

ENGINEER DEPARTMENT, UNITED STATES ARMY.

REPORT

UPON

GEOGRAPHICAL AND GEOLOGICAL

EXPLORATIONS AND SURVEYS

WEST OF THE ONE HUNDREDTH MERIDIAN,

IN CHARGE OF

FIRST LIEUT. GEO. M. WHEELER,
CORPS OF ENGINEERS, U. S. ARMY,

UNDER THE DIRECTION OF

BRIG. GEN. A. A. HUMPHREYS,
CHIEF OF ENGINEERS, U. S. ARMY.

PUBLISHED BY AUTHORITY OF HON. WM. W. BELKNAP, SECRETARY OF WAR,
IN ACCORDANCE WITH ACTS OF CONGRESS OF JUNE 23, 1874, AND FEBRUARY 15, 1875.

IN SIX VOLUMES, ACCOMPANIED BY ONE TOPOGRAPHICAL AND ONE
GEOLOGICAL ATLAS.

VOL. V.—ZOOLOGY.

WASHINGTON:
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1875.

FORTY-THIRD CONGRESS, FIRST SESSION.

CHAPTER 455.

Be it enacted by the Senate and House of Representatives of the United States of America in Congress assembled, That the following sums be, and the same are hereby, appropriated, for the objects hereinafter expressed, for the fiscal year ending June thirtieth, eighteen hundred and seventy-five, namely:

* * * * *
For engraving and printing the plates illustrating the report of the geographical and geological explorations and surveys west of the one hundredth meridian, to be published in quarto form, the printing and binding to be done at the Government Printing-Office, twenty-five thousand thousand.
* * * * *

Approved June 23, 1874.

FORTY-THIRD CONGRESS, SECOND SESSION.

CHAPTER 76.

Be it enacted by the Senate and House of Representatives of the United States of America in Congress assembled, That the act entitled "An act making appropriations for sundry civil expenses of the Government for the fiscal year ending June thirtieth, eighteen hundred and seventy-five, and for other purposes," approved June twenty-third, eighteen hundred and seventy-four, be, and the same is hereby, amended by adding to the clause of said act relating to the engraving and printing of the plates illustrating the report of the geographical and geological explorations and surveys west of the one hundredth meridian, the following words: and "that two thousand copies of the report shall be printed by the Congressional Printer," after substituting the word "dollars" in lieu of the concluding word of said clause.

Approved February 15, 1875.

N O T E .

Six volumes, accompanied by one topographical and one geological atlas, embrace Reports of Explorations and Surveys West of the One hundredth Meridian up to the close of the field-season of 1873, (excepting Volume V, which embodies results up to 1874,) as follows:—

Volume I.—Geographical Report.

Volume II.—Astronomy and Meteorology, including Barometric Altitudes.

Volume III.—Geology and Mineralogy.

Volume IV.—Paleontology.

Volume V.—Zoölogy.

Volume VI.—Botany.

An advance edition of the Topographical Atlas, consisting of Title-Page, Legend-Sheet, Index, Progress and Basin Maps, and sheets Nos. 49, 50, 57, 58, 59, 65, 66, and 67, was issued in 1874; other sheets will follow as rapidly as they can be prepared, engraved, and printed. The maps from the field-work of 1873 and subsequent years will be projected upon a scale of one inch to four miles. Sheets of a geological atlas, to supplement Volume III, based upon the topographical results, advance toward completion.

Addenda Note.—Lieutenant Wheeler, in his Annual Report for 1875, recommends an additional volume, to be numbered VII, and to be devoted to the subjects of Ethnology, Philology, and Ruins.

GEOGRAPHICAL AND GEOLOGICAL EXPLORATIONS AND SURVEYS WEST OF THE ONE
HUNDREDTH MERIDIAN, FIRST LIEUT. GEO. M. WHEELER, CORPS
OF ENGINEERS, U. S. ARMY, IN CHARGE.

REPORTS

UPON

THE ZOOLOGICAL COLLECTIONS OBTAINED FROM PORTIONS OF NEVADA,
UTAH, CALIFORNIA, COLORADO, NEW MEXICO, AND ARIZONA,

DURING

THE YEARS 1871, 1872, 1873, AND 1874.

BY

H. C. YARROW, A. A. SURGEON U. S. ARMY, SURGEON AND ZOÖLOGIST
TO THE EXPEDITIONS OF 1872 AND 1874.

H. W. HENSHAW, ORNITHOLOGIST TO EXPEDITIONS OF 1872-'73-'74.

PROF. E. D. COPE, PALEONTOLOGIST TO EXPEDITION OF 1874.

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IN 16 CHAPTERS.

ILLUSTRATED BY 45 PLATES AND 3 WOOD-CUTS.

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The plates illustrating this volume were engraved and printed by Messrs. Thos. Sinclair & Son, of Philadelphia. The bird plates were drawn from nature by Mr. Robert Ridgway, of the Smithsonian Institution.

LETTER OF TRANSMITTAL.

UNITED STATES ENGINEER OFFICE,
GEOGRAPHICAL EXPLORATIONS AND SURVEYS
WEST OF THE ONE HUNDREDTH MERIDIAN,
Washington, D. C., February 5, 1875.

GENERAL: I have the honor to transmit herewith a report based upon the results of the examinations of the collections in zoölogy, made by the several field parties of the survey during the years 1871 to 1874, inclusive.

In the examination and identification of these collections, several gentlemen, eminent in this branch of scientific investigation, have cheerfully rendered valuable assistance, and their reports, together with those by members of the survey, constitute the subject-matter of this volume.

The general collation of the data and supervision for publication has been intrusted to Acting Assistant Surgeon H. C. Yarrow, United States Army, in addition to his duties as medical officer during and since 1872, in which he has manifested commendable energy.

Skilled assistance in this branch was had for the first time in the expedition of 1871; the services of Acting Assistant Surgeon W. J. Hoffman, United States Army, by detail through the Medical Department, and of Mr. Ferdinand Bischoff, having been secured.

In 1872, Acting Assistant Surgeon H. C. Yarrow, United States Army, with the assistance of Mr. H. W. Henshaw, and incidentally of other members of the expedition, accomplished most satisfactory results.

In 1873, the force was further augmented by the services of Acting Assistant Surgeons J. T. Rothrock and C. G. Newberry, United States Army, and Mr. John Wolf, collector.

The field operations of the survey require the services of medical officers in their professional capacity, yet not to such an extent as to preclude their availability for labor in other directions, hence their assignment to investigations in the important branches of zoölogy.

In an organization formed for exact geographical purposes, the auxiliary branches must of need be secondary to the main object; still, it is believed that this report will meet all just expectations, especially when the dependency under which the material was obtained and the limited additional expense incurred are considered.

The collections made have generally been large, and include a fair proportion of new and rare specimens. Many of them have been forwarded to the Smithsonian Institution, and a number of crania and osteological specimens have been collected for the Army Medical Museum.

The services of the gentlemen whose analytical reports are herewith, and of the officers of the Army who have rendered valuable assistance to the field parties, are gratefully acknowledged.

To Brig. Gen. M. C. Meigs, Quartermaster-General United States Army, who has so fully sympathized with the objects of the survey, thanks are due.

The active and hearty co-operation of the Medical Department, for which much is due to Surgeon-General J. K. Barnes and Assistant Surgeon-General C. H. Crane, in supplying medical officers with tastes for natural history work, has conduced largely to the gratifying results obtained.

For want of space, the final Botanical Report has been excluded, and will appear separately as Volume VI, embracing results to the date of its issue.

The accumulating material in the subjects of Ethnology, Philology, and Ruins will, as time and means permit, be consolidated into a separate report, with appropriate illustrations.

In conclusion, I beg to express my hearty appreciation of the services of the professional gentlemen who have been engaged in this field of research.

Very respectfully, your obedient servant,

GEO. M. WHEELER,

Lieutenant of Engineers, in Charge.

Brig. Gen. A. A. HUMPHREYS,

Chief of Engineers, United States Army.

INTRODUCTORY LETTER.

UNITED STATES ENGINEER OFFICE,
GEOGRAPHICAL EXPLORATIONS AND SURVEYS
WEST OF THE ONE HUNDREDTH MERIDIAN,
Washington, D. C., February 1, 1875.

SIR: The following brief statement of the operations of the zoölogical work of the expedition for the years 1871, 1872, 1873, and 1874, based upon the collections made by different members of the party in this period, and embracing an epitomized account of certain portions of the different Territories visited by the collectors, may prove of interest, besides assisting in giving an idea of the features of the several regions as regards geographical distribution.

Although the active operations of the expedition were inaugurated in 1869, owing to various circumstances it was not until 1871 that facilities adequate to a proper prosecution of natural history work, as an item of interest collateral to the special object of the survey, topography, were available. Anticipating at this time that the country through which the expedition must pass, being but little known and seldom visited, would prove a rich field for the study of the naturalist in developing the existence of many forms of animal and vegetable life, rare, if not new, to science, the services of Acting Assistant Surgeon W. J. Hoffman, United States Army, were secured, together with those of Mr. F. Bischoff, a collector of recognized skill and enthusiasm, to whom was confided the task of collecting.

The points of departure in 1871 were: Carlin and Battle Mountain, Nev., on the Central Pacific Railroad; the point of disbandment, Tucson, Arizona; the area between these places extending about eight degrees in latitude, and longitudinally from the 110th to the 119th degree.

The several rendezvous were: Belmont, Nev.; Camp Independence, Cal.; Cottonwood Springs, Nev.; Crossing of the Colorado River, Truxton Springs, Prescott, and Camp Apache, Arizona.

The expedition being divided, a collector was assigned to each of the main parties, who diverged therefrom in the vicinity of the rendezvous camps and other desirable points along the line of travel. In this way, facility was also afforded for visiting portions of Nevada, California, and Utah, which were minutely examined; special attention being paid to the areas in basins of drainage of large parts of the several interior basins, as Owens River, Death Valley, Amargosa Desert, Las Vegas Valley, valleys of the Muddy and Rio Virgen, southeastern edges of the San Francisco Plateau, Verde and Salt Rivers, and Rio Gila. The map of the region in question, however, affords a more graphic as well as a better explanation of the localities visited than would any written description.

The reports on the parts of the collection which were received show that the regions visited are possessed of great interest to the student of natural history, and with the study of the specimens themselves can hardly fail to extend greatly our knowledge of the range of the fauna and flora of North America.

It is to be regretted that the great fire in Chicago left but few of the specimens gathered; those that remain, however, suffice to attest the reputation for zeal and industry of the gentlemen by whom the collection was made, and are abundant evidence to warrant the belief that the collection entire must have been extremely interesting.

Confident, perhaps, of the recent universally marked increase in attention to this branch of natural science, and of the great enthusiasm being manifested by foreign governments in kindred researches, and, perchance, not unmindful of the necessity for increased knowledge of our own fauna and flora, for the proper study of the fauna and flora of other lands, and that to this end specimens were necessary for comparison to establish the degrees of resemblance which exist between different bodies, in 1872 every facility practicable was afforded.

In 1872, the natural history branch of the survey was placed in my charge, with Mr. H. W. Henshaw, as assistant. The expedition was organized at Salt Lake City, where investigations were made in regard to the natural history of the vicinity of Great Salt Lake.

From this point, Mr. Henshaw and myself proceeded south fifty miles

to Provo, Utah, where two weeks were most profitably spent in the vicinity of the city, the cañons of the Wahsatch range, Utah Lake, and the Provo River. At Provo the two collectors separated, the former joining Lieutenant Hoxie's party on the way to Eastern Nevada, while the latter proceeded with your party through Spanish Fork Cañon to the valley of the Gunnison, and southward.

Lieutenant Hoxie's route was from Fairfield, Utah, making a detour westward to Fillmore, Utah, passing *en route* the Onaqui, Thomas, House, and Gosi-Ute ranges of mountains, and following quite closely the outward course of Captain Simpson in 1858 and 1859, the southern limit of the so-called American Desert was crossed, the extreme western limit reached being Schell Creek Valley, Nevada. From this point, the direction was south by east to Snake Creek Valley, due east across Confusion Range, past White Valley, traversing the House Range by means of Dome Cañon; south, to the crossing of the Sevier, a short distance above Deseret City, and thence to Fillmore.

The country traversed by this party was, in most instances, here and there, for miles in extent, either wholly destitute of vegetation, or at times relieved of its frightful barrenness by patches of sage-brush or dreary alkaline flats; even the few streams and water courses met with were triflingly diminutive, while the vegetation on their banks bordered well on to sterility. From the uninviting and infertile character of the country, and the rapidity with which the party necessarily moved, results in the way of specimens were not remarkable, although those secured amply repaid the time spent in their collection, and seemed to fully mark many of the peculiarities of the fauna and flora of the districts traversed.

From Fillmore the march was southerly along the main range in extension south of the Wahsatch, crossing this at Frémont's Pass; thence to the eastern valley of the Sevier, which was followed south to Panquitch, at which point much interesting work was done near the town and lake of the same name. From Panquitch the route was south and west to the Rio Virgen, along which the course lay to Toquerville, a rendezvous camp.

The party to which Mr. Henshaw, assistant, was attached, after crossing the main range, passed southward through Strawberry, Thistle, Sam

Pitch, and Grass Valleys, through Frémont's Pass westward to the regular wagon road, thence south to Toquerville. At the last mentioned point, a minor party was organized for special operations, and consisted of two collectors and assistants. This section, under myself, proceeded south to Saint George, Utah, via Washington, Utah, thence westward and northward to Pine Valley, east to Harmony, and north to Beaver, and finally to Provo, where considerable time was spent, as at the commencement of the field work. By moving leisurely from point to point, and making detours from time to time to localities of special interest, many valuable specimens were secured, as well as much important information that it would hardly have been possible otherwise to have gained. From Provo, the party proceeded to Salt Lake City, and disbanded.

The reports of the operations of the season will show that while much was accomplished of value to our own knowledge of the animal and vegetable characteristics of the region specially visited, the extensive collections obtained will enable a distribution to foreign museums of duplicate specimens, many of them unique, and highly desired to fill gaps in the Old World representations of North American zoölogy.

Finding that the results of the previous season fully warranted the increased facilities then afforded this branch of the expedition, it was determined in 1873 to prosecute with renewed vigor observations incident to this interesting study, and the following were named to continue the work, viz: Dr. J. T. Rothrock, Dr. C. G. Newberry, Dr. O. Loew, and Mr. H. W. Henshaw. The party rendezvoused at Denver, Colo.; Dr. Rothrock being assigned to Lieutenant Marshall's party, Dr. Newberry to Lieutenant Russell's, and Dr. Loew to your own, Mr. Henshaw setting out in advance to make collections at special points.

The party under Lieutenant Marshall left Denver, and proceeded westward through Middle Park, visiting Georgetown, Fairplay, South Park, Roaring Fork, Cochetopa, Saguache, and Tierra Amarilla. The party to which Dr. Newberry and Dr. Loew were attached operated in Northern and Southern New Mexico and Arizona; Mr. Henshaw joining Lieutenant Russell's party at Fort Wingate in Western New Mexico, and proceeded through Western and Southern Arizona. The very extensive collection of these gen-

tlemen fully attests their zeal and industry in their respective departments. To Dr. Rothrock, and his assistant, Professor Wolf, is due the credit of a botanical collection hardly surpassed under similar circumstances in point of number and variety of specimens, and to Mr. Henshaw that of a unique, and unprecedented collection of 1,200 bird skins.

In 1874, the results of the zoölogical collectors were simply unexampled, as a collection was secured excelling in value and magnitude that of any similar expedition. A party, consisting of Dr. J. T. Rothrock, H. W. Henshaw, and James M. Rutter, took the field early in May, and proceeded to Santa Fé, N. Mex., from which point their labors commenced. The route of travel selected was through portions of Western New Mexico and Arizona; the farthest southern point reached being old Camp Crittenden, not far from the Mexican boundary line, returning through Eastern Arizona and New Mexico to their point of departure in the latter part of December. Being independent of the topographical parties, they were enabled to carefully study the fauna and flora of certain areas not previously investigated, and in addition acquired valuable meteorological data. Another party left Pueblo, Colo., in July, consisting of Prof. E. D. Cope, W. G. Shedd, and R. J. Ainsworth, in charge of myself, and was organized for the especial purpose of investigating beds of fossil vertebrates and invertebrates in New Mexico and Colorado. As a detailed account of the routes of travel of the different parties has already been given in your annual report for 1874, it is unnecessary to repeat it here. In addition, the main or supply party had the services of C. E. Aiken as collector, who was able to add very largely to the stock of material gathered; and Dr. O. Loew, with Lieutenant Price's party, likewise furnished an important share.

Besides the labors of the regular collectors, it is pleasing to note the co-operation of many of the members of the different parties, who offered every assistance in their power to swell the general aggregate of results, among whom were Lieutenants Marshall, Hoxie, Russell, Whipple, and Birnie; Dr. O. Loew; and Messrs. Keasbey, Klett, Thompson, Gilbert, Howell, and Brown. It is also mentioned with pleasure that, during the entire time covered by the field operations of the survey, all the officers at the different military posts visited, cheerfully rendered every assistance

desired, and to their courtesy and uniform kindness much of the success of the natural history operations is attributable.

In the special work of preparing the reports relative to its collections, the expedition is under obligations to a number of distinguished scientists for their kind and gratuitous services in the work of identification of the individual specimens. The following are among the large number of the gentlemen in question:

In the determination of—

Mammals, thanks are due to Prof. S. F. Baird, of the Smithsonian Institution; Prof. Harrison Allen, of the University of Pennsylvania; Dr. Elliott Coues, U. S. A., naturalist of the Northern Boundary Survey; Prof. J. A. Allen, of the Museum of Comparative Zoölogy, Cambridge.

Birds, Prof. S. F. Baird; Dr. Elliott Coues, U. S. A.; Mr. Robert Ridgway, of the Smithsonian; Prof. J. A. Allen; Mr. George N. Lawrence, of the Lyceum of Natural History of New York; Mr. C. Hart Merriam, of the Yale Scientific School; Dr. Thomas Brewer, of Boston; Mr. William Brewster, of Cambridge; Mr. Charles E. Aiken, of Colorado; and Capt. C. Bendire, U. S. A.

Reptiles, Prof. S. F. Baird; Prof. E. D. Cope, of the Academy of Natural Sciences of Philadelphia; and Mr. G. Brown Goode, of the Smithsonian.

Fishes, Prof. S. F. Baird; Mr. G. Brown Goode; Prof. E. D. Cope; Prof. Theo. Gill; Mr. J. H. Milner, of the United States Fish Commission; Mr. T. Bean, of the Smithsonian; and Mr. M. P. Madsen, of Utah.

INSECTS.

Coleoptera, Mr. Henry Ulke, of Washington, D. C.; Dr. George H. Horn, of the Academy of Natural Sciences of Philadelphia; Prof. John L. LeConte, of the Academy of Natural Sciences of Philadelphia.

Lepidoptera, Mr. W. H. Edwards, of Coalburgh, W. Va.; Mr. Theo. L. Mead, of Cornell University, New York; Mr. R. H. Stretch, of San Francisco, Cal.

