip in May, 1925, about a mile west of Pullman, Washington, on the Pullman-Colfax Highway. The plants were few in number and were growing with the species. No specimens were preserved at the time.

This pink-flowered plant was found in great abundance in 1928 at another locality. The area on which it grew was approximately three hundred square feet. The typical blue-flowered species was there intermingled with the pink color form. According to Ridgway's "Color Standards and Color Nomenclature," the flowers of the species are blue-violet, while the flowers of this plant are rose-mallow.

Penstemon euglaucus C. S. English, Jr., n. sp.

Perennial from a decumbent freely branching somewhat woody base; stems several herbaceous simple erect 2–4 dm. high; plant glaucous throughout, glabrous or only slightly pubescent in the inflorescence; leaves thick glaucous entire opposite; the radical leaves oblong-lanceolate or oblanceolate, acute to nearly obtuse, 2–6 cm. long, 0.5–2 cm. wide, attenuate at the

base into a more or less winged petiole about one third the length of the blade; cauline leaves sessile clasping, oblong-lanceolate or oblanceolate; upper leaves reduced lanceolate; inflorescence a panicle, strict and narrow, glabrous or only slightly pubescent, 4–12 cm. high, flowers bracted; sepals glabrous, scarious margined, irregularly dentate or erose, broadly ovate abruptly truncate above into an acute tip, 3–4 mm. long; corolla blue cylindrical widened upwards, two-lipped, upper lip two-lobed, lower lip three-lobed, lobes spreading, throat bearded with hispid hairs below the sinus of the lobes of the lower lip; corolla limb 11–15 mm. long, 6 mm. wide; fertile anthers 4, glabrous 2-celled, splitting the whole length, perpendicular to the filament; sterile stamen with stout hispid hairs 0.5 mm. long on one side of the apex; stigma two-lobed; capsule brownish conic-ovoid, 4–6.5 mm. long; seeds blackish, rough and somewhat pitted, flattened ovoid, 1.5 mm. long.

The mature capsules and seeds were studied from plants cultivated at Camas, Washington, that had been transplanted from the type locality.

Perennis herbaceus, caule stricto glabro glauco, foliis integerrimis glabris glaucibus radicalibus oblongo-lanceolatis vel oblanceolatis petiolatis, superioribus amplexicaulibus oblongo-lanceolatis vel oblanceolatis, paniculo interrupto glabro, cymis breviter pedunculatis subcongestis, corollis tubo minime inflato, filamento sterile apice barbato, barbatis 0.5 mm. longis, corollis azureis, segmentis calycis 3–4 mm. longis glabris.

Oregon: Open sandy slopes, Blue Grass Ridge, Mt. Hood, Hood River Co., Aug. 6, 1927, *English* 816 (type in Herb. State College of Wash., duplicate type in Herb. Carl English, Jr.); Cloud Cap Inn, Mt. Hood, Hood River Co., July 5, 1926, *English* 189 A; Blue Grass Ridge, Aug. 6, 1927, *English* 811; also, July 31, 1927, *John W. Thompson* 3460; also, Aug. 6, 1927, *Thompson* 3293.

Penstemon euglaucus was found on the open sandy slopes about Cloud Cap Inn and Blue Grass Ridge. Here it was in great abundance, forming the greater portion of the herbage. The showy blue flowers and the attractive glaucous foliage make it a very handsome plant.

The new species *Penstemon euglaucus* is most closely related to *P. Watsoni* Gray and *P. attenuatus* Dougl. *Penstemon euglaucus* may be distinguished by the sepals 3–4 mm. long, broadly ovate abruptly truncate above into an acute tip; sterile stamen with hispid hairs 0.5 mm. long; leaves oblong-lanceolate; and the inflorescence glabrous. On the contrary, *P. Watsoni* has sepals 2–3 mm. long, orbicular ovate; hairs of sterile stamen long (2 mm.) hispid; leaves lanceolate acuminate; and the inflorescence minutely puberulent.

Penstemon euglaucus may be distinguished from *P. attenuatus* by having herbage glaucous throughout; inflorescence glabrous; sepals and corolla glabrous; sepals 3–4 mm. long, broadly ovate, and abruptly truncate above into an acute tip. On the contrary, *P. attenuatus* has herbage not glaucous, corolla somewhat glandular pubescent; sepals and inflorescence glandular pubescent; and the sepals long acuminate (5–7 mm.).