Orthoptera, Prof. Cyrus Thomas, of Washington, D. C.; Mr. S. H. Scudder, of Cambridge, Mass.; Prof. Townend Glover, of the Agricultural

Department, Washington, D. C.; Mr. Charles H. Dodge, Agricultural Department, Washington, D. C.

Hymenoptera, Prof. E. T. Cresson, of the American Entomological Society; Dr. A. S. Packard, jr., of the Essex Institute, Salem, Mass.; and Mr. Edward Norton.

Diptera, Baron C. R. Osten-Sacken, of the Museum of Comparative Zoölogy, Cambridge, Mass.

Hemiptera, Dr. P. R. Uhler, of the Peabody Institute, Baltimore, Md.

Spiders, Dr. William Holden, of Columbus, Ohio.

Neuroptera, Dr. H. A. Hagen, of the Museum of Comparative Zoölogy, Cambridge, Mass.

Leeches, Worms, Crustacea, and Larvæ, Prof. A. E. Verrill, of Yale College, New Haven, Conn.; Prof. J. Leidy, of the University of Pennsylvania; Dr. H. A. Hagen.

Mollusca, Mr. George W. Tryon, jr., of the Academy of Natural Sciences of Philadelphia; Mr. W. G. Binney, of Burlington, N. J.; Dr. James Lewis, of Mohawk, N. Y.; and Mr. Temple Prime, of New York City.

I have the honor to be, very respectfully, your obedient servant,

H. C. YARROW,

Acting Assistant Surgeon United States Army.

First Lieut. GEORGE M. WHEELER,

Corps of Engineers United States Army, in charge.

CHAPTER I.

NOTES

UPON

GEOGRAPHICAL DISTRIBUTION AND VARIATION

WITH REGARD TO

THE ZOÖLOGY OF THE WESTERN UNITED STATES AS
RELATES MORE PARTICULARLY TO
MAMMALS AND BIRDS.

BY

DR. H. C. YARROW.

Please substitute for the errata between pages 22 and 23 of Vol. V,
Report upon U. S. Geographical Surveys west of the 100th meridian—
Wheeler.

ERRATA.

[Vol. V. Reports upon U. S. Geographical Surveys West of the 100th Meridian.—Wheeler.]

REPTILES AND BATRACHIANS.

Page 619, fourteenth line from bottom, for "O. pyromelas", read "O. pyrrhomelas".

FISHES.

Page 673, ninth line from top, after "proper", read "with".

Page 677, for "Alticolus", read "Alticolum".

Page 678, for "Fecundus", read "Fecundum".

DIURNAL LEPIDOPTERA.

Page 762, tenth line from bottom, for "Phyciodes", read "Melitæa".

Page 763, sixth and eleventh lines from top and thirteenth line from bottom, for "Phyciodes", read "Eresia".

Page 786, seventeenth line from top, for "Epargyreus", read "Eudamus".

Page 792, under "Anthocharis", for "A. Ausonoides", read "A. Ausonides".

ZYGÆNIDÆ.

Page 798, twelfth line from top, *dele* "Cochliidiinæ".

Page 799, sixteenth and seventeenth lines from top, *dele* "Zygænidae" and "Castniinæ".

Page 802, eleventh line from top, insert "Zygænidae" before "Melanchroia".

COLEOPTERA.

Page 816, for "Straphylinidæ", read "Staphylinidæ".

Page 820, for "Lamphyridæ", read "Lampyridæ".

ORTHOPTERA.

Page 863, fifth line from top, for "my Tr. pacifica", read "Scudder's *Ædipoda atrox*".

Page 863, sixteenth line from top, for "Trimerotropus", read "Trimerotropis".

Page 870, under "Syrbula fusco-vittata", for "Plate XLIII, fig. 5", read "Plate XLV, fig. 7".

Page 871, eighth and tenth lines from top, for "leucocerca", read "leucocera".

Page 873, tenth line from top, for "Pediocertesis", read "Pediocertes".

Page 886, under "Eremobia magna", for "Plate XLV, fig. 1", read "Plate XLIII, fig. 5".

Page 888, under "Pezotettix unicolor", Plate XLV, for "fig. 5", read "fig. 4".

Page 888, under "Pezotettix oregonensis", Plate XLV, for "figs. 2 and 3", read "figs. 1 and 2".

Page 889, under "Pezotettix Marshalli", Plate XLV, for "fig. 4", read "fig. 3".

Page 894, under "Caloptenus Yarrowii", Plate XLV, for "fig. 6", read "fig. 5".

Page 900, seventeenth line from top, for "Oxycorophus", read "Oxycoryphus".

Page 900, eleventh line from bottom, for "Trimerotropis", read "Trimerotropus".

Page 901, eleventh line from top, for "S. leucocerca", read "S. leucocera".

Page 901, seventh line from bottom, for "P. Marshalli", read "P. Marshallii".

Page 905, under "Steiroxys bilineata", Plate XLV, for "fig. 7", read "fig. 6".

Page 918, tenth line from top, for "G. colubrinus", read "O. colubrinus".

ERRATA.

Reptiles and Batrachians.

Page 619, 14th line from bottom, for "O. pyromelas," read "O. pyrrhomelas."

Fishes.

Page 673, 9th line from top, after the word "proper," read "with."

Page 677, for "Alticolus," read "Alticolum."

Page 678, for "Fecundus," read "Fecundum."

Diurnal Lepidoptera.

Page 762, 10th line from bottom, for "Phyciodes," read "Melitæa."

Page 763, 6th and 11th lines from top and 13th line from bottom, for "Phyciodes," read "Eresia."

Page 786, 17th line from top, for "Epargyreus," read "Endamus."

Page 792, under "Anthocharis," for "A. Ausonoides," read "A. Ausonides."

Zygænidæ.

Page 798, *dele* "Cochlidiinæ."

Page 799, 16th and 17th lines from top, *dele* "Zygænidæ" and "Castniinæ."

Page 802, 11th line from top, insert "Zygænidæ" before "Melanchroia."

Coleoptera.

Page 816, for "Straphylinidæ," read "Staphylinidæ."

Page 820, for "Lamphyridæ," read "Lampyridæ."

Orthoptera.

Page 863, 5th line from top, for "my Tr. pacifica," read "Scudder's *Ædipoda atrox*."

Page 863, 16th line from top, for "Trimerotropus," read "Trimerotropus."

Page 870, under "Syrbula fusco-vittata," for "Plate XLIII, fig. 5," read "Plate XLV, fig. 7."

Page 871, for "Leucocerca," read "Leucocera."

Page 873, 10th line from top, for "Pedioscertetis," read "Pedioscertetes."

Page 886, under "Eremobia magna," for "Plate XLV, fig. 1," read "XLIII, fig. 5."

Page 888, under "Pezotettix unicolor, Plate XLV," for "fig. 5," read "4."

Page 888, under "Pezotettix oregonensis, Plate XLV," for "figs. 2 and 3," read "1 and 2."

Page 889, under "Pezotettix Marshallii, Plate XLV," for "fig. 4," read "3."

Page 894, under "Caloptenus Yarrowii, Plate XLV," for "fig. 6," read "5."

Page 900, 17th line from top, for "Oxycorophus," read "Oxycoryphus."

Page 900, 11th line from bottom, for "Trimerotropis," read "Trymerotropus."

Page 901, 11th line from top, for "S. Leucocerca," read "leucocera."

Page 901, 8th line from bottom, for "P. Marshalli," read "P. Marshallii."

Page 905, under "Steiroxys bilineata," Plate XLV, for "fig. 7," read "6."

Page 918, 10th line from top, for "G. colubrinus," read "O. colubrinus."

CHAPTER I.

NOTES UPON GEOGRAPHICAL DISTRIBUTION AND VARIATION WITH REGARD TO THE ZOÖLOGY OF THE WESTERN UNITED STATES, AS RELATES MORE PARTICULARLY TO MAMMALS AND BIRDS.

The subject of the geographical distribution and variation of our western zoölogy is one that has of late years attracted more than ordinary attention from our naturalists; and, as appropriate to the subject-matter of this volume, it is here proposed to give a brief *résumé* of their conclusions and generalizations, as far as they may be deemed applicable to the special natural history work of the geographical surveys west of the one hundredth meridian.

It would be hazardous in the extreme to base a series of conclusions or generalizations upon the limited work of this expedition for the last few years; but enough has been gathered in that period to fully confirm and corroborate the opinions of Professors Baird, Cope, and Allen, and Mr. Ridgway in this regard. Of these scientists, Prof. J. A. Allen has probably paid more attention to the subject under discussion of late than the others; and, from his published papers, short excerpts may be permitted more particularly as touching upon mammals and birds.*

This gentleman, in view of his more recent studies in this line, now considers that we may recognize, in a general way, at least, five more or less well marked areas, characterized by certain peculiarities of variation of coloration; and that there exists a correlation between these areas and the prevalent increase of color and the amount of aqueous precipitation. No doubt, other and lesser areas, also characterized by certain similar peculiarities, will be recognized when a fuller examination of more material is afforded to admit of a careful and prolonged study of the subject.

* See Proceedings of the Boston Society of Natural History, vol. xvi, February 4, 1874.

Professor Allen defines these areas as follows :

“The first region is that of the Atlantic slope, which will include not only the countries east of the Alleghanies, but a large part of the British Possessions, extending westward at least as far as Fort Simpson, and thence northward and westward to Alaska, including apparently all of that territory north of the Alaskan Mountains, with an annual rain-fall throughout the whole of this extended region of about 35 to 45 inches. Over this region (to which may be given the general term *Atlantic Region*), the colors may be regarded as of the average or normal type ; those of other regions being either of a diminished or increased intensity.

“The second region will embrace the Mississippi Valley, or more properly the Mississippi Basin, and may hence be termed the *Mississippi Region*. Here the annual rain-fall reaches 45 to 55 inches, and over a small area east of the Lower Mississippi even exceeds 60 inches. The tendency here is so often to an increase of fulvous and rufous tints, that we may regard it as the distinctive chromatic peculiarity of the region; these tints reaching their maximum in the limited area of greatest *humidity*, but a general increase in intensity of color is also more or less characteristic of the region.

“A third region embraces the central portion of the Rocky Mountains, and, being developed most strongly within the present territory of Colorado, and being also mainly included within that territory, may be termed the *Colorado Region*. The tendency here again, as compared with the immediately adjoining districts, is to a general increase of intensity of color, with also a marked inclination to the development of rufous and fulvous tints ; this region being also within the influence of a comparatively high temperature, at least in summer. The humidity is here less than in either of the other regions already defined, the annual aqueous precipitation amounting to only about 24 to 30 inches ; but it is yet greatly in excess of that of the districts immediately surrounding it.

“The fourth region may be regarded as made up of the arid plains and deserts of the great central plateau of the continent ; including not only the ‘great plains,’ usually so called, but the deserts and plains of Utah, Nevada, Western Colorado, New Mexico, Arizona, and southwestward to Lower California, and may hence be appropriately termed the *Campestrian Region*.

The annual rain-fall is generally below 15 inches, but ranges at different localities from 3 to 20 inches; this increase or decrease depending greatly upon the position of such localities in immediate or close proximity to hills or mountains. Here a general paleness of color is the distinctive feature" It is in this region that nearly all the natural history work of the survey has been performed.

"The fifth region begins in the Pacific coast, at about the fortieth parallel, embracing a comparatively narrow belt along the coast from Northern California to Sitka. Its peculiarities are most strongly developed west of the Cascade range, north of 45° ; they also prevail eastward nearly or quite to the main chain of the Rocky Mountains. It may hence be termed the *Columbian Region*. With an average annual rain-fall of 55 to 65 inches, the prevalent tendency in color is to dusky and fuscous, rather than rufous tints. The district between the Cascade range and the main chain of the Rocky Mountains presents features that may almost entitle it to rank as a distinct region, as might also the region of maximum rain-fall in the Mississippi Region. The southern half of Florida is also, perhaps, entitled to recognition as a distinct region, being characterized by excessive humidity and a sub-tropical intensity of color. It may also be necessary to eventually recognize as distinct districts the almost rainless portion of the Campestrian Region.

"In respect to the correlation of intensity of color in animals with the degree of humidity, it would perhaps be more in accordance with cause and effect to express this law of correlation as a *decrease* of intensity of color with a decrease of humidity; the paleness evidently resulting from exposure and the blanching effect of intense sunlight, and a dry, often intensely heated, atmosphere." This theory is strongly corroborated by the fact that, in the human race, many instances are known of persons, having dark hair and beards, losing their depth of color under the same condition and circumstances as affect other mammals as well as birds, and transmitting the lighter colors to the hair of their progeny. Professor Allen continues: "With the decrease of aqueous precipitation, the forest-growth and the protection afforded by arborescent vegetation gradually also decreases as of course does also the protection afforded by clouds, the excessively humid regions being also

regions of extreme cloudiness, while the dry regions are comparatively cloudless districts.

“In addition to the tendency to change of color with locality, there is another phase of color-variation that requires in this connection a passing notice, namely, *melanism*. It is now well known that almost every species of mammal may be expected to present melanistic individuals; instances of its occurrence in the majority of the North American species being now well established. Indeed, the very fact of a melanistic phase of coloration may be looked upon as almost *a priori* evidence that the individuals presenting it belong to a melanistic race of some species whose normal color is some other tint than black, as Professor Baird long since remarked in respect to the American squirrels. It has been supposed that the tendency to melanism is more prevalent at the northward; but such does not appear to be necessarily the case. Among the *Sciuridae*, for instance, a group rather remarkable for a tendency to melanistic varieties, the black and dusky forms are as often southern as northern. In some species, melanistic individuals are as rare as are the cases of albinism, as in *Sciurus hudsonius*, the species of *Tamias*, and in many of the *Spermophiles*, while in others they are sometimes the common, if not the prevalent, form over a considerable area, as occurs in *Sciurus cinereus* and *Sciurus carolinensis*. Melanism is often of frequent occurrence in *Sciurus aberti* and in *Spermophilus grammurus*, which presents a melanistic form both in Texas and in Lower California. *Spermophilus parryi* has also a black race along the Youkon River, and frequent instances of melanism are well known in all the species of *Arctomys*.

“In numerous instances, these melanistic individuals and melanistic forms have been described as distinct species, while, in reality, they are so sporadic in their occurrence as to render them hardly worthy of recognition even as varieties.

“The gradual increase of our knowledge in respect to the character of these melanistic forms, and especially in regard to the extent and character of geographical variation, necessarily leads to the modification of our views in respect to the status of many forms that have formerly passed current as more or less well established species, and also to consequent changes in nomenclature.”

Professor Allen has thus been largely quoted from for the reason that his views embody the identical opinions held and expressed by the naturalists of this expedition, and are peculiarly adapted to the circumstances of this survey ; and, although the above remarks apply more particularly to mammals, a law of generalization may be deduced, which will apply to birds also, and probably we may eventually be able to include reptiles and insects.

As an addition to the views of Professor Allen, it may be mentioned that, so far as regards color-variation, our attention should be drawn to the singular mimicry of color as seen more particularly by the collectors of the expedition in the Campestrian Region, or in localities contiguous thereto. This, as has been mentioned in a different portion of this report, was extremely well marked in the cases of reptiles, and such observations were taken as to prove the case beyond the cavil of a doubt. In the *Phrynosomæ* was it particularly noticeable, as also in some of the more brilliantly-colored serpents ; and there can be no doubt that a law may yet be formulated in this respect which will equally apply to all classes of animals.

With regard to the distribution of birds and their color-variation, the same general rule may be applied as to mammals, differing slightly, however, in some minor particulars, and perhaps further quotations from Professor Allen* may serve to elucidate the matter better than any description of my own. We must premise, however, by stating that, within the last few years, so much has our knowledge increased respecting these interesting members of the animal kingdom, "that the opinions formerly current respecting the rank of a certain class of forms heretofore generally regarded as specific have been radically modified. Intergradation has been frequently traced between widely different forms ; a gradual coalescence in scores of instances having been positively established, and rendered extremely probable in a large number of others.

"In North America, a geographical variation exhibits two marked phases (as has already been stated), a differentiation with differences of latitude and elevation ; and, secondly, differentiation with differences of longitude, which, for convenience, may be termed respectively latitudinal and longi-

* Proceedings of the Boston Society of Natural History, vol. xv, June, 1872.

tudinal variation.* In respect to both, differentiation occurs in different degrees in different groups, in accordance with their general tendency to variation, or, as it were, in proportion to their normal degree of plasticity. In regard to variation with latitude, the modifications are apparently more general than in what I have termed longitudinal variation: the differentiation affects not merely color but size and the details of structural parts, whereas color appears to be the main element affected by longitudinal variation. The fact of variation in size has been conceded as a general law by the majority of at least American ornithologists and mammalogists, since it was so fully established by Prof. S. F. Baird, in 1857 and 1858, in his admirable reports on the Mammals and Birds of North America, published in the series of the Government reports on the exploration and survey of the various Pacific Railroad routes.

Professor Baird then and subsequently called attention to the fact of the greater length of the tail in several specimens of birds at certain localities, and cites instances of the larger size of the bill at southern points, and the paler color of the plumage of the birds of the plains and the arid peninsula of Lower California. All his subsequent works have furnished numerous citations of similar variation with locality; but, instead of insisting upon any common tie connecting these phenomena as the result of general laws, they are viewed as evidences of specific differentiation. The differences are indeed so great between many of the forms now known to intergrade that it is not surprising that they were regarded as different species when known from only a few examples, apparently unconnected by any intermediate form. Subsequently, however, it has been found that they are not trenchantly separated, intermediate forms so linking them together that they can be only vaguely diagnosed. These connecting links, inhabiting—at least in the breeding season—localities intermediate in geographical position and in climatic conditions to those frequented by the more extreme forms, suggest an intimate genetic relationship and a differentiation mainly or wholly through climatic influence, or the diverse conditions of environment.

“Latitudinal variation presents the following phenomena, which are of

* See Bulletin of the Museum Comparative Zoölogy, vol. ii, April, 1871.

such general occurrence that even the exceptions, if such there really be, are exceedingly few :

“1st. *As regards size*: There is a general reduction in the size of the individual, from the north southward, amounting not unfrequently to as high as 10 to 15 per cent. of the maximum size of the species. The reduction is much greater in some species, and in some groups of species, than in others, but is almost invariably considerable and easily recognizable.

“2d. *In respect to the bill*: The variation of the bill is somewhat inverse to that of the general size; as a rule the southern forms having generally relatively, and often absolutely, larger bills than northern ones, the increased size taking different proportions in different species and different styles of bill. Those of a stout, thick, conical form generally increase in size, but especially in thickness. Those of a slender alternate form become slenderer and relatively longer at the southward, with a decidedly greater tendency to curvature.

“3d. *In respect to the claws* : A similar increase in size is apparent in the claws, especially in that of the hallux, at southern localities, perhaps less marked and less general than the increase of the bill, with which it evidently correlates.

“4th. *In respect to the tail* : A marked elongation of the tail at the southward has been noticed in many cases, both in Cape St. Lucas birds (Baird) and in those of Florida.

“5th. *In respect to color* : The differences in color are especially obvious, and may be reduced to two phases of modification : (*a*) a general increase in intensity at the southward; and (*b*) an increase in the extent of dusky or black markings at the expense of the intervening lighter or white ones, or, conversely, the reduction in size of white spots and bars. Under the general increase in intensity, the iridescence of lustrous species becomes greater, and fuscous, plumbous, rufous, yellow, and olivaceous tints are heightened in species with the color continuous in masses.

Under the repression of light colors, the white or yellowish edgings and spots on the wings and tail become more or less reduced; and frequently, to a great degree in species barred transversely with light and dark colors, the dark bars widen at the southward at the expense of the white or lighter

ones, sometimes to such an extent as to greatly change the general aspect of the species, as is the case in the *Ortyx virginianus* of the Atlantic States, and in other well known species; also, under the tendency to the increase of dark colors, longitudinal streaks and blotches in a light ground increase in extent and intensity of color.

“In respect to longitudinal variation, the differences appear to be mainly those of color, and to hold a direct relationship to the humidity of the climate. On the arid plains of the middle and western portion of the continent, the annual rain-fall is less than half that of the eastern half of the continent, while a rain-belt occurs on the Pacific coast stretching northward from near the mouth of the Columbia River to Alaska, over which the annual rain-fall is double that of any portion of the eastern half of the continent. Taking the species that present a nearly continental range, we find that almost invariably they pass gradually into the pallid forms of the interior at the eastern edge of the arid plains; the greatest pallor being developed in the driest regions, as the peninsula of Lower California, and the almost rainless belt along the Colorado River, and northward along the eastern base of the Sierra Nevada Mountains; that on the Pacific slope they again re-assume nearly the tints of the eastern form; but more to the northward, over the above mentioned rainy region, they acquire a depth of color far in excess of what the species presents in the Atlantic Region. This coincidence of bright and pale tints with the relative humidity of the locality is certainly suggestive, if not demonstrative, of the relation of cause and effect between these two phenomena, since the same rule is traceable over large portions at least of the Old World; the Scandinavian forms, for instance, being darker-colored than the conspecific races of Central Europe, and these again darker than those of Northern Africa and the adjacent regions. Humidity alone, or in conjunction with greater intensity of light, seems equally well to account for the increase of color to the southward. Yet from the well known bleaching effect of sunlight, intensified by reflection, upon the colors of animals living upon sandy islands and sea-beaches and desert interior regions, it seems doubtful whether the larger share of modification in intensity of color in birds may not be due to humidity alone, or to humidity and a high temperature together, rather than to intensity of light.

In regard to the enlargement of peripheral parts, to the southward, it seems not unreasonable to suppose that the increase of temperature in stimulating the circulation in these exposed members may have something to do with it, especially in view of the evidence afforded by mammals, which, in general, present climatic modifications parallel with those of birds.

"Whatever may be the cause of the above modifications of structure and color, at different localities, we certainly find the following coincidences :

"1st. In accordance with the increase in the intensity of color in individuals of the same species from the north southward, in the northern hemisphere, the brighter colored species in general represented in both the temperate and tropical regions occur, as a general rule, at the southward; the same fact holding good also for sub-families. In cosmopolitan genera, families, etc., the tropical species are almost always brighter colored than the extra-tropical ones. All the most gorgeously colored families of birds are either exclusively tropical or semi-tropical, with generally the outlying species more plainly colored than the average for the family.

"2d. In accordance with the increase in the size of the bill at the southward, all the species that have this member enormously developed are tropical or semi-tropical; not only such families as have the beak at its maximum of development, as the toucans and hornbills, but in all groups in which it is unusually large, the extreme development is reached in the inter-tropical regions.

"3d. In respect to the tail, with very few exceptions, all long-tailed forms reach their highest development within or near the equatorial regions.

"The facts indicated above in respect to the inosculation of forms formerly regarded as specifically differentiated will evidently require modifications of the hitherto accepted nomenclature. Evidently, many of these forms are so strongly marked that they should be, in some manner, recognized in nomenclature, though admittedly of less than specific rank. Most naturalists now practically recognize as species such groups of individuals as are not known to graduate by nearly imperceptible stages into any other similar group, and as varieties such groups of individuals as occur at certain localities, or over certain areas, which differ more or less from other groups inhabiting other (generally contiguous) localities, with which there is evi-

dence that they do more or less fully intergrade. Convenience seems to demand such a course, in order to enable the naturalist to specify what particular variety or race of a species inhabits a given section of country : a method, in fact, already more or less generally practiced."

With the question of the bearing of these facts of geographical distribution and variation upon the matter of the origin of genera and species, we have at present nothing to do ; but that they form an important element in the solution of the problem is none the less certain.

With regard to the causes which influence the migration of birds, the celebrated Swedish poet Runeberg, during a long and severe illness at Helsingfors, occupied himself in observing their habits, especially in regard to migration, and ascribes it to an ardent and intense longing for light. This ingenious theory, which is hardly to be considered tenable, he explains as follows :

"When the days shorten in the north, the birds go south ; but as soon as the long northern nights set in with their luminous long-drawn hours, the wanderers return to their old haunts. It is generally supposed that they move southward to get more abundant food. But why do they leave the rich southern feeding grounds to return northward ? Simply because one thing is richer there, and that is light. The same instinct that makes plants turn toward the light, and stretch their branches to reach it, also works in birds, and compels them to fly after and follow it. The bird of passage is of noble birth ; he bears a motto, and his motto is *Lux mea dux*."

But Prof. Alfred Newton, in discussing this theory in "Nature and Science" for January, says :

"In some cases, scarcity of food would seem to be a sufficient cause ; and it is undoubtedly the most obvious one that presents itself to our mind. As food grows scarce toward the end of summer in the most northern limits of the range of a species, the individuals affected thereby seek it in other countries. Thus doing, they press upon the haunt of other individuals ; these in like manner upon that of yet others ; and so on, until the movement, which began in the far north, is communicated to the individuals occupying the extreme southern range of the species at that season ; though, but for such an invasion, these last might be content to

stay some time longer in the enjoyment of their existing quarters. When we consider, however, the return movement, at the end of winter, it is doubtful, I think, whether scarcity of food can be assigned as its sole or sufficient cause. But here we feel the want of knowledge. At present, we are far too little acquainted with the physical peculiarities of those more equatorial regions, which in winter are crowded with emigrants from the north, to come to any final decision. It seems not too violent an assumption to suppose that, though such regions are well fitted for the winter resort of the bird population of the north, they may be deficient in certain necessities for the nursery; and it seems still less of an assumption to suppose that even if such necessities are not wanting, yet that the regions in question would not supply food sufficient for both parents and offspring. But another point must not be overlooked. The most sedentary of birds year after year occupy the same quarters in the breeding season. It seems to me, therefore, that among the causes of migration the desire of returning to old haunts must be included."

With regard to the distribution of reptiles and fishes, and their color-variation, from our present standpoint of knowledge, we cannot as yet apply the same generalization that governs the other classes; but we do know that the brightest colored individuals, and the largest generally of these two classes, are found in tropical or semi-tropical regions.

Unfortunately, reptiles particularly are rather restricted in their ranges, and cannot move from point to point with the regularity and rapidity of birds, so that what we might apply to the class in general will not apply to species, with but one exception as far as known, and for the reason that we find distinct species inhabiting distinct localities, northern forms being replaced by southern ones, with no intergradation of colors or varieties. The one exception in the case of serpents is that of *Ophibolus triangulatum*, which, as it proceeds southward, becomes darker and larger.

With regard to the geographical distribution of insects, and their color-variation thereupon depending, as yet the subject has not received the share of attention that has been accorded to other classes, consequently we are not in position to give any generalization regarding them; but we may say as we have said of reptiles, that the largest and brightest colored species

are generally found to the southward, this statement applying more particularly to the *Coleoptera* and *Lepidoptera*. It is only within the last few years that anything has been known of the insect fauna of the Rocky Mountain range proper and the area west of it; and, as our knowledge increases, we will possibly be better able to establish a theory or theories of development, distribution, and color-variation, which will aid in establishing a general law, applying to all classes of animated nature.

Thanks are due to Professor Allen for his kindness in permitting the use of his papers already mentioned, and for his criticism of this chapter.

CHAPTER II.

REPORT

UPON

THE COLLECTIONS OF MAMMALS

MADE IN PORTIONS OF

NEVADA, UTAH, CALIFORNIA, COLORADO, NEW MEXICO, AND ARIZONA,

DURING

THE YEARS 1871, 1872, 1873, AND 1874.

BY

DR. ELLIOTT COUES AND DR. H. C. YARROW.

CHAPTER II.

REPORT UPON, AND LIST OF, THE MAMMALS COLLECTED IN 1871-'72-'73, AND '74.

The following report is based primarily upon the collections made during the years above noted by the naturalists and other members of the expedition, upon whose observations the field notes mainly rest. Besides Dr. Yarrow, Drs. Rothrock, Newberry, and Hoffman, and Messrs. Henshaw and Aiken, have each contributed to the general result. Our thanks are due to these gentlemen, to Prof. H. Allen for examination of the *Chiroptera*, to Mr. J. A. Allen for a like service rendered in the examination of the *Sciuridæ* and *Leporidæ*, and to Mr. D. G. Elliot, who obligingly gave us the use of much synonymy of the *Felidæ*, prepared for his forthcoming monograph of that family.

A few species, known to occur in the region explored, though not actually procured by the expedition, are introduced to complete an account of certain groups. The article on the *Chiroptera* represents a monographic essay on all the North American species of that order. The extensive bibliography of the species presented throughout will, it is thought, materially facilitate the study of the subject. Considerable technical matter is introduced, for which, as well as for the nomenclature, Dr. Coues is mainly responsible. The classification adopted is in close accord with the views of Prof. Theodore N. Gill, whose "Arrangement of the Families of Mammals," published in the Smithsonian Miscellaneous Collections, seems to us to be, upon the whole, the most philosophical among the many which have been proposed.

Lists of the specimens actually collected are rendered in tabular form. The collections constitute a large representation of the mammalian life of

the regions explored, and serve to show that the operations of the expeditions in this department of science are not behind those which have been conducted in other fields of research in interest and importance. Although the collection contains no novelties, it includes a fair proportion of the rarer and less generally known species, among which the peculiar deer of Arizona and Sonora may be particularly noted. It also extends the previously known range of some species, like *Lepus bairdii*, *Mustela americana*, and *Putorius longicauda*, not hitherto recognized as occurring in so low a latitude. The collections were made at points too remote to permit the basing upon them of any very nice zoö-geographical conclusions; but they may be said to bear out the general characters by which the southern portion of the Middle Faunal Province, as defined by Baird, is recognized. An almost entire absence of Mexican types is noteworthy, taken in connection with the unexpectedly large number of sub-tropical birds, which the indefatigable labors of Mr. Henshaw have shown to inhabit the same region. Much, however, remains to be done in this part of the country before our knowledge of its *Mammalia* reaches the point already gained in ornithology.

The specimens collected are deposited in the National Museum at the Smithsonian Institution, Washington, with the exception of some of the osteological material, which has been presented to the Army Medical Museum.

MONODELPHIA EDUCABILIA.

FERAE.

FAM. FELIDÆ.

Genus FELIS, L.

FELIS CONCOLOR, L.

Panther; Cougar; Rocky Mountain Lion.

- Felis concolor*, LINN., Mantissa, 1771, 552.—ERXL., Syst. Reg. Anim., 1777, 511, sp. 17.—BODD., El. Anim., 1784, 90.—GMEL., Syst. Nat., 1788, vol. i, pt. i, 79, sp. 9.—SCHREB., Säugth., 1778, th. iii, 394, tab. civ.—F. CUV., Hist. Nat. des Mamm., 1829, vol. ii, pl. 143.—CUV., Ossem. Foss., 1825, vol. iv, 40.—TEMM., Mon. Mammif., 1827, 134.—WILS., Illust. Zoöl., 1831, pl. i.—MAXIMILIAN, Beitr. Naturg. Brasil., 1826, band ii, 358.—REUG., Zoöl. Journ., 1835, vol. v, 476.—FULLER, P. Z. S., 1836, 62.—AZARA, Nat. Hist. Quad. Parag., 1838, 207.—SWAINS., Anim. Menag., 106.—RICH., Zoöl. Beechey's Voy. Mam., 1839, 6.—GRIFF., Anim. King., 1827, 436.—BURM., Ueber. Thier. Bras., 1854, 88.—MURR., Geog. Distr. Anim., 1866, 100.—GERV., Nat. Hist. Mamm., 1855, 89.—BLAINV., Osteog., 1839-64, vol. ii, atl. vi, pls. xi, xiv.—FISCH., Zoogn. 1814, 223, sp. 5.—*Id.*, Syn., 1829, 197.—JARD., Nat. Libr., vol. xvi, 124, pls. iv, v.—DESM., Mammal., 1820, 218, No. 336, pl. 94, fig. 102.—D'ORBIG., Voy. Amér. Mérid., 1847, 21 (Mamm.).—BARTL., P. Z. S., 1861, 141.—CUNNINGH., P. Z. S., 1868, 185.—SCLAT., P. Z. S., 1868, 624.—TEMM., Mon. Mamm., 1827, vol. i, 134, et app. 256.—LESS., Man. Mamm., 1827, 190, sp. 507.—COOP. & SUCK., Nat. Hist. Wash. Terr., 1859, 74, 108.—BAIRD, U. S. & Mex. B. Sur., 1859, 5.—DEKAY, Nat. Hist. N. Y., 1842, 47.—BAIRD, U. S. P. R. R. Expl. Ex., 1857, vol. viii, 83.—HARL., Faun. Amer., 1825, 94.—WAGN., Suppl. Schreb., 1841, 461.—AUD. & BACH., Quad. N. Am., vol. ii, 1851, 305, pls. xevi, xevii (8vo ed.).—LESS., Nouv. Tab. Règn. Anim., 1842, 56, sp. 512.—NEWB., P. R. R. Rep., vi, 1857, 36.—MARCY, Rep. Expl. Red River, 1852, 200.—WOODH., Sitgr. Rep. Zuñi & Colorado, 1854, 47.—COUES, Am. Nat., i, 1867, 286.—*Id.*, Proc. Acad. Nat. Sci. Phila., 1867, 133.—ALL., Bull. Essex Inst., vi, 1862, 53, 58.—*Id.*, Bull. M. C. Z., ii, 1871, 168.
- Felis discolor*, GMEL., Syst. Nat., 1788, vol. i, pt. i, 79, sp. 12.—SCHREB., Säugth., 1778.—FISCH., Zoogn., 1814, 223, sp. 6.—LESS., Man. Mamm., 1827, 190, sp. 509.
- Felis puma*, SHAW, Gen. Zoöl., 1830, vol. i, 358, pl. cxxxix.—MOLINA, Saggio Stor. Nat. Chili, 1810, 245, sp. 8.
- Leopardus concolor*, J. E. GRAY, P. Z. S., 1867, 265.—*Id.*, Cat. Carn. Mamm., 1869, 12.—*Id.*, Cat. Mamm. Brit. Mus., 1842, 41.
- Puma*, PENN., Hist. Quad., 1793, 289, sp. 189.—*Id.*, Arct. Zoöl., i, 1784, 49.
- Felis nigra*, GRIFF., Syn., sp. 444(?).—ERXL., Syst. Reg. Anim., 1777, 512, sp. 8.
- Black Puma*, JARD., Nat. Libr., vol. xvi, 135, pl. 5.

Felis unicolor, LESS., Man. Mamm., 1827, p. 190, sp. 508.

Panthera concolor, FITZIN., Sitzg. Akad. Wiss. Wien, 1869, lix, 629.

Panthera concolor niger, FITZIN., Sitzg. Akad. Wiss. Wien, 1869, lix, 634.

Puma concolor, J. E. GRAY, Ann. & Mag. Nat. Hist., 1874, p. —.

Gouazoura, AZARA, Nat. Hist. Paraguay, i, 133.

Le Cougar, CUV. & ST. HIL., Hist. des Mammif., ii, 1819, p. —.

Specimens.

No.	Name.	Locality.	Date.	Collector.	Remarks.
B 8	F. concolor	Triplet Mountains, Arizona	Sept., 1873	Dr. O. Loew .	Cranium.
B 9	.....do . . . . .	.....do . . . . .	.....do	J. L. McGee .	Skin and cranium.

This species, the second in size of the North American cats, is tolerably common in the mountains of Colorado, New Mexico, and Arizona, as observed by different members of the expedition. It ranges from 50° or 60° north latitude to the most southern part of the South American continent.

In certain localities in New Mexico and Arizona, it wages a terrible warfare upon wild turkeys, destroying hundreds of them, and depopulating their former breeding places to such an extent that in a few years the race will have become almost extinct in this region, if measures are not taken to prevent the wholesale slaughter.

The crania and skins of two fine specimens were secured on the southern slope of the Triplet Mountains, near the Gila Valley, close to the San Carlos Indian reservation in Arizona.

A large species of cat was frequently heard during the night howling near the camps in Eastern and Middle Utah, supposed to be the above; but no specimens were secured. The inhabitants of the surrounding country state that they are not numerous.

The following measurements were taken from a full-sized female, in the flesh, and indicate a fair average:

From nose to end of tail	82.00 inches.
Head, over the frontal curve	9.50 inches.
Head and body, to root of tail	50.00 inches.
Tail	32.00 inches.
Stature at shoulders	29.00 inches.
Fore leg and foot, from elbow	15.50 inches.
Sole of hind foot	11.00 inches.
Close girth of chest	27.00 inches.

Weight, after evisceration, 82 pounds; probably 100 pounds gross.

Though not so large an animal as the Jaguar, *F. onça*, the present species stands as high or higher, owing to the much greater relative length of the legs. Kittens are spotted, as usual in this family; but the adults are nearly uniformly tawny, whitening underneath and about the face, where there are blackish markings, and with a black tip to the tail.

Genus LYNX, Raf.

LYNX CANADENSIS, (Desm.) Raf.

Canada Lynx.

- Lynx*, PENN., Hist. Quad., 1793, 301, sp. 203.
Felis canadensis, DESM., Nouv. Dict. d'Hist. Nat., 1816, 108.—*Id.*, Mam., 1820, 224, No. 346.—GAPPER, Zoöl. Journ., 1835, vol. v, 203.—SWAINS. & RICH., Faun. Bor.-Am., vol. i, 1829, 101.—MURR., Geog. Distr. Mam., 1866, 101.—JARD., Nat. Libr., vol. xvi, 259, pl. xxxiii.—LESS., Man. Mam., 1827, 191, sp. 513.—HARLN., Faun. Am., 1825, 98.—GRIFF., Anim. King., 1827, vol. v, 174.—FISCH., Syn. Mam., 1829, 213, sp. 31.—LESS., Nouv. Tab. Règn. Anim., 1842, 57, sp. 548.—GERV., Hist. Nat. Mam., 1855, 92.
Felis borealis, TEMM., Mon. Mam., 1847, vol. i, 109, app. 251.—LESS., Man. Mam., 1827, 184, sp. 490.—*Id.*, Comp. Buff., 1839, vol. i, 411.—WAGN., Suppl. Schreb., 1841, vol. ii, 519.—BLYTH, J. A. S. B., 1842, vol. xi, pt. ii, p. —.
Le Lynx du Canada, CUV., Ossem. Foss., 1825, vol. iv, 443.—BUFF., Suppl., vol. iii, pl. xlv.
Le Lynx de Mississippi, BUFF., Suppl., vol. vii, pl. liii.
Lyncus canadensis, GRAY, Cat. Mam. Brit. Mus., 1842, 46.—*Id.*, P. Z. S., 1867, 276.—*Id.*, Cat. Carn. Mam., 1869, 37, sp. 3.
Lyncus borealis, DEKAY, Nat. Hist. N. York, 1842, 50, pl. x, fig. 2.
Lynx canadensis, BAIRD, U. S. P. R. R. Expl. Exp., 1857, vol. viii, 99.—RAF., Am. Month. Mag., 1817, vol. ii, 46.—AUD. & BACH., Quad. N. Am., 1849, vol. i, 136, pl. xvii.