The specific name is derived from the two Greek words εὖ meaning well, and γλαῦκος meaning pale green.

Grindelia oregana Gray, forma **Wilkesiana** (Piper) St. John & R. Sprague, comb. nov.

Grindelia oregana wilkesiana Piper, Piper & Beattie, Fl. N. W. Coast, 363. 1915.

This plant was described as being, "Sparsely pubescent throughout with weak white hairs; otherwise like *G. oregana.*" Certain specimens do show this character, but it is not in any way constant. Some are densely white villous on the stems and to a lesser extent on the leaves. Other specimens are so sparsely pubescent that it is a question whether to consider them of the glabrous or of the pubescent trend. That is, there is a gradual transition from the glabrous to the pubescent ones. Finally the pubescent plants have no distinct range, occurring throughout the range of the species. Consequently, the plant, although it is recognizable, seems worthy of being treated only as a forma.

Additional Plants from Glacier National Park.

BY HAROLD ST. JOHN.

While travelling east the writer stopped off part of the day of June 18, 1926, at Belton, Montana. There was time only for a ride to Lake McDonald and a tramp up the trail towards Sperry Glacier. Two plants seemed to be of interest and specimens of them were preserved. Neither is included in Standley's Flora of Glacier National Park,[1] nor in Graff's Unreported plants from Glacier National Park.[2]

These additional plants are:

Carex concinnoides Mack., open woods, Snyder Creek, Flathead Co., *H. St. John* 4851.

Calochortus apiculatus Baker, open woods, Snyder Creek, Flathead Co., *H. St. John* 4852.

These specimens have been deposited in the Herbarium of the State College of Washington, Pullman, Wash.

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[1]Contrib. U. S. Nat. Herb., 22:235. 1921.

[2]Bull. Torrey Bot. Club, 49:175. 1922.

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PROCEEDINGS

OF THE

BIOLOGICAL SOCIETY OF WASHINGTON

A NEW SUBSPECIES OF FLYCATCHER FROM GONAVE ISLAND, HAITI.[1]

BY ALEXANDER WETMORE.

In view of other races of birds that have been distinguished lately from the Island of Gonave, which occupies a position between the two great peninsulas of western Haiti, it is not surprising to find that the wood pewee differs from that of the main island. This insular form may be known as

Blacicus hispaniolensis tacitus, subsp. nov.

Characters.—Similar to *Blacicus hispaniolensis hispaniolensis* (Bryant)[2] but paler; dorsal surface grayer and ventral surface lighter buff.

Description.—Type, U. S. Nat. Mus. No. 252,964, male, taken at Anse à Galets, Gonave Island, Haiti, March 9, 1920, by W. L. Abbott. Upper surface, including sides of head, slightly darker than deep grayish olive, centers of crown feathers dark hair brown, rump and upper tail-coverts slightly paler than back; wings and tail brownish black, the tertials and inner secondaries edged narrowly with whitish; an indistinct whitish ring about eye; lores indistinctly flecked with whitish; rictal bristles black; throat, breast and sides in general light smoke gray, washed on center of throat and upper breast with pale olive buff; abdomen and under tail-coverts grayish white with a wash of primrose yellow; under wing-coverts dull cream buff. Maxilla brownish black, mandible dull horn color, tarsi and toes brownish black (from dried skin).

Measurements (in millimeters).—Four males, wing, 73.4–77.9 (75.5); tail, 69.0–72.7 (70.6); culmen from base, 14.8–16.9 (15.5); tarsus, 14.4–15.9 (15.0).

Three females, wing, 69.6–74.7 (72.6); tail, 67.6–70.3 (69.1); culmen from base, 14.2–15.6 (14.8); tarsus, 14.9–15.3 (15.1).

Type, male, 74.0; tail, 72.7, culmen from base, 15.0; tarsus, 14.5.

Range.—Restricted to Gonave Island, Haiti, according to present information.

Remarks.—The present form is easily evident when compared in series with our set of twenty-nine from Hispaniola proper. Occasional skins from the main island are almost as pale as the race here named, but the characters indicated are sufficiently marked to warrant separation.

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

[2] *Tyrannula carriboea* (var. *hispaniolensis*) Bryant, Proc. Boston Soc. Nat. Hist., vol. 11, May, 1867, p. 91. (Port-au-Prince, Haiti.)

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PROCEEDINGS

OF THE

BIOLOGICAL SOCIETY OF WASHINGTON

THREE NEW RODENTS FROM WESTERN ARIZONA.

BY E. A. GOLDMAN.

Study of specimens collected in western Arizona for use in connection with a report on the mammals of the State has resulted in the discovery of three hitherto unnamed, or unrecognized, subspecies. These are described as follows:

Thomomys fulvus suboles, subsp. nov.

COLORADO RIVER POCKET GOPHER.

Type.—From alluvial bottom at Old Searchlight Ferry, Colorado River (northwest of Kingman), Arizona (altitude 1,000 feet). No. 244,163, ♂ adult, U. S. National Museum (Biological Survey collection), collected by Luther Chase Goldman, September 26, 1923. Original number 17.

Geographic range.—Probably limited to alluvial bottom lands extending for a few miles along the Colorado River, near Old Searchlight Ferry, Arizona.

General characters.—A small, light-colored subspecies, most closely allied to *Thomomys fulvus desertorum,* but more ochraceous tawny and skull differing especially in remarkable angularity. Much paler than *T. f. fulvus,* and differing in much the same cranial details as from *desertorum.*

Color.—Type (molt about two-thirds complete, extending backward from head, leaving rump in summer pelage being replaced): General tone of upper parts near ochraceous-tawny, inclining toward tawny on cheeks, shoulders, and unmolted portion of rump; ears and post-auricular patches black; lips dusky; throat and outer sides of forearms light buffy; under parts in general dull white (varying in some specimens to pale buff), the plumbeous basal color showing through; feet whitish; tail light buffy above, whitish below.

Skull.—Similar to that of *T. f. desertorum,* but narrower, more angular, and heavier in details of structure; ascending branches of premaxillae broader; zygomata, especially maxillary arms, decidedly broader, with acutely projecting lateral angles; jugal broader at point of attachment to maxilla; auditory bullae smaller, less smoothly rounded. Compared with

that of *fulvus* the skull is smaller and differs notably in heavier, more squarely spreading zygomata.

Measurements.—Type: Total length, 227 mm.; tail vertebrae, 75; hind foot, 30. Average and extremes of four adult male topotypes: 213 (205–223); 65 (58–75); 28 (26–30). Average and extremes of three adult female topotypes: 185 (182–188); 56 (52–61); 24 (23–25.5). *Skull* (type): Greatest length (median line, front of incisors to upper margin of foramen magnum), 39.4; length of nasals, 14.4; zygomatic breadth, 24; mastoid breadth, 18.4; interorbital breadth, 6.8; alveolar length of upper molar series, 7.4.

Remarks.—The range of *Thomomys fulvus desertorum* includes the Detrital Valley and neighboring valleys at 3,500–4,000 feet altitude, northwestern Arizona. Along the western side of this general range a rocky ridge bearing little soil, and therefore unfavorable as a habitat for pocket gophers and tending to stand as a barrier, forms the top of the escarpment flanking the Colorado River in the Pyramid Canyon section. In an embayment of the escarpment, and between it and the river, near the Old Searchlight Ferry are alluvial bottoms consisting of soft, sandy soil overgrown with mesquite (*Prosopis*), Gregg Acacia (*Acacia greggi*), and other vegetation. These bottoms, above ordinary flood stages of the river, extend for several miles until interrupted by cliffs rising abruptly from the water. On the bottoms *Thomomys fulvus suboles* was found abundant. It appears to be a well-marked offshoot of the more widely ranging type of animal inhabiting the tableland above, and beyond, the escarpment described.

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

Perognathus baileyi domensis, subsp. nov.

CASTLE DOME POCKET MOUSE.

Type.—From Castle Dome (at base of Castle Dome Peak), Arizona (altitude 1,400 feet). No. 248,002, ♀ adult, U. S. National Museum (Biological Survey collection), collected by George G. Cantwell, April 13, 1927. Original number 2882.

General characters.—Closely allied to *Perognathus baileyi baileyi,* but general color of upper parts decidedly paler, the lighter element ashy gray instead of ochraceous buffy, and overlying dusky hairs much less conspicuous; buffy lateral line (usually present and distinct in *baileyi*) faint or absent. Similar to *P. b. rudinoris* but color much grayer and cranial characters distinctive.