The Canada Lynx (*L. canadensis*), though not observed by the expedition, is known to occur at least as far south as Fort Tejon, Cal., where specimens were taken by Mr. J. Xantus, and sent to the National Museum. Like the Wolverine, this species ranges in the Rocky Mountains considerably south of the latitude it reaches in the eastern portion of the continent.

LYNX RUFUS, (Gm.) Raf.

Bay Lynx ; Wild Cat.

- Bay Cat*, PENN., Syn., 1771, 183, pl. xix, fig. 1.—*Id.*, Hist. Quad., 1781, No. 171.—*Id.*, Arct. Zoöl., 1784, vol. i, 51.
Mountain Cat, PENN., Hist. Quad., 1781, No. 168.—*Id.*, Arct. Zool., 1784, vol. i, p. 51.
Bay Lynx, PENN., Hist. Quad., 1793, 303, sp. 204.

- Felis ruffa*, GULDENSTAEDT, Nov. Comm. Petrop., xx, 1776, 499.
- Felis rufa*, GMEL., Syst. Nat., 1788, vol. i, pt. i, 82, sp. 19.—SCHREB., Säugth., 1788, th. iii, 412, tab. cix B.—DESM., Nouv. Dict. d'Hist. Nat., 1816, 107.—F. CUV., Hist. Nat. Mamm., 1828, vol. ii, pl. 141.—BLAIN., Osteog., 1839-64, vol. ii, pl. xi.—DESM., Mamm., 1820, 225, No. 347.—GULDENST., Voy. de la Venus, t. 9, fig. 2-4 (skull).—TEMML., Mon. Mamm., 1827, vol. i, 141.—LESS., Man. Mamm., 1827, 192, sp. 514.—*Id.*, Compl. Buff., 1839, vol. i, 411.—GEOFF. ST. HIL., Voy. Venus, Zoöl., 1855, vol. i, 150, pl. ix.—FISCH., Syn. Mamm., 1829, 212, sp. 32.—LESS., Nouv. Tab. Règn. Anim., 1842, 57, sp. 549.—GERV., Hist. Nat. Mamm., 1855, 91.—BLYTH., Journ. Asiat. Soc. Beng., 1842, vol. xi, pt. ii, 752.
- Lynx floridana*, RAFF., Amer. Month. Mag., 1817, vol. ii, 46.
- Lyncus rufus*, GRAY, P. Z. S., 1867, 279.—*Id.*, Cat. Carn. Mamm., 1869, 38, sp. 7.—DEKAY, N. H. N. Y., 1842, 7.
- Felis montana*, DESM., Mam., 1820, 225, No. 349, pl. 98, fig. 2.—LESS., Man. Mam., 1827, 194, sp. 522.—*Id.*, Compl. Buff., 1839, vol. i, 411.—HARL., Faun. Amer., 1825, 101.—LECONTE., P. A. N. S. Philada., 1854, 9.—GERV., Hist. Nat. Mamm., 1855, 92.
- Felis maculata*, VIG. & HORSE., Zoöl. Journ., 1829, vol. iv, 380.—LESS., Comp. Buff., 1839, vol. i, 411.—*Id.*, Nouv. Tab. Règn. Anim., 1842, 58, sp. 553.
- Lynx rufus* var. *maculatus*, BAIRD, U. S. & Mex. B. Sur., 1859, 13.—*Id.*, U. S. P. R. R. Expl. Ex., 1857, vol. viii, 93.—AUD. & BACH., Quad. N. Am., 1851, vol. ii, 293, pl. xcii.
- Lynx maculatus*, MURR., Geog. Distr. Mam., 1864, 101.
- Lynx montanus*, RAFF., Am. Month. Mag., 1817, vol. ii, 46.
- Lyncus maculatus*, GRAY, P. Z. S., 1867, 297.—*Id.*, Cat. Carn. Mam., 1869, 38, sp. 8.
- Lynx rufus*, RAFF., Am. Month. Mag., 1817, vol. ii, 46.—AUD. & BACH., Quad. N. Am., 1849, vol. i, 2, pl. i.—MARCY, Expl. Red River, 1852, 200.—NEWB., P. R. R. Rep., vi, 1857, 36.—BD., Mam. N. A., 1857, 90.—COUES, Am. Nat., i, 1867, 287.—ALL., Bull. M. C. Z., ii, 1871, 168.
- Chat à ventre tacheté*, F. CUV., Hist. des Mamm., 1826, vol. ii, pl. 140.—*Id.*, Temm. Mon. Mam., 1827, vol. i, app. 258.
- Felis fasciata*, HARL., Fn. Am., 1825, 100.—SWAINS. & RICH., Faun. Bor.-Am., 1829, Mamm., 104.—MURR., Geog. Distr. Mam., 1866, 101.—CUV., Ossem. Foss., vol. iv, 441.—BUFF., Suppl., vol. iii, pl. 44.—LESS., Man. Mam., 1827, 193, sp. 521.—COOP. & SUCK., Nat. Hist. Wash. Ter., 1859, 109.—LESS., Comp. Buff., 1839, vol. i, 411.—FISCH., Syn. Mam., 1829, 212.—LESS., Nouv. Tab. Règne Anim., 1842, 57, sp. 550.
- Felis floridana*, DESM., Mam., 1820, 225, 350.—LESS., Man. Mam., 1827, 194, sp. 523.—*Id.*, Comp. Buff., 1839, vol. i, 412.
- Felis aurea*, DESM., Mam., 225, sp. 351.—LESS., Man. Mam., 1827, 194, sp. 524.—*Id.*, Nouv. Tab. Règn. Anim., 1842, 57, sp. 357.
- Felis mexicana*, DESM., Mam., 225, sp. 352.—LESS., Man. Mam., 1827, 194, sp. 525.—*Id.*, Comp. Buff., 1839, vol. i, 411.
- Lyncus fasciatus*, GRAY, P. Z. S., 1867, 276.—*Id.*, Cat. Carn. Mam., 1869, 38, sp. 6.
- Felis carolinensis*, DESM., Mam., 231.—LESS., Man. Mam., 1827, 195, sp. 527.—*Id.*, Comp. Buff., 1839, vol. i, 415.

Lynx aureus, RAF., Am. Month. Mag., 1817, 46, sp. 6.—LESS., Comp. Buff., 1839, vol. i, 412.

Panthera concolor maculata, FITZ., Sitzg. Akad. Wiss. Wien, 1869, lix, 636.

Lynx fasciatus, RAF., Am. Month. Mag., 1817, vol. ii, 46.—BAIRD, U. S. P. R. Expl. Exp., 1857, vol. viii, 96.—SUCKL., U. S. P. R. Expl. Exp., 1860, vol. xii, 109.—DESM., Mamm., 1820, vol. i, 225.

Tiger Cat, LEWIS & CLARK, Travels, 1814, vol. ii, 167.

NOTE.—The above synonymy, as prepared by Mr. D. G. Elliot, includes the three subspecies into which the present is divisible, and which, we think, will demand recognition by varietal name, since they are differentiated strictly according to geographical distribution; var. *fasciatus* being the heavily-colored red form from the wet northwest coast, and var. *maculatus* being the richly-spotted southern form.

Specimens.

No.	Name.	Locality.	Date.	Collector.	Remarks.
15	<i>L. rufus</i>	Acoma, N. Mex.	Nov., 1873	Lieutenant Russell..	Cranium and skin.
15 A	.....do	——, N. Mex.	Oct., 1873	H. W. Henshaw....	Skin.
15 B	<i>L. rufus</i> , var. <i>maculatus</i> .	White Mts., Ariz.	Aug., 1873	Dr. C. G. Newberry.	Skin.

The presence of this widely-distributed animal in all suitable localities in the region explored was ascertained by the survey; and several fine specimens were secured, apparently representing both the ordinary *rufus* and the var. *maculatus*. In addition to the specimens above tabulated, others were taken in 1871, near Bill Williams' Mountain.

FAM. CANIDÆ.

Genus CANIS, L.

CANIS LUPUS OCCIDENTALIS.

American Wolf; Timber or Buffalo Wolf; Lobo of the Mexicans.

Generally distributed; but said to be scarce in Colorado, New Mexico, and Arizona. Very numerous north of the fortieth parallel, in mountains of Western Utah. Species represented by a cranium and skin, deposited in the Army Medical Museum, from Indian Spring, Utah.

CHAR.—Largest species of the genus. Length 3 to 5 feet, generally about 4; tail 12 to 18 inches; skull 8 to 11 inches long, generally 9 to 10; width $4\frac{3}{4}$ to $5\frac{3}{4}$, generally about $5\frac{1}{4}$; color indeterminate.

- a. *White Wolves*.—LEWIS & CLARK, i, 107; iii, 263; FRANKLIN'S Journ., 312.—*Canis lupus, albus*, SABINE, Journ., 652; RICH., F. B. A., i, 1829, 68; A. & B. ii, 156, pl. 72. White, pure or washed with yellowish, with or without black-tipped tail. Among the largest. Northerly and alpine.
- b. *Grizzled Wolves*.—*C. variabilis*, MAXIM., Reise Nord-Am., 1841, ii, 95.—*C. griseo-albus*, BAIRD, 104.—*C. occidentalis* var. *griseo-albus*, NEWB., P. R. R. Rep., vi, 1857, 37; SUCKL. & GIBBS, P. R. R. Rep., xii, 1859, pt. ii, 110; SUCKL., *ibid.*, 90; COUES, Am. Nat., i, 1867, 288.—*C. occidentalis*, COOP., P. R. R. Rep., xii, pt. ii, 1859, 75 (includes a and c). White, more or less extensively grizzled with gray. Large, and rather northerly. An indeterminate link between a and—
- c. *Gray and Brindled Wolves*.—*C. lupus* of AUTHORS; LEWIS & CLARK, i, 206, 283; SABINE, 654; ALLEN, Bull. M. C. Z., ii, 1871, p. 168.—*C. lupus, a. griseus*, RICH., F. B. A., 1829, i, 66; A. & B., iii, 279.—*C. occidentalis*, DEKAY, Nat. Hist. N. Y., 42, pl. 27, f. 2.—*Lupus occidentalis*, PEALE, U. S. Ex. Ex., 1848, 26; MARCY, Expl. Red River, 1852, 200.—*Lupus gigas*, TOWNS., Proc. Phila. Acad. Nat. Sci., 1850, ii, 75. Gray, of variable shade and pattern, generally brindled; darker along the dorsal aspect, paler or white below; little or no rufous. Medium size. Most general distribution.
- d. *Red Wolves*.—*C. lupus* var. *rufus*, A. & B., ii, 240, pl. 82.—*C. occidentalis* var. *rufus*, BD., 113. Mixed reddish and black, paler below. Small. Southerly, especially Texas.
- e. *Dusky Wolves*.—*C. nubilus*, SAY, Long's Exped., 1823, i, 168; GODM., Am. Nat. Hist., 1831, vol. i, 265; WOODH., Sitgr. Rep., 1854, 45.—*C. mexicanus*, Gm. S. N., 1788, i, 71.—*C. occidentalis*, vars. *nubilus* and *mexicanus*, BD., 111, 113.—? *C. nigrirostris*. Dusky or plumbeous brown, with or without darker muzzle-band and leg-stripe. Small. Chiefly southerly.
- f. *Black Wolves*.—*C. lupus ater*, RICH., F. B. A., 1829, i, 70; A. & B., ii, 126, pl. 67.—*C. occidentalis* var. *ater*, BD., 113.—*C. lycaon*, HARLAN, Fn. Am., 1825, 126. Black or nearly so. Small. Chiefly southerly, especially Florida.

CANIS LATRANS, Say.

Prairie Wolf; Coyoté.

- Canis latrans*, SAY, in Long's Exped. R. Mts., i, 1823, 168.—HARLAN, Fn. Am., 1825, 83.—FISCHER, Synopsis, 1829, 183.—RICH., F. B. A., i, 1829, 731, pl. iv.—DOUGHTY'S Cab. Nat. Hist., i, 1830, 73, pl. 7.—MAXIM., Reise, ii, 1841, 96.—AUD. & BACH., Q. N. A., ii, 1851, 150, pl. 71.—BD., M. N. A., 1857, 113.—COUES, Am. Nat., i, 1867, 289; 1873, 385.
- Canis frustror*, WOODHOUSE, Proc. Acad. Nat. Sci. Phila., v, Oct., 1850, 147; v, Feb., 1851, 157; Sitgreave's Exped. to Zuñi and Colorado R., 1853, 46, pl. i.
- Canis ochropus*, ESCHSCH., Zoöl. Atl., 1829, i, pl. 11.—GRAY, Zoöl. Voy. Sulphur, 1844, 32, pl. 10.
- "*Lyciscus cajottis*, H. SMITH, Nat. Lib., iv, 164."
- Prairie Wolf and Burrowing Dog*, LEWIS & CLARK.
- Coyoté*, MEXICANS & FRONTIERSMEN.

Very common from Fort Riley, Kansas, to the Pacific Ocean, and from the Upper Missouri to the Rio Grande of Texas. A number of individuals were secured from different localities visited by the expedition.

The following account is taken from Dr. Coues' different papers in the American Naturalist, as above cited.

"The Prairie or Barking Wolf (*Canis latrans*, Say) is by far the most abundant carnivorous animal in Arizona, as it is also in almost every part of the West. Practically, the Coyoté is a nuisance; theoretically, he compels a certain degree of admiration, viewing his irrepressible positivity of character and his versatile nature. If his genius has nothing essentially noble or lofty about it, it is undeniable that few animals possess so many and so various attributes, or act them out with such dogged perseverance. Ever on the alert, and keenly alive to a sense of danger, he yet exhibits the coolest effrontery when his path crosses ours. The main object of his life seems to be the satisfying of a hunger which is always craving; and to this aim all his cunning, impudence, and audacity are mainly directed.

"Much has been written concerning the famous polyglot serenades of the Coyoté, by those who have been unwilling listeners, but it is difficult to convey an adequate idea in words of the noisy confusion. One must have spent an hour or two vainly trying to sleep before he is in a condition to appreciate the full force of the annoyance. It is a singular fact that the howling of two or three wolves gives an impression that a score are engaged, so many, so long drawn are the notes, and so uninterruptedly are they continued by one individual after another. A short, sharp bark is sounded, followed by several more in quick succession, the time growing faster and the pitch higher, till they run together into a long-drawn lugubrious howl in the highest possible key. The same strain is taken up again and again by different members of the pack, while from a greater distance the deep melancholy baying of the more wary Lobo breaks in, to add to the discord, till the very leaves of the trees seem quivering to the inharmonious sounds. It is not true, as asserted by some, that the Coyotés howl only just after dark and at daylight. Though they may be noisiest at these times, when the pack is gathering together for a night's foraging, or dispersing again to their diurnal retreats, I know that they give tongue at any time

during the night. They are rarely, if ever, heard in the daytime, though frequently to be seen, at least in secluded regions. Ordinarily, however, they spend the day in quiet out-of-the-way places, among rocks, in thick copses, etc., and seek their prey mainly by night, collecting for this purpose into packs, as already noticed.

"The Coyoté, although a carnivore, is a very indiscriminate feeder, and nothing seems to come amiss which is capable of being chewed and swallowed. From the nature of the region it inhabits, it is often hard-pressed for food, particularly in the winter season. Besides such live game as it can surprise and kill, or overpower by persevering pursuit and force of numbers, it feeds greedily upon all sorts of dead animal matter. To procure this, it resorts in great numbers to the vicinity of settlements, where offal is sure to be found, and surrounds the hunter's camp at night. It is well known to follow for days in the trail of a traveling-party, and each morning, just after camp is broken, it rushes in to claim whatever eatable refuse may have been left behind. But it cannot always find a sufficiency of animal food, and is thus made frugivorous and herbivorous. Particularly in the fall, it feeds extensively upon "tunas," which are the juicy, soft, scarlet fruit of various species of Prickly Pear (*Opuntia*); and in the winter upon berries of various sorts, particularly those of the Juniper (*Juniperus pachyderma*), and others.

"Coyotés are so annoying that a variety of means are used to destroy them. They may be shot, of course, but to hunt them in the daytime is uncertain, and hardly worth the trouble, while night shooting is still more laborious and unsatisfactory. Their cunning, inquiring disposition is ordinarily more than a match for man's ingenuity in the way of traps. The most certain as well as the easiest method of obtaining them is by poisoning the carcass of a dead animal or butcher's offal with strychnine. There is no doubt, also, that the odor of assafoetida is attractive to them, and a little of this drug rubbed into the poisoned meat greatly heightens the chances of their eating it. Since, after eating the poison, they suffer greatly from thirst, it is well to place a tub of water conveniently at hand, which generally keeps them from making off for water, and so being lost. There is considerable difference in the fur, both as to quality and color, according to

the season. In the winter, it is fuller, thicker, and softer than in summer, and has much less tawny or rufous about it, being almost entirely black and grizzled grayish white.

“Except under certain circumstances, there is a chronic feud between our domestic dogs and these dog-wolves. A good-sized dog will easily whip a Coyoté, though he may not come off unscathed from the sharp teeth and quick snaps of the latter. I have known a smallish terrier even to kill a Coyoté, of which he caught a throat-hold, enabling him by vigorous shakes to beat in the wolf’s skull against some bowlders between which the conflict took place. Notwithstanding, there is abundant evidence that the Coyoté will cross and bear fertile offspring with the domestic dog; and I believe the female of either will take the male of the other. During the season of heat, which is in spring, I have known dogs to disappear for several days, and return in such a dilapidated condition as to leave no doubt they had been decoyed away by some female Coyoté, and received hard treatment from her or her relatives. The hybrid is said to possess the bad qualities of both parents, and the good ones of neither, as usual with bastards, and to always remain snappish and intractable, spite of severity or kindness. The gestation of the species, as is well known, does not differ materially from that of its allies. It brings forth in May or in June, in secluded places, usually under or among rocks. Five or six puppies are ordinarily produced at a birth.

“A variety of absurd stories regarding its reproduction pass current among even the best-informed backwoodsmen; many affirming that the pups are born shapeless, inchoate masses, to be afterward licked into proper shape by the mother.”—(Am. Nat. i, 1867, 289, *et seq.*)

“A large amount of fresh material, gathered on the Upper Missouri, may furnish some data bearing upon the question, now agitated, of the resemblance of the Coyoté to the dog of the Bronze Period. The examination is made of about twenty skins with skulls, and several specimens in the flesh. I compare them with a dog very nearly of the same size, selecting for this purpose a thorough-bred pointer—an animal which, in its enlarged brain-box, shortened muzzle, pendulous lips, long, loose, silky, drooping

ears, close, glossy coat and rat-like tail, departs as much, perhaps, as any breed, from an original stock, in all the fortuitous points engrafted through domestication. Even in this case, the likeness in all essential respects is striking, and, as shown in the sequel, specimens of Indian dogs of this region can be found not certainly distinguishable from a Coyoté, for a reason that will be evident. The differences between the Coyoté and pointer become reduced to character of pelage and physiognomy; while the facial aspect itself, so strikingly diverse in its entirety, appears, when analyzed, much less substantially different.

“To begin with size and proportions: it appears from the following measurements that the pointer and Coyoté differ less in these respects than the normal individual variation among Coyotés themselves; and that there is no essential discrepancy whatever in general ‘build.’

Comparative measurements of a medium-sized male pointer and several Coyotés of both sexes.

[The measurements are given in inches and decimals.]

Measurements.	Pointer ♂ dog.	Large ♂ Coyoté.	Medium ♂ Coyoté.	Large ♀ Coyoté.	Small ♀ Coyoté.
Standing height at shoulder	24	24	21	22	19
Tip of nose to root of tail	36	36	33	34	28
Tail to end of vertebræ	13	14	12	14	11
Tail to end of hairs	14	18	15	16.50	13.50
Tip of nose to eye	4	4	3.75	4	3.50
Tip of nose to ear	8	.....	7.50	7.75	7
Tip of nose to occiput	9	8.50	8.25	8.50	7.50
Elbow to end of fore claws	14	13.25	12	12.50	11.50
Knee to end of hind claws	16	16.25	13.50	.....	.....
Heel to end of hind claws	8	7.25	6.75	7	6.50
Width across eyes at inner canthus	2.50	.....	1.60	.....	.....
Width across eyes at outer canthus	4.25	.....	3.25	.....	.....
Width across inner base of ears	4.65	.....	4	.....	.....
Height of ear above notch	5	.....	4	.....	.....
Width across tips of outstretched ears	15	.....	11.75	.....	.....
Greatest width of ear, pressed flat	3.25	.....	3.25	.....	.....
Tight girth of muzzle at middle	8.50	.....	7.50	.....	.....
Tight girth of chest	26	.....	19	.....	.....
Tight girth of belly	23	.....	16.50	.....	.....
Longest hairs of back	1.50	.....	5	.....	.....
Width across hairs of tail, pressed flat .....	.....	.....	8.50	.....	.....

“The Coyoté appears more stoutly built, but this is deceptive, owing to the dense furring; the various girths show the contrary. It is, however, somewhat more ‘compact’, the limbs lacking a certain freedom of swing, if not being slightly shorter.

“It would not be much to the point to compare the pelages, since the cultivated coat of the pointer differs quite as much from the shaggy one of numerous other dogs as from that of the Coyoté. It is interesting to observe, however, that even the closest-haired pointer shows in anger a slight though decided ‘mane’. The mane of the Coyoté is very conspicuous; the longest hairs over the back measuring four to six inches. The furring of the tail is as extremely diverse. The tail of a Coyoté ordinarily droops to the suffrago; the hairs reaching beyond half-way to the heels. It is perfectly straight. The ‘brush’ is terete-tapering, perhaps not quite so full for its length as that of a fox; in absolute size, it is just intermediate between that of a *Vulpes velox* and *V. macrurus*, both of which are smaller animals. But, furring aside, we find, in the total lack of curve in the thorough-bred pointer’s tail, a curious coincidence, if nothing more. This straightness, prized by sportsmen, the result of breeding, and often cruelly insured by removal of the terminal joints, so that some of the tendons lose insertion, is a feature in which the pointer departs from most dogs (the curly tail has been laid down as a specific characteristic of ‘*Canis familiaris*’), and resumes that of the Coyoté.

“Fortuitous conditions of pelage aside, the physiognomy, an almost equally casual matter, is the most striking difference between the two. It is difficult to portray an animal’s facial expression in words; in this case, we can hardly do better than to say that the aspect is just between a wolf’s and a fox’s, but more ‘doggy’ than either. Audubon’s figure is good; if anything, the front view of the upper figure is too ‘foxy’. The Coyoté’s face would be exactly matched by that of many cur-dogs, especially slender-nosed kinds, did it not lack almost entirely the frontal prominence of the latter; a feature which, in some kinds of lap-dogs, is exaggerated into monstrosity.

“The upper profile of the Coyoté’s face, from occiput to snout, deviates not much from a straight line; the forehead being remarkably flat. This

feature gives an appearance of breadth that is deceptive; the real width being both absolutely and relatively less than in the pointer. But the width across the ears of the pointer (six inches instead of four) is largely produced by the drooping of these organs down the side of the head. The lips are thin and scant, ordinarily showing the teeth, always parting after the animal is dead. There is something peculiar about the eyes; they seem to look more directly forward than those of the pointer. They are set very near together, the inner angles being only about an inch and a half apart; yet the obliquity carries the outer canthi over three inches apart. The ears are very large, triangular, pointed, upright, with very stiff cartilage. When pressed apart, their tips form with the point of the snout a nearly equilateral triangle. In fine, the pointer's physiognomy differs from the Coyoté's mainly in its special engrafted features, and these produce a discrepancy much greater than that existing between the Coyoté and many mongrel dogs.

"It is unnecessary to compare the skulls of the animals. There are no differences of moment, at least viewing the immense discrepancies existing in the crania of different breeds of dogs. Nor does an 'average' dog's skull differ from a Coyoté's by anything like as much as do the skulls of *C. latrans* and *C. lupus*.

"It appears, then, that the pointer, though a highly-specialized case of the domestic dog, is identical in essential structural points with the Coyoté; differs less in size than Coyotés vary among themselves; differs no more in pelage than it does from many other dogs; and, in details of form and physiognomy, differs vastly less than various dogs do among themselves. It appears, furthermore, that close as the likeness is, it is less than that subsisting between the Coyoté and various kinds of dogs domesticated by the Indians.

"For example, there is nothing in Audubon's description of the Hare-Indian dog specifically inapplicable to the Coyoté. Even the colors are the same; the difference in pattern (masses of blackish instead of brindling) is not of the least consequence, since it is entirely unstable. Richardson noted close traits of resemblance, even to the remarkable mode of outcry—a few short, sharp barks, followed by a prolonged, shrill howl. The fact that this particular strain of dog is bred beyond the present distribution of the Coyoté is, of course, not to the point in the general question. But we have much

more striking and unquestionable evidence of relationship by direct descent of some Indian dogs from the Coyoté. In the first place, we should note that the habitual antagonism of these dogs and the Coyotés is nothing but the animosity all dogs show to strangers of their own kind, an aversion probably rooted in jealousy, which is a strong canine trait. Next, we continually find dogs of both sexes on the frontier deserting their haunts at particular (sexual) periods; and if the occurrence of a feral wolf-dog (Coyoté ♀ and dog ♂) has not been recorded, there are numerous cases of the production of the same (from Coyoté ♂ and dog ♀) in domestication. I have, finally, information which I consider perfectly satisfactory, in still stronger evidence of the readiness with which the two animals interbreed.

“Indians not unfrequently bring it about themselves; on suitable occasions, they picket out their ♀ dogs over night to procure the cross, with constant success. What profitable quality is secured, I do not know; but such is the case.

“These crosses are not known to be otherwise than fertile; and the result is, in every Indian community there are mongrel dogs shading into Coyotés in every degree; all having the clear wolf-strain, and some being scarcely distinguishable from a prairie-wolf.

“The matter of color merits passing mention. The Coyoté is as constant in this respect as other *Feræ*, and I think its peculiar coloring can be reasonably traced in certain dogs. The animal is dingy white as a ground-color, which remains so on all the under parts; above, it is suffused with tawny brown (bright in summer, paler and more grayish, or quite gray, in winter). This color is overlaid with a clouding of black. This black is rarely uniformly distributed; it tends to streakiness along the back and across the shoulders and hips, producing a pattern similar to that of a “brindled” bull-dog. But there is a more striking feature, and one very characteristic of the animal (the brindled gray and black being shared exactly by an ordinary strain of *C. lupus*). The top of the muzzle, back of the ears, and outside of both fore and hind legs are usually nearly uniformly tawny. This shade is precisely the so-called “tan” of the black-and-tan terrier, and has the same general distribution. In an attempt to trace pedigree, a fact of this sort seems to rank in value with the appearance, in a horse or mule, of the stripes of a quagga-stock.”—(*Am. Nat.*, 1873, 385.)

Genus VULPES.

VULPES VULGARIS PENNSYLVANICUS, (Bodd.) Coues.

American Red Fox.*Brant Fox*, PENN., Hist. Quad., 235; Arct. Zool., 1784, 47.*Renard de Virginie*, PAL. DE BEAUV., Bull. Soc. Philom.*Canis vulpes* var. *pennsylvanicus*, BODD., Elenchus Anim., 1784, 96 (from Pennant).*Canis fulvus*, DESM., Mamm., i, 1820, 203 (from Pal. de Beauv.).—FR. CUV., Dict. Sci. Nat., viii, 568.—HARLAN, Fn. Amer., 1825, 89.—GRIFFITH, An. Kingd., v, 1827, 150.—DOUGHTY'S Cab. N. H., i, 1830, 25, pl. 3.—GODMAN, Am. Nat. Hist., i, 1831, 286.*Vulpes fulvus*, RICH., Fn. Bor.-Am., i, 1829, 91.—FISCHER, Syn., 1829, 191.—DEKAY, N. Y. Fn., i, 1842, 44, pl. 7, f. 1.—AUD. & BACH., Quad. N. A., ii, 1851, 263, pl. 87.—BAIRD, Mamm. N. A., 1857, 123.*Canis (Vulpes) vulgaris* var. *fulvus*, WAGN., Suppl. Schreber, ii, 1841, 413.*Red Fox*, *Common Fox*, ANGLICÈ.

CHARS. of the ordinary variety (*pennsylvanicus*).—Pelage long, fine, and lustrous; brush large and full, the distance between the ends of the outstretched hairs 6–7 inches. Ears haired both sides; feet so clothed that the claws and balls are nearly hidden. Tail to end of hairs rather more than half as long as the head and body. General color bright brownish-red or tawny red, rather darker on the shoulders and flanks, blackening on the back of the ears and outsides of the legs below, and on the ends of the tail-hairs; space around the black snout, edges of upper jaw, chin, throat, breast, and narrow belly-line more or less purely white; tip of tail usually white.

Coloration subject, as in many other animals, to melanism in varying degree from the slightest darkening of normal shades to black; one particular stage of incomplete melanism being strongly marked and frequent. These melanotic conditions have their due interest as items of natural history, and great commercial importance, but no classificatory significance whatever. A special state of semi-melanism is—

The CROSS-FOX (*decussatus*).—Muzzle, legs, and middle line of under parts blackish, with two cross-bars running down the inside of the legs. A more or less extended dark dorsal band crossed by another over the shoulders. Tail largely obscured by the increased black ends of the hairs; the white tip often wanting. Forehead and back dark grayish, owing to grizzled appearance of the plumbeous-black roots of the hairs, with their pale

tips. Sides of the head and neck, and of the body itself, a varying shade of ferrugineous or reddish-yellow; inner surface of ears the same. Black of under parts frequently ending on the chest, when the rest and the parts about the root of the tail below are pale rusty. Shades into the preceding and following styles by insensible degrees. This is *Canis* or *Vulpes fulvus* var. *decussatus*, of AUTHORS; RICH., Fn. B.-A., i, 1829, 93; AUD. & BACH., i, 1849, 45, pl. 6; BD., 124.

Melanism complete or very nearly so results in—

The BLACK or SILVER-GRAY FOX (*argentatus*).—Black; tail usually conspicuously white-tipped; more or fewer of the hairs, especially of the back and flanks, tipped with white or gray, producing a “silvered” appearance. Perfectly black animals are extremely rare and correspondingly high-priced. This style of pelage is chiefly produced in high latitudes. *C.* or *V. argentatus*, or *fulvus* var. *argentatus*, of AUTHORS; RICH., Fn. B.-A., 1829, i, 94; AUD. & BACH., iii, 1853, 70, pl. 116; BD., 124.

Lieut. W. L. Marshall reports having seen a fox which he supposed to be of this variety in New Mexico. If his identification is correct, this fact would extend the limit of the animal very far to the southward of its ordinary range.

Dimensions of any of the varieties.—Nose to root of tail, 2-2½ feet; tail to end of bones, 12-15 inches; to end of hairs, 15-19 inches. Ear, 2½-2¾ inches high, Height at shoulders rather over 1 foot. Skull about 5½ inches long by 3 inches in greatest width.

While the Cross and Black or Silver Foxes are usually considered as different “varieties”, they are not such, in the classificatory sense of that term, any more than are the red, black, or white wolves, the black marmots, squirrels, etc. The proof of this is in the fact that one or both of the “varieties” occur in the same litter of whelps from normally-colored parents. They have no special geographical distribution, although, on the whole, both kinds are rather northerly than otherwise, the Silver Fox especially so. It does not appear to be ascertained exactly how far the styles of pelage tend to perpetuate themselves, that is to say, in what proportion of cases a cross will produce a cross litter, or a black a black litter; but the interbreeding of the several varieties, and their purely accidental origin from parents of the normal coloration, are incontestable.

There is likewise no reasonable question of the specific identity of the American and European Red Fox, in which latter the same color-variations occur. Indeed, it has been surmised, apparently not without some foundation, that the American are lineal descendants of imported European individuals, and this hypothesis is more strongly colored from the fact of the abundance of the animal in settled districts. It is difficult, however, to suppose that an animal could have become in such short time so universally spread over a continent; a more reasonable hypothesis ascribing to it an original circumpolar distribution in warmer times gone by, whence it has spread southward in either hemisphere. This, it will be observed, by no means excludes the supposition that many of the animals may have also sprung from direct importation. Subjected for a long period to different climatic conditions, it is no wonder that the American has repeatedly been considered as a distinct species, on the grounds of certain slight observable differences. It offers a case parallel with many others we shall have to notice in this volume. According to Audubon, whose opportunities for comparison were ample, the American Red Fox "is a little the largest; its legs are less robust; its nose is shorter and more pointed; the eyes are nearer together; its feet and toes more thickly clothed with fur; its ears shorter; it has a finer and larger brush; and its fur is much softer, finer, and of a brighter color." These differences, it will be observed, are all comparative, not positive; and, although undoubtedly subsisting on the average, are liable to be nullified by the first specimens one may happen to compare. It is going quite far enough to admit a geographical distinction of race.

The generic structural discrepancies, the dissimilarity in color, and a difference in build, easier to remark upon comparison than to express in words, readily distinguish the Red Fox, in any of its pelages, from the Gray Fox (*Urocyon virginianus*).

Specimen.

No.	Name.	Locality.	Date.	Collector.	Remarks.
415	<i>Vulpes vulgaris pennsylvanicus</i>	Los Pinos, Colo.	Aug , 1874	Dr. H.C. Yarrow.	Skin.

VULPES MACRURUS, Bd.

Large Prairie Fox.

Vulpes macrourus, BD., Stansbury's Rep. Expl. Great Salt Lake, 1853 (pub. June, 1852), 309.—*Id.*, Mamm. N. A., 1857, 130.—HAYDEN, Trans. Am. Phil. Soc., xii, 1862, 142.

Vulpes utah, AUD. & BACH., Proc. Philada. Acad., July, 1852, 114.—*Id.*, Quad. N. Am., iii, 255, pl. 151.—COUES, Am. Nat., i, 1867, 292.

? *Vulpus fulvus*, MAXIM., Reise, 1841, ii, 98.

Large Red Fox of the Plains, LEWIS & CLARK, ii, 168.

CHARS.—Averaging larger than the Red Fox. Tail very long, extremely bushy; fur long, fine, and thick; coloration substantially as in the Red Fox, and presenting the same special degrees of melanism (cross, silver-gray, and black), but the normal coloration "yellow" rather than "red." Skull, $5\frac{3}{4}$ by $2\frac{3}{4}$, thus longer and narrower than in the Red Fox. Nose to root of tail, 30–33 inches; tail to end of vertebræ, 16; to end of hairs, 21; greatest breadth across flattened hairs at the end, 10 inches, elsewhere about 8. Nose to eye, $3\frac{1}{4}$; to ear, $5\frac{1}{2}$; to occiput, $6\frac{1}{2}$; ear, $3\frac{1}{2}$ high posteriorly; elbow to wrist, 6; to end of toes, 10; knee to ankle, 6; heel to end of toes, 6.

We indorse the specific character of this animal with some misgiving. As Professor Baird himself says: "Owing to the close resemblance to the common Red Fox, it is difficult to describe the Prairie Fox intelligibly except by comparison with the other species." There are, however, certain tangible differences, not accounted for upon any of the recognized laws of variation among animals of the region this supposed species inhabits; and it is, moreover, associated in some parts of its habitat with the common species. These two considerations have weighed with us in making a decision, provisionally, of specific rank.

A single specimen, believed to be of this species, was closely observed at Deep Creek, Utah. It is thought to be tolerably common in Utah and Nevada, as Indians were seen with skins in their possession.

A specimen, which we are inclined to refer to this species on account of its great size and especially large tail, is jet black all over, with a pure white tip to the tail; one of the finest examples of complete melanism we have seen. The purity of the black is only interrupted by a slight gray grizzle on the face and rump. It was collected in Colorado.

Specimen.

No.	Name.	Locality.	Date.	Collector.	Remarks.
392	<i>Vulpes macrurus</i> ? (melanotic)	Los Pinos, Colo.	Sept., 1874	Dr. H C. Yarrow	Skin.

Genus **UROCYON**, Baird.

UROCYON CINEREO-ARGENTATUS, (Schreb.) Coues.

Gray Fox.

- Gray Fox*, CATESB., Car., ii, 1731, 78, pl. 78.—PENN., Syn. Quad., 1776, 157.—*Id.*, Hist. Quad., 1781, No. 160.—*Id.*, Arct. Zoöl., i, 1784, 48.
- Canis cinereo-argentatus*, SCHREBER, Säug., iii, 1778, 360, pl. 92 (has actual priority over ERXLEBEN).—ERXL., Syst. An., 1777, 576.—GM., Syst. Nat., i, 1788, 74.—SHAW, Gen. Zoöl., i, 1800, 324.—DESM., Mamm., i, 1820, 204 (*partim*).—HARLAN, Fn. Amer., 1825, 90.—GRIFF., An. Kingd., v, 1827, 148.—GODMAN, Am. Nat. Hist., i, 1831, 280.—FR. CUV., Suppl. Buff., i, 1831, 187.—DOUGHTY'S Cab. Nat. Hist., ii, 1832, 145, pl. 14.—WAGN., Suppl. Schreber, ii, 1841, 436 (partly).—WOODH., Sitgreave's Rep. Expl. Zuñi and Colorado, 1854, 46.
- Canis virginianus*, SCHREBER, Säug., iii, 1778, 361, pl. 92.—ERXL., Syst. An., 1777, 567.—GM., Syst. Nat., i, 1788, 74.—SHAW, Gen. Zoöl., i, 1800, 325.—HARLAN, Fn. Amer., 1825, 89.—GRIFF., Anim. Kingd., v, 1827, 150.—RICH., F. Bor.-Amer., i, 1829, 96 (*Vulpes*).
- Vulpes virginianus*, DEKAY, N. Y. Fn., i, 1842, 45, pl. 7, f. 2.—AUD. & BACH., Quad. N. A., i, 1849, 162, pl. 21.
- Vulpes (Urocyon) virginianus*, BD., Mamm. N. A., 1857, 138.
- Canis griseus*, BODD., Elench. Anim., i, 1784, 97 (*ex Penn*).