Color—Type: Upper parts in general ashy gray, finely and rather inconspicuously overlaid with black hairs which are most numerous on top of head; under parts, fore limbs, and hind feet white; tail light brownish above, whitish below.

Skull.—About as in *P. b. baileyi.* Compared with that of *P. b. rudinoris* the skull differs in detail as follows: Rostrum broader; ascending branches of premaxillae broader and only slightly exceeding nasals in posterior extension (premaxillae reaching well beyond nasals in *rudinoris*); mastoid and auditory bullae slightly larger.

Measurements.—Type: Total length, 222 mm.; tail vertebrae, 125; hind foot, 28. Average and extremes of seven adult topotypes: 221 (210–228); 118 (110–125); 27.5 (26–28). *Skull* (type): Greatest length, 29.5; greatest width (between outer margins of auditory processes, 16.2); greatest zygomatic width, 16.1; interorbital constriction, 7.3; length of nasals, 10.4; interparietal, 6.5 x 4; maxillary toothrow, 4.2.

Remarks.—Typical *Perognathus baileyi* is now known from a considerable number of localities within a comparatively narrow strip of territory extending north from the type locality, Magdalena, Sonora, to the Salt River Valley in east-central Arizona. Previous collecting had failed to reveal its presence in the western part of the state and the discovery of a new form in that region is therefore of considerable interest. *P. baileyi* appears to be a species of rather irregular or sporadic occurrence, but future field work will probably add materially to its known range. The rather slight differential characters indicate probably intergradation of *P. b. domensis* with *P. b. baileyi* to the eastward of the type locality. It requires no close comparison with *P. b. rudinoris* of Lower California.

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

Sigmodon hispidus plenus, subsp. nov.

COLORADO RIVER COTTON RAT.

Type.—From Parker, Arizona (altitude 350 feet). No. 181,086, ♂ adult, U. S. National Museum (Biological Survey collection), collected by E. A. Goldman, February 2, 1913. Original number 21819.

Geographic range.—Colorado River Valley, above the confluence of the Colorado and Gila rivers, as far north as Needles, California.

General characters.—A large, pallid subspecies, most nearly related to *Sigmodon hispidus eremicus,* but usually much larger, with skull more massive and differing in detail; color about as in *eremicus.* Approaching *S. h. arizonae* in size, but paler and cranial characters distinctive.

Color.—Type: Upper parts pale buff, tending toward rusty on rump, moderately mixed or lined on top of head and back with blackish which, however, leaves the general tone rather light; under parts, ears, and feet dull whitish, or grayish, as usual in the group; tail light brownish above, grayish below.

Skull.—Similar to that of *S. h. eremicus,* but larger and more massive, in the older adults rather more elongated; rostrum much broader and heavier; interparietal larger; auditory bullae slightly larger, more inflated; dentition heavier. Somewhat similar to that of *S. h. arizonae,* which it nearly equals in size, but supraorbital ridges in adults less prominent, less upturned; parietals less extensively developed below temporal ridges; dentition heavier.

Measurements.—Type: Total length, 316; tail vertebrae, 147; hind foot, 36.5. An adult male from Needles, California: 328; 139; 37. *Skull* (type): Greatest length, 36.8; zygomatic breadth, 21.7; interorbital breadth, 5.5; nasals, 13.8; width of braincase (immediately in front of descending process of supraoccipital), 15; width of rostrum (maxillae at

antorbital notch), 7; interparietal (at median line), 2.7; maxillary toothrow, 6.6.

Remarks.—Although closely allied to *Sigmodon hispidus eremicus*, which inhabits the lower Colorado and the Gila river valleys, this geographic race is readily distinguished by the larger skull, with rostrum decidedly heavier, and interparietal more extended antero-posteriorly. Only a few specimens have been collected, but these exhibit uniformly well-marked cranial differences in comparison with series of typical *eremicus* now available from various localities, and which collectively establish the range of individual variation in that form. It is not very unlike *S. h. arizonae*, but a fine series of 25 topotypes of the latter reveals distinctive characters that have been pointed out. *Sigmodon h. plenus* appears to be restricted to isolated sections of alluvial bottom along the Colorado River, in a region of extreme general aridity.

Specimens examined.—Seven, from localities as follows:

Arizona: Parker (type locality), 2.
California: Needles, 1; Colorado River (opposite Parker, Arizona), 1; 15 miles southwest of Ehrenberg, Arizona, 3.