The cranial characters of *Urocyon*, as compared with *Vulpes*, are very remarkable, fully warranting generic distinction, if not, indeed, of still higher taxonomic value. The differences are much greater than those subsisting between *Vulpes* and *Canis*. These were first pointed out in 1857, by Professor Baird, in the work above cited, p. 121. The principal characters are as follows; in addition to those of cranium, there is a very curious condition of pelage on the tail; in consideration of which the name of "Mane-tailed Foxes" was applied to the group, which contains, besides the present species, the *U. littoralis*.

VULPES proper.—Temporal crests approximate, nearly parallel, and single, as far as the coronal suture. No supplementary tubercle on lower sectorial tooth. Tail uniformly haired. Muzzle comparatively long. Angle of jaw ordinary, and skull, in general, thoroughly canine.

UROCYON, Baird.—Temporal crests divaricate, oblique, widely separated at coronal suture. A supplementary tubercle on lower sectorial tooth.

Tail with a hidden mane of stiff hairs along the upper line. Muzzle comparatively short. Angle of jaw peculiar, (angularly emarginate).

Specimen.

No.	Name.	Locality.	Date.	Collector.	Remarks.
401	<i>Urocyon cinereo-argentatus</i>	Taos, N. Mex ..	Aug., 1874	Dr. H.C. Yarrow.	Skin.

DESCR.—About as large as the Red Fox, but much more stoutly built, with shorter and broader head; tail not perfectly cylindrical nor uniformly haired, having a stiffish mane along the dorsal line. Prevailing color above a gray grizzle, produced by intimate mingling of black and hoary whitish, with which each hair is annulated; it is darkest along the dorsal line, and the upper surface of the tail has a similar blackish lengthwise stripe; sides of tail hoary, under surface tawny. Sides of the neck, flanks, and more or less of the outer surfaces of the limbs rich fulvous, or cinnamon-brown; under parts tawny whitish, usually pure white on the throat. Muzzle banded with black, extending on the chin; lower half of head, tip of chin, and sides of muzzle at end white. Back of ears not black (more or less tawny); tip of tail not white (black, in continuation of the dorsal stripe). Length about 28 inches; tail, to end of vertebræ, 13 to 16 inches; to end of hairs, 14 to 18; ears, $2\frac{1}{2}$ high; hind foot, 5 inches; skull, $4\frac{1}{2}$ to $4\frac{2}{3}$ by $2\frac{1}{3}$ to $2\frac{2}{3}$.

Different specimens of the Gray Fox vary much in the shade of the grizzled gray parts, extent and intensity of the fulvous, and precise pattern of the black and white on the head; but the animal does not appear subject to the particular variations so conspicuous in the Red Fox (although partial crossing has been recorded), and is always distinguishable on sight by color, independently of the differences in build, in physiognomy, and in cranial characters.

Although both species are found together over a great part of our country, the Gray is, on the whole, a more southern animal than the Red. It is not common north of Pennsylvania and Southern New York, is rare in New England, and only casual in Maine and Canada. Along its proper parallels of latitude, it extends across the country from Atlantic to Pacific, wherever the surface is suitable; but, being rather a woodland animal, it

shuns prairie as a rule, so that there are extensive regions where it may never be seen, although occurring on either side. From Virginia southward is the characteristic species, and abundant; it occurs in Texas, California, and Oregon.

Sharing vulpine traits with its kind, the Gray Fox has, nevertheless, its peculiarities. It is not a burrowing animal, at least to any great extent; and, when it digs, the burrow is simple, with a single entrance. It lies concealed in rank herbage, beneath or inside fallen logs, under partially-excavated stumps, and similar retreats. This habit is in evident correlation with its woodland range; for having no such protection as the Red Fox, which takes to the earth anywhere, it is forced to abide where there are the natural means of concealment just mentioned. This same habit, moreover, causes a certain modification of the animal's range with the settling of a country. In clearing off forests, the Gray Fox is forced to seek elsewhere; although, in effect, the circumstances that cause removal of one species are precisely those that invite the other, the Red Fox being able to exist in settled regions where the other could find no suitable resorts. It is this that makes the Red a greater nuisance to the farmer; it sticks closer to the farm-yard, being forced in a measure to thus supply itself, owing simply to its being in more cultivated districts. The Gray Fox subsists more extensively upon the wild game of his habitat. Another distinctive trait is the climbing powers of the Gray Fox; much greater than would be expected from an animal with non-retractile claws and no great "hugging" powers. When hard-pressed, the Gray Fox is treed, as regularly as the Red is earthed. The climbing seems to be chiefly an agile leaping along an inclined trunk, or from bough to bough; though it has been noted that the animal can climb small trunks by clasping, or even with its claws, like a cat or raccoon.

According to our observations, this is to be considered the characteristic fox of Arizona, where it is much more abundant than the Red.

MUSTELIDÆ.

Subfamily MARTINÆ.

Genus PUTORIUS, Cuvier.

PUTORIUS LONGICAUDA.

Long-tailed Ermine.

? *Mustela longicauda*, BP., Charlesw. Mag., 1838, 38.—GRAY, List Mamm. Br. Mus., 195.

? *Putorius longicauda*, RICH., Zoöl. Beechey's Voy., 1839, 10 * (in text).

Putorius longicauda, BD., Mamm. N. A., 1857, 169.—SUCKLEY, P. R. R. Rep., xii, pt. ii, 1859, 93, 114.—HAYD., Tr. Amer. Phil. Soc., xii, 1862, 142.—(?) ROSS, Canad. Nat. & Geol., vi, 1861, 441.

Specimens.

No.	Name.	Locality.	Date.	Collector.	Remarks.
419	<i>Putorius longicauda</i>	Fort Garland, Colo.	June 23, 1873	Mr. Schmeiding.	Skin.
400	.....do	Taos, N. Mex.	Aug., 1874	Dr. H.C. Yarrow.	Skin.
399	.....do .....	.....do .....	.....do .....	.....do	Skin.

The above specimens are interesting as demonstrating a more southerly range of the species than is generally recognized, and as showing some characters not exhibited by the typical form from the Missouri and Yellowstone plains.

In his monograph of this family, now about publishing, Dr. Coues has shown that the present species is distinct from *P. erminea*, to which it had usually been referred with doubt, and that, moreover, its closest relationships are with the Bridled Weasel (*P. brasiliensis*, var. *frenatus*). It shares with the last the peculiar rusty-red or salmon-colored (instead of clear sulphury, as in *P. erminea*) under parts. Now, these New Mexican skins show another decided approach to *P. frenatus* in darkening of the head; this part being as dark as it is in *P. xanthogenys*, which is merely the northernmost Pacific extension of *P. frenatus*. Were white spots present in these skins, they would unhesitatingly be referred to *P. frenatus* by any naturalist; and we know that, in undoubted specimens of the latter from Mexico and Central America, the peculiar facial markings are not seldom extinguished. The specimens are strong proof of the correctness of Dr. Coues's view that *P. longicauda* should be compared with *frenatus* and not with *erminea*.

We have no notes on the habits of this species, which, however, probably differ in no essentials from those of its better-known congeners. It appears to be a rather common animal in the regions explored.

One specimen shows, as an accidental peculiarity, a pencil of white hairs in the black tuft at the end of the tail.

PUTORIUS VISON, (Schreb.) Rich.

The Mink.

Mink, SMITH, Virginia, 1624.

Foutereau, LA HONT., Voy., i, 1703, 81.

Minx, LAWSON, Car., 1709, 121.

Vison, BUFF., Hist., xiii, 1765, 304, pl. 43.

Mustela vison, SCHREB., Säug., iii, 1778, 463, pl. 127 b.—GM., Syst. Nat., i, 1788, 94.—TURT., Syst. Nat., i, 1806, 58.—DESM., Mam., i, 1820, 183 (*Martes*).—CUV., Règne Anim., i, 1817, 150 (*Martes*).—HARL., Fn. Amer., 1825, 63.—GRIFF., An. King., v, 1827, 124.—LESS., Man., 1827, 148.—RICH., F. B.-A., i, 1829, 48 (*Putorius*).—MAXIM., Reise, i, 1839, 213.—WAGN., Suppl. Schreb., ii, 1841, 241 (*Lutreola*).—THOMPS., Vermont, 1853, 31.

Lutra vison, SHAW, Gen. Zool., i, 1800, 448.

Putorius vison, GAPP., Zool. Jour., v, 1830, 202.—DEKAY, N. Y. Zool., i, 1842, 37, pl. 11, f. 1, pl. 8, f. 3, a, b.—AUD. & BACH., Q. N. A., i, 1849, 250, pl. 33.—KENN., Tr. Ill. State Agric. Soc., 1853-54, 578.—BEESLEY, Geol. Cape May, 1857, 137.—BAIRD, Mamm. N. A., 1857, 177.—NEWB., P. R. R. Rep., i, 1857, 42.—COOP. & SUCK., N. H. W. T., 1860, 93, 115.—BILLINGS, Canada Nat. & Geol., ii, 1857, 48.—ROSS, Canad. Nat. & Geol., vi, 1861, 29.—MAXIM., Verz. N. A. Säug., 1862, 52.—SAM., Rep. Mass. Agric. for 1861, 1862, 157, pl. 1, f. 8.—GILPIN, Tr. N. Scotia Inst., ii, 1870, 12, 59.—AMES, Bull. Minn. Acad. Nat. Sci., 1874, 69.

Mustela lutreola, FORST., Phil. Trans., lxii, 1772, 371.

Putorius lutreolus, ALLEN, Bull. M. C. Z., i, 1869, 175.

Putorius lutreolus var. *vison*, ALLEN, Bull. Essex Inst., vi, 1874, 54, 59, 62.

Mustela lutreola, var. *americana*, SCHINZ, Syn. Mamm., i, 1844, 347.

Vison lutreola, GRAY, List Mam. Br. Mus., 1843, 64 (partly).

Mustela canadensis, ERXL., Syst. An., i, 1777, 455 (mixed with another species, but the description *clearly* is of this species).

Mustela canadensis var. *vison*, BODD., Elench. Anim., i, 1784, 86 (*ex* Buff).

Mustela weningus, BARTON, Am. Phil. Tr., vi, 1809, 70.

Mustela minx, TURTON, Syst. Nat., i, 1806, 58.

Mustela lutreocephala, HARL., Fn. Amer., 1825, 63.

Vison lutreocephala, GRAY, P. Z. S., 1865, 116.

Common throughout the Territory of Utah near the water-courses. Some very fine specimens secured at Provo. For boldness and thieving proclivities, this little animal is unequalled; and, during our collecting at

Provo, some ducks, allowed to remain in the water where they fell, in a short time were mutilated to such an extent by minks as to be useless for taxidermic purposes.

MUSTELA AMERICANA, Turton.

American Sable.

- Mustela martes*, FORST., Phil. Trans., lxii, 1772, 342; and of many American writers.
Mustela americana, TURTON, Syst. Nat., i, 1806, 60.—BD., M. N. A., 1857, 152.—NEWB., P. R. R. Rep., vi, 1857, 41.—KNEELAND, Pr. Bost. Soc., vi, 1858, 418.—COOP. & SUCKL., N. H. Wash. Terr., 1860, 92.—ROSS, Canada Nat. & Geol., vi, 1861, 25.—GILPIN, Tr. Nova Scotia Acad., ii, 1870, 10, 59.—AMES, Bull. Minn. Acad., 1874, 69.
Martes americana, GRAY, P. Z. S., 1865, 106 (with vars. *abietinoides*, *huro*, and *leucopus*).
Mustela zibellina var. *americana*, BRANDT, Beit. Säug. Russl., 1855, 16, pl. 3, f. 10.
Mustela zibellina, GODM., Am. Nat. Hist., i, 1831, 208.
Mustela vulpina, RAF., Am. Jour. Sc., i, 1819, 82.
Mustela leucopus, KUHLE, Beit., 1820, 74.
Martes leucopus, GRAY, List Mamm. Br. Mus., 1843, 63.
Mustela huro, FR. CUV., Dict. Sc. Nat., xxix, 1823, 256.
Mustela leucotis, GRIFF., An. Kingd., v, 1827, 126.
Mustela martinus, AMES, Bull. Minn. Acad., 1874, 69.

Specimen.

No.	Name.	Locality.	Date.	Collector.	Remarks.
398	<i>Mustela americana</i>	Taos, N. Mex	Aug., 1874	Dr. H. C. Yarrow.	Skin.

Particularly interesting on account of the locality, which is the southernmost on record thus far for the species.

GULO LUSCUS, (L.) Sab.

Wolverene.

- Ursus freti-hudsonis*, BRISS., Quad., 1765, 260.
Ursus luscus, L., S. N., i, 1766, 71.
Meles luscus, BODD., Elench. Anim., i, 1784, 80.
Gulo luscus, J. SABINE, Frankl. Jour., 1823, 650.—E. SABINE, App. Parry's 1st Voy., 1824, clxxxiv.—RICH., App. Parry's 2d Voy., 1825, 292.—RICH., F. B. A., i, 1829, 41.—DEKAY, N. Y. Zool., i, 1842, 27.—AUD. & BACH., Quad. N. A., i, 1849, 203, pl. 26.—THOMPS., Vermont, 1853, 30.—BD., Stansbury's Rep., 1852, 311.—BD., Mamm. N. A., 1857, 181.—MAXIM., Verz. N. A. Säug., 1862, 35.—COUES, Am. Nat., i, 1867, 352.—ALLEN, Bull. M. C. Z., i, 1869, 177.
Id., Bull. Essex. Inst., vi, 1874, 54.—TRIPPE, *apud* Coues's Birds of the Northwest, 1874, 224 (in text).
Gulo arcticus var. A., DESM., Mam., i, 1820, 174.
Gulo wolverene, GRIFF., An. King., v, 1827, 117.

Sparingly found in Wahsatch Mountains. One very fine skin obtained from Indians at Fillmore, Utah. Stuffed specimen seen in Salt Lake City Museum from Bear River, Utah. This is near the extreme southern limit where this animal has been found. It is only lately that the southward extension of the species in the Rocky Mountains has been fully determined. Both Mr. Allen and Mr. Trippe ascertained its occurrence in Colorado south of 40°, and Dr. Coues obtained evidence of its existence even in Arizona.

Subfamily MEPHITINAE.

Genus MEPHITIS, Cuv.

MEPHITIS MEPHITICA, (Shaw) Bd.

American Skunk.

- (?) *Viverra mephitica*, SHAW, Gen. Zoöl., i, 1800, 390.
Mephitis mephitica, BD., Mamm. N. A., 1857, 195.—COOP. & SUCKL., N. H. Wash. Terr., 1860, 94.—HAYD., Trans. Amer. Phil. Soc., xii, 1861, 143.—SAM., 9th Ann. Rep. Agric. Mass., 1862, 161.—GERRARD, Cat. Bones Br. Mus., 1862, 97.—ALLEN, Bull. M. C. Z., i, 1869, 178 ; ii, 1871, 169.—ALLEN, Pr. Bost. Soc., xiii, 1869, 183.—GILP., Pr. Nova Scotia Inst., ii, 1870, 60.—STEV., U. S. Geol. Surv. Terr. 1870, 1871, 461.—PARKER, Am. Nat., v, 1871, 246 (anatomy).—ALLEN, Bull. Essex Inst., vi, 1874, 46, 54, 59, 63.—ALLEN, Proc. Bost. Soc., xvii, 1874, 38.—AMES, Bull. Minn. Acad., 1874, 69.
Mephitis chinga, TIEDEM., Zool., i, 1808, 362 (partly).—AUD. & BACH., Quad. N. A., i, 1849, 317, pl. 42.
Mephitis varians var. *chinga*, GRAY, P. Z. S., 1865, 148.
 “*Mustela*” *americana* var. K, DESM., Mam., i, 1820, 186 (*lapsu* for “*Mephitis*”).
Mephitis americana, SAB., Frankl. Jour., 1823, 653.—DEKAY, N. Y. Zoöl., i, 1842, 29, pl. 12, f. 1.—WYMAN, Pr. Bost. Soc., i, 1844, 110 (anat.).—WARREN, Pr. Bost. Soc., iii, 1849, 175 (anat.).
Mephitis americana var. *hudsonica*, RICH., F. B. A., i, 1829, 55.
Chincha americana, LESS., Nouv. Tabl. Règne Anim., 1842, 67.
Mephitis chinche, FISCH., Syn., 1829, 260 (partly).
Mephitis mesomelas, LICHT., Darst. Säug., pl. 55, f. 2.—BD., Mamm. N. A., 1857, 199.
Mephitis varians, GRAY, Mag. N. H., i, 1837, 581.—BD., Mam. N. A., 1857, 193.
Mephitis macroura, AUD. & BACH., Quad. N. A., iii, 1853, 11, pl. 102 (*not of* Licht).
Mephitis occidentalis, BD., Mam. N. A., 1857, 194.

A number of skunks were killed by the party, but none brought in. They are said to be quite common. It is a matter of some interest with regard to this beautiful little animal that the Rev. Dr. Hovey, in “Silliman’s Journal” for May, 1874, states its bite, under certain conditions, is capable

of producing a disease analogous to *rabies canina*—the hydrophobia of dogs—and for which he claims the name *rabies mephitica*. He asserts that the salivary virus is only dangerous when there is a corresponding diminution or disappearance of the peculiar offensive fluid which it uses for defensive purposes. A paper, however, is now in course of preparation by Dr. Janeway, of the United States Army, which, it is expected, will disprove the truth of Dr. Hovey's theory. Should Dr. Hovey's theory eventually prove true, the *Mephitis* should be as ruthlessly exterminated as the *Caudisoma* (Rattlesnake).

Subfamily MELINAE.

Genus TAXIDEA, Waterhouse.

TAXIDEA AMERICANA, (Bodd.) Bd.

American Badger.

Meles taxus var. *americanus*, BODD., Elenchus Animalium, i, 1784, 136.

Meles americanus, ZIMM., Penn. Arktische Zool., i, 1787, 74 (after Boddært).

Taxidea americana, BAIRD, Mamm. N. A., 1857, 202, pl. 39, f. 2.—NEWB., P. R. R. Rep., vi, 1857, 45.—COOP. & SUCKL., N. H. Wash. Terr., 1860, 117.—HAYD., Trans. Amer. Phil. Soc., xii, 1862, 143.—GRAY, P. Z. S., 1865, 141.—COOP., Am. Nat., ii, 1868, 529.—STEV., U. S. Geol. Surv. Terr. 1870, 1871, 461.—ALLEN, Pr. Bost. Soc., xiii, 1869, 183.—ALLEN, Bull. Ess. Inst., vi, 1874, 46, 54, 59, 63.—ALLEN, Proc. Bost. Soc., xvii, 1874, 38.—AMES, Bull. Minn. Acad., 1874, 69.

Ursus labradorius, GM., S. N., i, 1788, 102.

Meles labradoria, MEYER, Zool. Arch., ii, 1796, 45.—J. SAB., App. Frankl. Jour., 1823, 649.—DEKAY, N. Y. Zool., i, 1842, 27.—AUD. & BACH., Quad. N. A., i, 1849, 360, pl. 47.

Taxus labradoricus, SAY, Long's Exp., i, 1823, 261, 369.

Meles jeffersonii, HARLAN, Fn. Amer., 1825, 309.

Very common throughout Western Utah and Eastern Nevada. Several fine skins and crania were obtained. Less abundant in New Mexico and Arizona.

Subfamily LUTRINAE.

Genus LUTRA.

LUTRA CANADENSIS, (Turton) Cuv.

North American Otter.

Mustela canadensis, TURTON, Syst. Nat., i, 1806, 57 (not of the same work, p. 59, nor of Schreber, Erxleben, and authors. This reference, which appears to have been wholly overlooked heretofore, is the first we have found for the species).

- Lutra canadensis*, F. CUV., Dict. Sc. Nat., xxvii, 1823, 242.—SABINE, App. Frankl. Jour., 1823, 653.—LESS., Man., 1827, 154.—GRIFF., Anim. Kingdom, v, 1827, 130.—FISCH., Syn., 1829, 225.—RICH., F. B. A., i, 1829, 57.—DEKAY, N. Y. Zoöl., i, 1842, 39.—WOODH., Sitgr. Rep., 1853, 44.—AUD. & BACH., Q. N. A., ii, 1851, 2, pl. 51.—BD., M. N. A., 1857, 184.—HAYD., Tr. Am. Phil. Soc., xii, 1862, 143.
- Lutra canadensis*, var., AUD. & BACH., Q. N. A., iii, 1853, 97, pl. 122 (fig. of Gray's type of "*Lataxina mollis*").
- Latax canadensis*, GRAY, P. Z. S., 1865, 133.
- Lutra vulgaris* var. *canadensis*, WAGN., Suppl. Schreber, ii, 1841, 256.
- Lutra hudsonica*, FR. CUV., Suppl. Buff., i, 1831, 194.
- Lutra brasiliensis*, DESM., Mam., i, 1820, 188 (in part).—HARL., Fn. Amer., 1825, 71 (in part).—GODM., Am. Nat. Hist., i, 1831, 222 (in part).—THOMPS., Vermont, 1853, 33.
- Lutra lataxina*, F. CUV., Dict. Sc. Nat., xxvii, 1823, 242.
- Latax lataxina*, GRAY, Ann. Mag. N. H., i, 1837, 119.
- Lataxina mollis*, GRAY, List. Mam. Br. Mus., 1843, 70.
- Lutra americana*, WYMAN, Pr. Bost. Soc., ii, 1847, 249.
- Lutra californica*, BD., M. N. A., 1857, 187.
- Lutra destructor*, BARNSTON, Canada Nat. & Geol., viii, 1863, 147, f. —.
- Loutre d'Amérique, partim*, CUV., R. A., i, 3d ed., 1836, 91 (mixed with true *brasiliensis*).

The otter is found sparingly in some of the fresh water lakes of various portions of the regions explored; but no specimens were secured.

FAM. PROCYONIDAE.

Genus PROCYON, Storr.

PROCYON LOTOR, (Linn.) Storr.

Raccoon.

- Ursus lotor*, LINN., Syst. Nat., i, 1758, 48; 1766, 70.—SCHREB., Säug., iii, 1778, 521.—ERXL., Syst. An., 1777, 165.—GM., Syst. Nat., i, 1788, 103.—HARLAN, Fn. Amer., 1825, 53.
- Procyon lotor*, STORR, Prod. Meth. Anim., 1780, —.—DESM., Mamm., i, 1820, 168.—GRIFF., An. Kingd., v, 1827, 114.—FISCHER, Syn., 1829, 147.—RICH., Fn. Bor.-Amer., i, 1829, 36.—DOUGHTY'S Cab. N. H., ii, 1832, 73, pl. 7.—DEKAY, N. Y. Zoöl., i, 1842, 26.—AUD. & BACH., Q. N. A., ii, 1851, 74, pl. 61.—BAIRD, Mam. N. A., 1857, 209.—ALLEN, Bull. M. C. Z., i, 1869, 181; ii, 1871, 170.
- Meles lotor*, BODD., Elenchus Animalium, 1784, 80.

Observed in Colorado.

As we have not completed our studies of this animal, we refrain from citing, in the above list of references, several names, which, nevertheless, we believe belong to the synonymy of this species.

FAM. URSIDÆ.

Genus URSUS, L.

URSUS ARCTOS HORRIBILIS.

Grizzly Bear; "Cinnamon Bear" of mountaineers.

- Ursus horribilis*, ORD, Guthrie's Geog., 2d Am. ed., ii, 1815, 291, 299.—SAY, Long's Exp. R., Mts., 1823, 53.—DOUGHTY'S Cab. Nat. Hist., i, 1831, 121, pl. 11.—GODM., Am. Nat. Hist., i, 1831, 131.—BAIRD, Mamm. N. A., 1857, 219.
- ? *Ursus horribilis* var. *horriæus*, BD., U. S. Mex. B. Surv., ii, pt. ii, 1859, Mamm., 24.
- Ursus ferox*, RICH., Fn. Bor.-Am., i, 1829, 24, pl. 1.—FISCH., Syn., 1829, 144.—AUD. & BACH., Q. N. A., iii, 1853, 141, pl. 131.
- Ursus cinereus*, DESM., Mamm., i, 1820, 164.—HARL., Fn. Amer., 1825, 48.—GRAY, P. Z. S., 1864, 690.
- Ursus candescens*, H. SMITH, Griff. Cuv., ii, 1827, 229; v, 1827, 112.
- Ursus arctos*, var., MIDDENDORFF, Sibir. Reise, ii, pt. ii, 1853, 4, 54, 61.
- Ursus arctos*, ALLEN, Bull. M. C. Z., ii, 1871, 170 (mixed with several other species or varieties).

Specimen.

No.	Name.	Locality.	Date.	Collector.	Remarks.
15 C	<i>U. horribilis</i>	Grass Valley, Utah.....	—, 1873	E. E. Howell	Cranium.

Found from the plains of the Upper Missouri to the Rocky Mountains, and along their bases; thence to the coast of California. Several seen by the party in New Mexico, and a fine cranium obtained in Utah by Mr. Howell.

Although no bears were seen on the expedition of 1872, yet evidence was received at Fillmore of the occasional presence of one of these monsters in the Wahsatch Mountains behind the town. Our informant was an old hunter, thoroughly acquainted with the Cinnamon Bear (*Ursus americanus*, var. *cinnamomus*, Aud. & Bach.), which is frequently miscalled "the grizzly"; and he stated positively that the bear in question was entirely different. Many attempts had been made to capture him, but without success.

A grizzly bear, apparently two years old, was obtained on the northern slope of Bill Williams' Mountain. Several were killed in this same locality by the party to which Dr. Coues was attached in 1864. They are quite common in the vicinity of Camp Apache.

In 1874, Lieutenant Marshall obtained a skin of this bear, killed near Pagosa Hot Springs, in Western Colorado.

In the present state of our unfinished studies of the American *Ursidæ*, we are unwilling to express ourselves upon the nicer questions involved; but so far we can see we have in the United States two perfectly distinct species, to which a third, the Barren Ground Bear, of Richardson, named *Ursus richardsoni*, by one Mayne Reid, may require to be added.

These two are the "Black Bear" (*Ursus americanus*) and the Grizzly, the latter probably not specifically separable from the *U. arctos* of Europe. Both occur under almost every variation in color, but preserve their specific characters throughout.

The "Cinnamon Bear" of *authors* is a variety of *U. americanus*; but the "Cinnamon" Bear of frontiersmen and mountaineers refers to some of the lighter or browner varieties of the Grizzly.

URSUS AMERICANUS, Pall.

Black Bear.

Var. AMERICANUS.

Ursus americanus, PALLAS, Spic. Zoöl., xiv, 1780, 6.—BODD., Elench. Anim., i, 1784, 79.—GMEL., Syst. Nat., i, 1788, 101.—DESM., Mamm., i, 1820, 165.—HARLAN, Fn. Amer., 1825, 51.—RICH., F. B. A., i, 1829, 14.—FISCH, Syn., 1829, 143.—GODM., Am. Nat. Hist., i, 1831, 114.—DEKAY, N. Y. Zoöl., i, 1842, 24.—AUD. & BACH., Q. N. A., iii, 1853, 187, pl. 141.—BD., M. N. A., 1857, 225.

Ursus niger americanus, GRIFF., An. Kingd., v, 1827, No. 318.

Var. CINNAMOMEUS.

Ursus americanus var. *cinnamomum*, AUD. & BACH., Q. N. A., iii, 1853, 125, pl. 127.

Ursus americanus var. *cinnamoneus*, BD., Mamm., N. A., 1857, 228.

Specimen.

No.	Name.	Locality.	Date.	Collector.	Remarks.
15 D	U. americanus...	White Mountains, Ariz ..	—, 1873	Dr. C. G. Newberry	Skin.

Widely distributed throughout North America, and quite numerous in the three Territories visited. In one locality, in the Miembres Mountains, a number were seen. Mr. Henshaw records the fact that one of the hunters

of the party killed a female bear having with her two cubs, one quite black in color and the other brown, and this, it is stated, is not uncommon. One fine skin obtained.

This animal is very frequently found in nearly the whole of the hilly and wooded country of Arizona. The Coyotero and Mogollon Mountains appear to be the home of this class of animals. Skins were often brought into camp by the Indians at Camp Apache.

Skins of var. *cinnamomeus* were obtained at Camp Apache, and it was also seen at Bill Williams' Mountain, and is chiefly found along the eastern border of Arizona and into New Mexico. Obtained by Lieutenant Marshall at Pagosa Hot Springs, Western Colorado, in 1874.

UNGULATA.

FAM. BOVIDÆ.

Genus BOS, L.

BOS AMERICANUS, Gm.

Buffalo.

Taurus mexicanus, HERNAND., Mex., 1651, 587, ♂.

Taureau sauvage, HENNEPIN, Nonv. Discov., i, 1699, 186.

Buffalo, LAWSON, Car., 1709, 115.—SAY, Long's Exp., iii, 1823, 68.

Bos bison, L., Syst. N., i, 1766, partly.

Bos americanus, GM., Syst. Nat., i, 1788, 204.—DESM., Mamm., ii, 1822, 496.—HARL., Fn. Amer., 1825, 268.—GODM., Am. Nat. Hist., iii, 1831, 4.—RICH., F. B. A., i, 1829, 279.—DOUGHTY'S Cab. N. H., ii, 1832, 169, pl. 14.—GIEBEL, Säug., 1855, 271.—MARCY, Rep. Red River, 1852, 201.—WOODH., Sitgr. Rep. Zuñi & Colorado, 1854, 57.

Bison americanus, GRIFF., An. Kingd., v, 1827, 374.—TURNER, P. Z. S., 1850, 174.—BAIRD, Agric. Rep. U. S. Patent Office 1851, 1852, 124.—AUD. & BACH., Q. N. A., ii, 1851, 32, pls. 66, 67.

Not common in Colorado, but a few individuals in 1873 visited South Park. One female was killed and calf captured.

In Arizona, Dr. Coues obtained some years since evidence considered satisfactory of the former presence of the Buffalo in that Territory, where it is now entirely unknown.

Formerly quite common in Utah, as it is still remembered by the older Indians. We were informed by Mr. Peter Madsen, an intelligent fisherman of Utah Lake, that in drawing his nets in that body of water he has frequently hauled up the skulls of Buffaloes, and it is supposed that, driven across the plains by the Indians upon the ice in the winter season, they broke through and were drowned.

FAM. OVIDÆ.

Genus **APLOCERUS**, H. Smith.

APLOCERUS COLUMBIANUS, (Desmoul.) Coues.

Rocky Mountain Goat.

- Capra columbiana*, DESM., Dict. Class., iii, 580.—FISCHER, Syn., 1829, 487.
Ovis montana, ORD, Guth. Geog. 2d Am. ed., ii, 1815, 292, 309; Journ. Acad. Nat. Sc. Phila., i, 1817, 8; Jour. de Phys., lxxxv, 1817, 333.
Capra montana, HARL., Fn. Amer., 1825, 253.—GODM., Am. Nat. Hist., ii, 325.
Aplocerus montanus, RICH., Zoöl. Voy. Herald; Foss. Mamm., ii, 1852, 131, pls. 16-19 (Osteology. Named *Rupicapra americana* on plate).—BD., Mamm. N. A., 1857, 671.
Antilope (Rupicapra) americana, BLAINV., Nouv. Bull. Soc. Philom., 1816, 73, 80.—DESMAR., Mamm., ii, 1822, 478.
Capra americana, RICH., F. B. A., i, 1829, 268, pl. 22.—OGILBY, P. Z. S., 1836, 137.—BD., Agric. Rep. U. S. Patent Office for 1851, 1852, 120, pl.—AUD. & BACH., Q. N. A., iii, 1853, 128, pl. 128.
Mazama americana, GRAY, P. Z. S., 1850, 136.
Aplocerus americanus, TURNER, P. Z. S., 1850, 174.
Mazama sericea et dorsata, RAF., Am. Monthly Mag., i, 1817, 44.
Antilope lanigera, H. SMITH, Linn. Trans., xiii, 1822, 38, pl. 4.

One individual seen in Colorado by Lieutenant Marshall's party.

Seen by Captain Anderson, of the British Boundary Commission, in 1874, in Rocky Mountains, near Chief Mountain Lake, lat. 49°.

Genus **OVIS**, L.

OVIS MONTANA, Cuv.

Rocky Mountain Sheep.

- Ovis ammon*, MITCH., Med. Repos., x, 1807, 35.—ORD., Guthrie's Geog., 2d Am. ed., ii, 1815, 292, 308.—HARL., Fn. Amer., 1825, 164.—GODM., Amer. Nat. Hist., ii, 328.

Ovis montana, CUV., Règne Anim., i, 1817, 267.—DESM., Mamm., ii, 1822, 487.—RICH., F. B. A., i, 1829, 271, pl. 23.—DOUGHTY'S Cab. Nat. Hist., i, 1830, 193, pl. 17.—MAXIM., Reise Nord-Am., i, 1839, 549.—AUD. & BACH., Q. N. A., ii, 1851, 163, pl. 73.—BD., Agric. Rep. U. S. Patent Office 1851, 1852, 123, pl.—; Stansbury's Rep., 1852, 312; Mam. N. A., 1857, 673, figs.—WOODH., Sitgr. Rep. Zuñi & Colorado, 1854, 56.—ALLEN, Proc. Bost. Soc. Nat. Hist., xvii, 1874, 40.

Capra (Ovis) montana, FISCH., Syn., 1819, 488.

Ovis cervina, DESM., Nouv. Diet., xxi, 1818, 553.

Ovis pygargus, H. SMITH.—GRIFF., An. Kingd., v, 1827, 359.

Ovis californianus, DOUGLAS, Zoöl. Journ., iv, 1829, 332.

Ovis californica, WAGN., Suppl. Schreb., v, 1836, 1371.

"*Belier de montagne*, GEOFF., Ann. du. Mus., ii, 1803, 351, pl. 60" (quoted by Fischer as "*Ovis montana*").

Bighorn, LEWIS & CLARK. *Mouflon d'Amérique*, DESM., l. c.

Specimens.

No.	Name.	Locality.	Date.	Collector.	Remarks.
40 L	<i>O. montana</i>	Near Santa Fé, N. Mex..	——, 1873	Governor Army....	Cranium.
40 M	.....do	——, N. Mex	——, 1873	Dr. C. G. Newberry	Do.

Common in mountainous portions of the regions explored.

FAM. ANTILOCAPRIDÆ.

Genus ANTILOCAPRA, Ord.

ANTILOCAPRA AMERICANA, Ord.

Antelope americana, ORD, Guthrie's Geog. 2d Am. ed., ii, 1815, 292, 308.—HARL., Fn. Amer., 1825, 250.—GODM., Am. Nat. Hist., ii, 320.

Antilocapra americana, ORD, Journ. de Phys., lxxxvii, 1818, 149; Bull. Soc. Philom., 1818, 146.—GRAY, P. Z. S., 1850, 137.—AUD. & BACH., Q. N. A., ii, 1851, 193, pl. 77.—MARCY, Rep. Expl. Red River, 1852, 201.—WOODH., Sitgr. Rep. Zuñi & Colorado, 1854, 56.—BD., Mamm. N. A., 1857, 666.—TENNEY, Man., 1866, 101.—ALLEN, Proc. Bost. Soc., xvii, 1874, 40.—COOP., Am. Nat., ii, 1869, 537.

Dicranoceros americanus, TURNER, P. Z. S., 1850, 174.

Cervus hamatus, BLAINV., "Bull. Soc. Philom., 1816, 73" (as quoted by Fischer, l. c.).

Antelope furcifer, H. SMITH, Trans. Linn. Soc., xiii, 1822, 28, pl. 2.—DESM., Mamm., ii, 1822, 479.—RICH., F. B. A., ii, 1829, 261, pl. 21.—FISCHER, Syn., 1829, 481.

Mazama furcifer, OGILBY, P. Z. S., 1836, 121.

Dicranoceros furcifer, SUND., K. Sv. Vet. Handl., 1844.

Antelope palmata, H. SMITH, Trans. Linn. Soc., xiii, 1822, 31, pl. 3.—DESM., Mamm., ii, 1822, 479.—FISCH., Syn., 1829, 481.

Pronghorn Antelope, HAYES, Am. Nat., ii, 1868, 131, figs. — (biography and physiology).

One specimen of this beautiful animal was found in Spring Valley, Nevada. Hundreds of them were seen on the Colorado plateau, especially around Bill Williams' Mountain.

Very common on plains to westward of Sink of the Sevier. Common on plains west of Missouri. Visits the mountains near South Park, Colorado, to herd, in June and July (*vide* Rothrock).

Specimens.

No.	Name.	Locality.	Date.	Collector.	Remarks.
150 ♂	A. americana	South Park, Colo	Aug. 1, 1873	Dr. J. T. Rothrock.	Cranium.
150 a	.....do ..	——, N. Mex	——, 1873	H. W. Henshaw ..	Skin and cranium.

FAM. CERVIDAE.

Genus CERVUS, L.

CERVUS CANADENSIS, Erxl.

Wapiti or American Elk.

Cerv de Canada, PERRAULT, Mém. Acad. Roy. Sci., iii, 65, pl. 45 (prior to 1700).

Hert van Kanada, HOUTT., Nat. Hist., iii, 83, pl. 22, f. 1 (subsequent to 1761).

Hirsch von Canada, MÜLL., Natursyst., i, 1773, 393, pl. 21, f. 1 (*ex* Houtt.)

Cervus canadensis, BRISS., Quad., 1756, 88.

Cervus elaphus γ, *canadensis*, ERXL., Syst., 1777, 305.—BODD., Elench. Anim., 1784, 135.

Cervus canadensis, SCHREB., Säug., v, "1835," 990, pl. 246 A.—DESMAR., Mamm., ii, 1822, 433.—HARL., Fn. Amer., 1825, 236.—GODM., Am. Nat. Hist., ii, 1831, 294, pl. —.—MAXIM., Reise, ii, 1839, 24, 84.—GRAY, P. Z. S., 1850, 226.—PUCH., Archiv. du Mus., vi, 1852, 386.—GIEBEL, Säug., 1855, 348.—BAIRD, Mam. N. A., 1857, 838, figs. 9. 10.