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PROCEEDINGS

OF THE

BIOLOGICAL SOCIETY OF WASHINGTON

DESCRIPTION OF A NEW WHISTLING THRUSH FROM SOUTHEAST SIAM.

BY J. H. RILEY.[1]

In the large collection of birds made by Dr. Hugh M. Smith in Siam for the U. S. National Museum, there is a specimen of a large whistling thrush taken on the island of Koh Chang. It is related to *Myophonus temminckii temminckii*, but evidently belongs to quite a different form. It may be known as

Myophonus temminckii changensis, subsp. nov.

Type, adult male, U. S. National Museum, No. 307,159, Koh Chang, Gulf of Siam, January 6, 1926. Collected by Dr. Hugh M. Smith (original number 475).

Similar to *Myophonus temminckii temminckii* Vigors, but darker, with the bases of the feathers of the chest, breast, belly and rump white.

Description.—Above and below plumbeous-black, each feather tipped more or less broadly with glistening, dark dull violet-blue, except on the belly, where the tips are obsolete; forehead a shining, dark aniline blue; lores dull black; under tail-coverts blue-violet black; bases of the feathers of the chest, breast, belly and rump white, especially conspicuous on the rump, where only the tips are plumbeous; lesser wing-coverts a shining, dark aniline blue, the feathers black at the base; rest of the wing feathers, except tertials, black, with the outer web dusky violet-blue (2), the outer primaries having the dusky violet-blue basally; tertials wholly dusky violet-blue; median wing-coverts rather broadly tipped with white; tail dusky violet-blue, black along the shafts of the feathers; bill mustard yellow, black along the culmen. Wing, 173; tail, 127; culmen, 29.5; tarsus, 49; middle toe, without claw, 30.5 mm.

Remarks.—The present race has been compared with eleven specimens of *M. t. temminckii*, fifteen of *M. t. eugenei*, and one of *M. t. crassirostris*, and it differs from the first form as indicated above. While *M. t. temminckii* has the bases of the feathers of the rump white, though not so pronouncedly as in *M. t. changensis*, the feathers of the chest, breast

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and belly are dusky at the base, or, if there is any white present, it is confined to the shaft or a narrow streak along it. *M. t. eugenei* has no white at the base of the rump feathers, or to those of the lower-parts and need not be considered further. *M. t. crassirostris* has the bases of the rump, chest and belly feathers white, as in *M. t. changensis*, but it lacks the white tips to the middle wing-coverts, and the blue of the upper- and lower-parts is much brighter, more of a dark bluish violet, rather than plumbeous black. *M. klossii* Robinson (Ibis, 1915, p. 750) I have not seen, but the description and measurements indicate quite a different species. The description of *M. robinsoni* Grant (Bull. Brit. Orn. Club, xv, 1905, p. 69) indicates a bird very similar to *M. t. changensis*, but the measurements are much too small. It was described from Mount Mengku-anglebah, Selangor.

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PROCEEDINGS

OF THE

BIOLOGICAL SOCIETY OF WASHINGTON

FORSTER'S TERN IN THE DISTRICT OF COLUMBIA.

BY FREDERICK C. LINCOLN.

Forster's Tern (*Sterna forsteri*) has had a somewhat curious history in connection with the list of birds of the Washington region. In the latest list of birds of this area[1] Miss May T. Cooke lists two records: "One, August, 1859 (Spec. U. S. Nat. Mus.); one, summer, 1875 (*fide* P. L. Jouy)."

Examination of the register of specimens in the National Museum reveals an entry for this species in the characteristic handwriting of Professor S. F. Baird. It was recorded as No. 20922, the other items of the data being Washington, Aug., 1859, S. F. Baird. In the column "how obtained" is the note "50c." From this it appears that the specimen was purchased, probably either in the market or from a local gunner, and while there is no definite reason to doubt its local origin, neither is there any definite assurance that it was so taken. This specimen apparently was overlooked by Coues and Prentiss in both editions of their birds of the District of Columbia,[2] and by Professor Cooke in his two lists of birds of Washington.[3] It was sent to Oberlin College, Oberlin, Ohio, March 21, 1888.

The specimen credited to P. L. Jouy was recorded by him in 1876,[4] as "obtained last summer [1875] on the Potomac, in the vicinity of Georgetown."

In view of this seeming rarity, it is remarkable that during the month of September and first half of October, 1928, this tern should be fairly common on the Potomac River, within the District limits. I am indebted to Mr. and Mrs. William J. Whiting and to Mr. W. H. Ball for their notes, which are here incorporated to complete the account of this occurrence.

[1] Proc. Biol. Soc. Wash., vol. 34, Mar. 31, 1921, p. 5.

[2] Annual Report of the Board of Regents of the Smithsonian Institution, 1862, pp. 399–421; also Bul. No. 26, U. S. Nat. Mus., 1883.

[3] Proc. Biol. Soc. Wash., vol. 21, pp. 107–118, April 11, 1908; also vol. 26, pp. 21–26, February 8, 1913.

[4] Notes on Forster's Tern, Field and Forest, vol. 2, No. 2, pp. 29–31, August, 1876.

Reports of the presence of these birds reached the Biological Survey about the middle of September, but it was not until the 27th that I was able to search for them. On that date, in company with Captain Moody Creighton, in charge of the Biological Survey patrol boat "Curlew," I examined all the mud banks and islands in the river from Hains Point to the site of the new Memorial Bridge. A few terns were seen and two were taken, both being examples of *Sterna hirundo*. Needless to say, my confidence in the report of *S. forsteri*, dropped to zero, and it was only upon the repeated insistence of Mr. Ball, that another trip was made on October 11. This time no common terns were seen, but 16 Forster's were under observation for two or three hours as they moved up and down a long mud bank on the Virginia side of the channel opposite East Potomac Park. Three specimens were collected, two being retained in the Biological Survey collections, while the third was placed in the collection of District birds in the National Museum.

The following additional dates serve to round out the history of this interesting case: Sept. 13, one seen from mud flat (Whiting); Sept. 23, one seen at Tidal Basin (Whiting); Sept. 24, two resting on mud flat (Whiting); Sept. 25, one at Tidal Basin (Ball); Oct. 1, fourteen, counted resting on mud flat (Whiting); Oct. 2, one at Hains Point (Ball); Oct. 6, three at Hains Point (Ball); Oct. 6, four, near Memorial Bridge, then passing to near Highway Bridge (Whiting); Oct. 9, thirty-seven counted resting on mud flat, eight flying near at same time (Whiting); Oct. 14, three resting on mud flat (Whiting); Oct. 14, three at Hains Point (Ball).

A fall field character that has not been adequately stressed by authors is the white crown with the rather broad blackish bar on the sides of the head, embracing the eyes. In *S. hirundo* the black cap is frequently imperfect at this season, but apparently the crown is never silvery white as in *forsteri*. These two species may, in fact, be more readily identified in the field in the fall, than in the spring. Of the three specimens obtained, two were adult, while the third was a bird of the year.

Forster's Tern is known to breed on islands off the coast of Virginia so it would seem that it should be of rather frequent occurrence in the Washington region.

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PROCEEDINGS

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DESCRIPTIONS OF SIX NEW NORTH AMERICAN GROUND SQUIRRELS.

BY ARTHUR H. HOWELL.

A revision of the North American ground squirrels, now in progress, has revealed a number of new races, which are here briefly described in advance of a more formal paper.

Citellus townsendii brunneus, subsp. nov.

IDAHO SPOTTED GROUND SQUIRREL.

Type.—Female adult, skin and skull No. 201,963, U. S. National Museum (Biological Survey collection); collected at New Meadows, Adams County, Idaho, July 11, 1913, by L. E. Wyman; original number 178.

Subspecific characters.—Similar to *Citellus t. townsendii*, but color of upperparts more brownish (less grayish), and the dorsal spots smaller; cinnamon patch on face darker and more extensive; ears much larger, raised conspicuously above the crown; tail darker above; skull averaging larger and relatively broader.

Measurements.—Type: Total length, 224; tail vertebrae, 61; hind foot, 32. *Skull.*—Average of 4 adult males from Weiser and Midvale, Idaho: Greatest length, 40.4 (39.8–40.8); zygomatic breadth, 25.5 (24.9–26.1); breadth of cranium, 18.4 (18.3–18.5); least interorbital breadth, 8.4 (7.5–9.2); least postorbital breadth, 10.8 (10.4–11.6); length of nasals, 15 (14.6–16.1); maxillary tooth row, 8.5 (8.4–8.8). *Adult female* (type): 38.2; 24; 17.2; 8.1; 9.5; 13.4; 7.5.

Range.—West-central Idaho; specimens examined from Weiser, Midvale, Goodrich, Van Wyck, and New Meadows.

Citellus elegans nevadensis, subsp. nov.

Type.—Female adult, skin and skull, No. 156,788, U. S. National Museum (Biological Survey collection); collected at Paradise, Humboldt County, Nevada, March 3, 1908, by Stanley E. Piper; original number 112.

Subspecific characters.—Similar to *Citellus e. elegans*, but larger, with longer tail and hind foot; upperparts averaging more grayish (less brownish) especially on head and shoulders; underparts darker buff; skull larger, but postorbital breadth less.

Measurements.—Type: Total length, 337; tail vertebrae, 100; hind foot, 47. Average of 9 adults from Ruby Valley and Skelton, Nevada, and McDermitt, Oregon: Total length, 291.1 (270–307); tail vertebrae, 88.1 (76–100); hind foot, 46.1 (42–48). *Skull.*—Average of 5 adults (3 males, 2 females) from Paradise and Metropolis, Nevada: Greatest length, 47.6 (44.7–48.6); zygomatic breadth, 31.5 (29.9–32.4); breadth of cranium, 21.1 (19.8–21.7); least interorbital breadth, 10.1 (9.2–11.6); least postorbital breadth, 10.8 (10.4–11.5); length of nasals, 17.7 (17–18.6); maxillary tooth row, 9.7 (9.3–10.3). *Skull of type:* 48.6; 32.2; 21.4; ——; 10.5; 18.6; 10.3.

Range.—Northeastern Nevada and southeastern Oregon; specimen examined from McDermitt and head of Quinn River, Oregon; Paradise Valley, Mountain City, Metropolis, Elko, Skelton, and Ruby Valley, Nevada.

Citellus columbianus ruficaudus, subsp. nov.

BLUE MOUNTAINS GROUND SQUIRREL.

Type.—Female adult, skin and skull, No. 231,942, U. S. National Museum (Biological Survey collection); collected at Wallowa Lake, Wallowa County, Oregon; by George G. Cantwell; original number 1093.

Subspecific characters.—Similar to *Citellus c. columbianus,* but sides of face and usually the throat a deeper shade of tawny; legs and feet darker; upper side of tail tawny (instead of gray); hind feet and skull larger.

Measurements.—Average of 10 adults (8 males, 2 females) from Wallowa Mountains, Enterprise, Elgin, and Bourne, Oregon: Total length, 369.6 (340–410); tail vertebrae, 100.7 (80–115); hind foot, 54.2 (51–58). *Skull.* —Average of 8 males from same localities: Greatest length, 54.2 (51.5–57); palatal length, 26.6 (24.5–28); zygomatic breadth, 34.1 (33.2–35.6); breadth of cranium, 21.9 (21.5–22.4); least interorbital breadth, 12.4 (11.1–14.3); least postorbital breadth, 11.9 (10.5–12.6); length of nasals 19.8 (18.8–20.3); maxillary tooth row, 11.4 (10.5–12.4). *Skull of type* (♀) 52.8; 25.5; 34.1; 21.7; 13; 12.2; 19.1; 11.

Range.—The Blue Mountain region of northeastern Oregon and southeastern Washington. Specimens have been examined from the following localities:

Washington: Anatone; Blue Mountains, 20–30 miles southeast of Dayton.
Oregon: Austin; Anthony; Bourne; Cornucopia; Dixie Butte; Elgin; Enterprise; Meacham; Wallowa Lake.

Citellus spilosoma pallescens, subsp. nov.

Type.—Male adult, skin and skull, No. 79,535, U. S. National Museum (Biological Survey collection); collected at La Ventura, Coahuila, Mexico, August 10, 1896, by E. W. Nelson and E. A. Goldman; original number, 10,016.

Subspecific characters.—Similar to *Citellus s. spilosoma* (as represented by specimens from Durango), but paler; skull smaller, with shorter, broader rostrum. Compared with *Citellus s. canescens,* of Arizona: Size larger; tail

longer, with more black on distal half; dorsal spotting finer; skull larger, with narrower rostrum.

Description of type.—Upperparts wood brown (of Ridgway, 1912), finely speckled, chiefly on hinder back, with white; tail above, light pinkish cinnamon on proximal half, the distal half bordered with fuscous-black, and edged with buffy white; tail beneath, pinkish buff, bordered with fuscous-black and buffy white; underparts white.

Measurements.—Average of 12 adults from the type locality: Total length, 242.6 (232–253); tail vertebrae, 84.4 (76–92); hind foot, 35.7 (34.5–37). *Skull.*—Average of 10 adults from type locality: Greatest length, 40.1 (38.9–41.1); zygomatic breadth, 23.8 (22.9–24.5); breadth of cranium, 18.6 (18.2–19); interorbital breadth, 8.4 (7.8–8.9); least postorbital breadth, 14 (12.8–15.1); length of nasals, 13.6 (13–14.5); maxillary tooth row, 7.5 (7.1–8.1).

Remarks.—Before undertaking further subdivision of this group, it was found necessary to identify the typical form, named without indication of its locality. Fortunately, the original specimens forming the basis of the description of *spilosoma* are still in the British Museum collection, and with the kind assistance of Mr. Oldfield Thomas, I have been able to obtain direct comparison of certain specimens in the Biological Survey collection with these types. Typical *spilosoma* is found to range from Durango City southward to Aguas Calientes, whereas the present form occupies the plains of north-central Mexico, from southern Chihuahua (Santa Rosalia) southward to San Luis Potosi and eastward to southern Nuevo Leon (Doctor Arroyo).

Citellus tridecemlineatus arenicola, subsp. nov.

Type.—Male adult, No. 87,686, U. S. National Museum (Biological Survey collection); collected April 22, 1897, at Pendennis, Kansas, by J. Alden Loring; original number 3988.

Subspecific characters.—Similar to *Citellus t. tridecemlineatus,* but smaller and paler, the dark dorsal stripes snuff brown (instead of sepia); similar also to *C. t. texensis,* but smaller and much paler.

Measurements.—Average of 8 adults (4 males, 4 females) from type locality: Total length, 238 (214–295); tail vertebrae, 77.7 (71–83); hind foot, 32.2 (31–34). *Skull.*—Average of 4 adult males from type locality: Greatest length, 38.3 (37.3–39); palatal length, 17.7 (17–18.5); zygomatic breadth, 23 (22.2–23.6); breadth of cranium, 17.1 (16.8–17.4); least interorbital breadth, 11.5 (10.8–11.8); length of nasals, 13.5 (12.9–13.9); maxillary tooth row, 6.8 (6.5–7).

Range.—Southwestern Kansas, extreme eastern Colorado, northwestern Texas, western Oklahoma, and eastern New Mexico. Specimens have been examined from the following localities:

Colorado: Eureka Hill, Cheyenne County; Leroy; Monon, Baca County; Springfield.

Kansas: Oakley; Pendennis.

Oklahoma: Woodward.

Texas: Lipscomb; Lubbock; Mobeetie; Texline; Washburn.
New Mexico: Cabra Springs; Clayton; Loveless Lake, Lincoln County; Roswell; Tucumcari.

Citellus tridecemlineatus monticola, subsp. nov.

Type.—Male adult, skin and skull, No. 209,255, U. S. National Museum (Biological Survey collection); collected June 15, 1915, at Marsh Lake,[1] White Mountains, Arizona (9,000 feet altitude), by Edward A. Goldman; original number 22,616.

Subspecific characters.—Similar to *Citellus t. alleni* (of Wyoming), but upperparts chestnut-brown instead of sepia and underside of tail more reddish; similar to *Citellus t. parvus*, but larger; coloration of upperparts and underside of tail darker; underparts more buffy. Compared with *hollisteri:* Upperparts paler, the dorsal stripes more whitish (less buffy); and underside of tail more reddish.

Description of type.—Ground color of upperparts chestnut-brown; light stripes and spots creamy white; front feet pinkish buff; hind feet cartridge buff, the thighs mikado brown; tail above, pinkish cinnamon on proximal third, the remainder fuscous-black, broadly edged with cartridge buff; tail beneath, russet, bordered with fuscous-black and tipped with cartridge buff; underparts and lower sides cartridge buff.

Range.—Known only from the type locality—a plateau at an elevation of about 9,000 feet in the White Mountains, Arizona. Specimens from Springerville, at the base of the mountains, are intermediate between *monticola* and *parvus*.

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[1]Also called Big Lake.

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New names are printed in **heavy type.**