Cervus (Elaphus) canadensis, GRIFF., An. Kingd., v, 1827, 308.

Elaphus canadensis, DEKAY, N. Y. Zool., i, 1842, 118, pl. 18, f. 2.—AUD. & BACH., Q. N. A., ii, 1851, 84, pl. 62.—BAIRD, Agric. Rep. U. S. Patent Office for 1851, 1852, 116.

Cervus strongloceros, SCHREB., Säug., v, "1836," pl. 247, F, G.—RICH., Fn. Bor. Am., i, 1829, 251; Zool. Beechey's Voy., 1839, 10.—SUNDEV., Kong. Vet. Ak. Handl., 1844; Arct. Scand. Beit., ii, 1850, 131.

Cervus wapiti, BARTON, Am. Philos. Trans., vi, 1809, 70; Med. & Phys. Journ., iii, 36.—LEACH, Journ. Phys., lxxxv, 1817, 67.

Cervus major, ORD, Guthrie's Geog., 2d Am. ed., ii, 1815, 292, 306; Journ. Phys., lxxxvii, 1818, 150.—DESM., Mamm., ii, 1822, 432.

? *Cervus occidentalis*, H. SMITH, Griff. An. King., iv, 1827, 101; v, 1827, 308 (quote? *Cervus auritus*, WARDEN, and *Mule Deer*, LE RAYE).

Although this animal was not actually observed, Indians of Nevada spoke of its occurrence there, and had in their possession skins and horns said to have been obtained in the mountains.

Remains of a Moose (*Alce americana*), said to have been killed in South Park, Colorado, in 1871, were observed by the expedition. The statement is open to doubt; if correct, it fixes the southernmost limit of the species.

Genus **CARIACUS**, Gray.

CARIACUS MACROTIS, (Say) Gray.

Mule Deer; Black-tailed Deer.

Cervus macrotis, SAY, Long's Exp., ii, 1823, 88.—HARL., Fn. Amer., 1825, 243.—GODM., Amer. Nat. Hist., ii, 1831, 204.—PEALE, "Phila. Advoc. Sci., i, 1834, 11; U. S. Expl. Exped., 1848".—WAGN., Suppl. Schreb., iv, 1844, 371, partly; v, 1855, 368.—PUCHER., Arch. du Mus., vi, 1852, 369.—WOODH., Sitgr. Rep., 1854, 55.—GIEBEL, Säug., 1855, 342.—NEWB., P. R. R. Rep., vi, 1857, 68.—BAIRD, Mamm. N. A., 1857, 656, figs. 19, 20.—SUCKL., P. R. R. Rep., xii, 1859, 135.—BD., U. S. Mex. B. Surv., ii, pt. ii, 1859, Mamm., 51.—COUES, Am. Nat., i, 1868, 535.—ALLEN, Proc. Bost. Soc. Nat. Hist., xvii, 1874.—TENNEY, Man. Zoöl., 1866, 93.—COUES, Proc. Acad. Nat. Sci. Phila., 1867, 136.—ALLEN, Bull. Essex Inst., vi, 1874:

Cervus (Cariacus) macrotis, GRAY, Knowls. Men., 1850, 67; P. Z. S., 1850, 239.

"*Cervus auritus*, WARDEN."

Mule Deer, LEWIS & CLARK, i, 77.—HAYES, Am. Nat., iii, 1869, 180 (biography).

? *Cerf Mulet*, DESM., Mamm., ii, 1822, 43.

Great-eared Deer, GRIFF., Anim. Kingd., iv, 1827, 133.

Specimens.

No.	Name.	Locality.	Date.	Collector.	Remarks..
R. S. 2	<i>C. macrotis</i>	Gunnison River, Colo...	—, 1873	Northington	Cranium.
R. S. 3	.....do	(?)	—, 1873	Dr. C. G. Newberry	Do.

An abundant and generally diffused species throughout the West, but especially east of the Rocky Mountains, where it is the only Black-tailed Deer certainly known to be of regular occurrence. West of the mountains, it is associated with *C. columbianus*, the true Black-tailed Deer, an apparently distinct species.

CARIACUS VIRGINIANUS MACRURUS, (Raf.) Coues.

White-tailed Deer.

Cervus macrourus, RAF., Am. Monthly Mag., i, 1817, 436.—H. SMITH, Griff. An. Kingd., iv, 1827, 134; v, 1827, 316 (Kansas).

Cervus leucurus, DOUGL., Zoöl. Journ., iv, 1829, 330.—RICH., F. B. A., i, 1829, 258; Zoöl. Beechey's Voy., 1839, 10.—WAGN., Suppl. Schreb., iv, 1844, 375; v, 1855, 372.—PUCH., Mon. du Cerf. Arch. du Mus., vi, 1852, 322.—AUD. & BACH., Q. N. A., iii, 1853, 77, pl. 118.—NEWB., P. R. R. Rep., vi, 1857, 67.—SUCKL., P. R. R. Rep., xii, 1859, 134.—BAIRD, Mamm. N. A., 1857, 649.—COUES, Am. Nat., i, 1868, 537.—TENNEY, Man. Zoöl., 1866, 98.—STEV., U. S. Geol. Surv. Terr. 1870, 1871, 462.

Long-tailed Red Deer, LEWIS & CLARK.

Specimens.

No.	Name.	Locality.	Date.	Collector.	Remarks.
190	<i>C. leucurus</i>	San Luis Valley, Colo ...	Sept., 1873	Dr. J. T. Rothrock.	Cranium.
191 ♀	.....do .....	.....do .....	.....do .....	.....do	Do.

Observed in Colorado, where it was common in the vicinity of swampy valleys.

There is no question of the impropriety of separating this animal specifically from *C. virginianus*. The point, indeed, is whether the differences are sufficient to constitute a fair geographical race. We, however, present it provisionally as such. The above name is adopted from the *Cervus macrourus* of Rafinesque, of prior date to *leucurus* of Douglas; the two being undoubtedly synonymous. The animal is of general distribution in the West, like the true *C. virginianus* in the East, and is associated in most of its range with the very different *C. macrotis*.

CARIACUS VIRGINIANUS, var.

Dwarf Deer of Arizona.

Cervus mexicanus, BAIRD, Mamm. N. A., 1857, 653 (whether of authors?).

Cervus virginianus var. *couesi*, ROTHROCK, MSS.

No. 657, Camp Crittenden, Ariz., Sept., 1874, *Dr. J. T. Rothrock*; ♂, with horns in the velvet.—The animal to be here described is clearly of the *C. virginianus* type, as shown by the characters of the horns and tail, but is much smaller and otherwise different.

The horns, still in the velvet, but beginning to polish, and probably about full grown, are like those of *C. virginianus*, in showing a strongly curved main beam, with the tines springing from its upper border, instead of the doubly dichotomous construction witnessed in *C. macrotis* and *columbianus*. The first tine, $2\frac{1}{2}$ inches long, springs about the same distance above the burr; the next, and main tine, 6 inches long, springs midway between the first and the forking of the beam. This forking results from the approximately equal size of the main beam and distal tine (4 or 5 inches); but its lower prong is clearly seen to be the main shaft of the horn, thus carrying out completely the pattern characteristic of *C. virginianus*. The ends of the horns are only $4\frac{1}{2}$ inches apart, and about $7\frac{1}{2}$ inches distant each from the burr of its own side. The ends of the main tines are 10 inches apart; the width of the horns across at the broadest point is only about 13 inches.

The tail is like that of *C. virginianus* in form and color, but much smaller. It is broad, flat, lanceolate, and somewhat distichous. The vertebræ are only about 5 inches long (as well as can be judged from the state of the specimen), beyond which the hairs project 3 inches. The ears are shaped as in *C. virginianus*, but are smaller and only very scantily pilous outside, where the skin is in plain view; inside, they are better clothed with long flocculent hairs on the concavity itself, and a closer pilous coat on the edge and flat terminal part.

The distance from the end of the metacarpal bone to the tips of the hoof is a short 11 inches. The sole of the fore hoof is 2 inches long by $1\frac{3}{8}$ broad. The distance from the heel to the end of the hind hoofs is $15\frac{3}{4}$ inches, of which the calcaneal portion is about 3 inches, and the digital portion 4. The hind hoofs are shorter and especially narrower than the fore. Both hoofs are black, as are also the false hoofs. As well as can be determined in the dried state, the metatarsal glands are small and like those of *C. virginianus*.

The prevailing coloration of this animal, taken in September, which is still "summer" in Arizona, is a pale, dull fawn color, with a peculiar ochreous shade, brightening into clearer tawny or reddish-brown all around where the color of the upper parts joins the white of the under portions, and on

the dorsal area becoming insensibly darkened in tone by an intimate admixture of mouse-gray. On this darkened area, the color is a blended grizzle of the mouse-gray with pale fawn or nearly colorless ends of the hairs. The tail is rich reddish brown on the central field above, fringed and tipped with white, and pure white below. Some of the terminal reddish hairs have a slight blackish tipping, but the sum of this scarcely produces a noticeable effect. The fore limb inside is white throughout, and whitish all around the digits; the hind limb is perfectly white inside only above the heel, and whitish all around the digits; both sides of the metatarsus being colored. The ears are dark mouse-gray outside, bleaching at the edges; the hairs inside are pure white. The forehead is extensively dusky; the naked muffle and the abundant eye-lashes are jet black.

No. 656, ♀, collected in the same place, at the same time, shows no tangible differences in color. It is, of course, considerably smaller than the buck.

A doe, killed in May, 1855, by Dr. C. B. R. Kennerly, at San Luis Springs, which furnished Professor Baird's account of *C. "mexicanus"*, is thus described as to color: "The prevailing color of this animal is an ashy brown, pointed with light gray or dull whitish. The hairs themselves are generally light gray at the base; the terminal portion becoming of a pure brown, (without any shade of red or yellow,) darkest near the tip, where it is rather broadly annulated with light gray, clearer than at the base, and with perhaps a faint tinge of yellowish. The under surfaces are lighter; the only pure white appears to have been in the inguinal region. The tail is entirely white beneath and all round. At the base above it is gray like the back; the sub-terminal portion is whitish, with a pale rufous tinge. The bases of the hairs above, however, except perhaps at the extreme end of the tail, are dark brown, darkest toward the tip. The head, including the convexity of the ears, presents the same grayish or pepper-and-salt color of the rest of the body. The end of the muzzle is encircled by a dusky ring, passing just behind the naked muffle; this ring is quite distinct on the side of the lower jaw, but for the rest is rather obsolete, being replaced by a grayish shade. The side of the muffle on either side of the nostrils and the tip of the chin are white. There is an increased amount of light in the

mottlings of the muzzle just behind the dark band referred to, but no distinctly light ring. The under surface of the head is white."

The under jaw of the buck taken by Dr. Rothrock measures $7\frac{3}{8}$ inches from the back of the condyle to the ends of the incisors. The skull of the doe gives the following measurements:

	Inches and decimals.
Occipital condyles to apex of intermaxillaries.....	8.25
Back of mandibular condyles to ends of incisors.....	6.90
Apex of coronoid to ends of incisors.....	7.50
Height of condyle above angle of jaw.....	3.25
Width of skull across orbits.....	3.75
Interzygomatic width.....	3.50
Interparoccipital width.....	1.75
Length of nasal bones.....	2.65

Specimens.

No.	Name.	Sex.	Locality.	Date.	Collector.	Remarks.
656	<i>Cervus virginianus</i> , var..	♀	Crittenden, Ariz.	Sept. 10, 1874	Dr. Rothrock.	Skin and skull.
657	.....do.....	♂	.....do.....	.....do.....	.....do.....	Skin, skull, and horns.

This is the animal carefully described by Professor Baird in 1858 as *C. mexicanus*, Gm.; but he applied this name provisionally, remarking that there was some doubt whether it was the true *C. mexicanus* of authors or not. According to the descriptions, the *C. mexicanus*, to which is ascribed a range from Mexico to Brazil, appears to be distinct from *C. virginianus*; but the present animal is beyond doubt only a small southern form of that wide ranging species, to which it must unquestionably be referred. Dr. Rothrock's specimens fix its characters with the desired precision; but further comparisons with more material from Mexico and Central America will be required to establish its relationships to the small deer of those countries. Should it prove distinct from these, it may bear the name applied to it in Dr. Rothrock's MSS.; but at present we are indisposed to formally recognize this designation.

The foregoing account may be properly supplemented by the notice published recently by Dr. Rothrock in the "American Sportsman," which gives measurements taken in the flesh, and various interesting particulars respecting the general appearance and habits of this deer.

“During the past season, that portion of Lieutenant Wheeler’s party to which I was attached, operating in Southern Arizona, found a small deer quite abundant there. The skins obtained have not yet [i. e., had not then] reached Washington. There can be but little doubt, however, that they will prove the much desired Dwarf Sonora Deer.

“I may as well state at the outset that zoölogists are in doubt as to whether *Cervus mexicanus* (Gmelin) is a valid species, or whether it is a dwarf southern form of our common Virginia Red Deer. It is well known that such a decrease in size as we proceed south is not unusual among mammals. Notwithstanding this fact, I am inclined to think the deer in question will yet prove distinct from the Red Deer. This, however, is a matter for zoölogists to settle.

“Taking the longitude of Mount Graham and going south from this point to the boundary between Arizona and Sonora, we find it nowhere rare, and in some places quite common. It ranges as far north as the valley of the Gila River, and may, indeed, reach a point still farther north; but it is evidently supplanted in the White Mountains of Arizona by the ordinary White-tailed Deer. I find in the volume already cited, the range of *Cervus mexicanus* given as “the Gadsden line” on the north, and the woody mountain region south as far as the city of Mexico, or a range just such as we might expect for the deer of our collection. There is, however, a slight discrepancy in the measurements of Dr. Kennerly and myself; his *doe* weighing “not over seventy pounds”, while the largest of three does shot by myself did not exceed sixty, and the smallest adult doe (whose udder was distended with milk) would hardly reach forty pounds. I did shoot one large and very poor doe, weighing nearly ninety pounds; but this was so evidently an ordinary White-tail, that I do not include it in what I may say regarding the smaller form. Neither of two fat, four-prong bucks that I killed exceeded seventy pounds in weight. The measurements taken by me will suffice to show that there is a much less difference in height between our deer and the Dwarf Deer than there is in girth. In fact, the latter is much more light and airy in all its movements. It stands up so well, however, that the hunter, shooting at it for the first time, might readily enough take it to be the Virginia Deer. On cutting the meat from the bones preparatory to jerking

it, I found that all we obtained from a doe would go into a small camp-kettle.

“A very fat four-pronged buck taken by myself gave the following measurements :

	<i>Inches.</i>
From tip of nose to between eyes	6
From tip of nose to between horns	10
From butt to tip of horns (following curve)	13
Length of longest antler	7
From horns to interscapular hollow	15½
From interscapular hollow to root of tail	25
From root to tip end of hair of tail	9
From top of rump to hind-toe tip	35½
From top of shoulder to tip of fore toe	32
Around chest at ensiform cartilage (animal eviscerated)	33
Around loins (animal eviscerated)	25¼
Heel to tip of toe	15½
Top of rump to heel	19¾
Between inner angle of eyes	4
Length of ears	7¾

“August 28, I shot an adult doe that had no fawn, and was therefore in good condition. The following are her measurements; her weight was not over fifty-five pounds :

	<i>Inches.</i>
Nose to eye	6
Nose to top of head	8
Ears to interscapular hollow	12
Interscapular hollow to root of tail	21
Root of tail to extreme tip	9¼
Top of rump to tip of hind toe	33
Interscapular hollow to tip of fore toe	28
Heel to tip of hind toe	12
Between inner angles of eyes	2½
Length of ears	7
Around chest at ensiform cartilage	27
Around loins	19¼

“Turning now to a more popular side of the subject, I may say that nowhere else in North America have I seen deer more abundant than these Dwarf Deer were in Southern Arizona, nor have I anywhere more thoroughly enjoyed the sport of hunting them. True, it was unsportsmanlike to shoot down a doe that it was morally certain had a fawn secreted in some clump of bushes near by; but then it was done partly in the interest of science, and

partly because, in the absence of other fresh meat, we were obliged to do so. Either reason will probably be sufficient to justify the act, and, with these extenuating circumstances in our favor, the sport was the same as we should have had a month or so later.

"I would here incidentally remark that while the meat was drying, immense numbers of the common "blow-flies" were attracted to the neighborhood of the camp, and, in default of some better place to deposit their surplus eggs, would place incredible numbers of them in any fold of our blankets that afforded a sufficiently dark location. In fact, so regularly and systematically was this done that we were obliged to make compact bundles of our blankets during the day to exclude the flies.

"On the lower grounds (which at one time was a uniform slope from the foot of the Santa Rita Mountains eastward, but now is everywhere intersected by small cañons worn out by the action of water), beautiful clumps of Emory's Oak were sparsely scattered over the surface, affording sufficient shade to make the intense heat tolerable, and yet were not dense enough to intercept a good shot, either running or standing. In each of these numerous cañons, a small stream of pure mountain water came tumbling from rock to rock, over precipice into chasm, and everywhere churning itself into foam; while, on the banks, luxuriant clumps of willow and scrub oaks alternated with sweet, nutritious gramma grass; thus making numberless retreats in which the deer might find shade, hiding places, and abundant food. In such places, the does, with their families, were usually found in August, during the heat of the day. The bucks, however, ranged from the foot to the top of the Santa Rita Mountains; thus taking in an altitude of from three to four thousand feet greater, having less heat to endure, and withal a greater security from stray hunters. They were found in great numbers among the rocks and conifers of this higher range, and obtained abundant food in the shorter bunch grasses and the tender twigs of the under-brush. In August, I found their kidneys covered with fat.

"A year previous to my visit, a buck had been wounded in the left fore leg, about the elbow. The lower part of the leg had sloughed off, and in this condition the animal was frequently seen by the hunters. He was finally killed during my stay, and on examination it was found that the stump of

the leg had perfectly healed, and been so constantly used by the Deer when he was moving along the hillside that it had become as hard and leathery as the foot of a bear. This specimen will eventually be deposited in the Army Medical Museum at Washington.

“As a rule, it was easy to get within fair shooting distance of the game. This was due, not more to the conformation of the ground, than it was to the unsuspecting nature of the deer themselves. In fact, they were in this so unlike the Virginia Deer, that their general expression was rather that of curiosity and surprise, than fear at the approach of the hunter. Part of this may have been due to the fact that years ago the continual raids of the most relentless band of Apaches have driven out the Mexican civilization, which the stone irrigating ditches show had existed there, and that of late the Indians themselves had been excluded from the ground. In the short interval of tranquility, but few whites have come in. This then allowed the deer to multiply and become moderately tame, as indeed they usually do when very abundant. Number appears to give them a sense of security. In fact, any hunter who has the least instinct in approaching game may always get within fifty yards, and have a fair standing shot. It was not uncommon to find (as early as August), small bands of three or four deer; and on such occasions the hunter might generally have killed most or all of them. They usually went to water and in search of food *later* in the morning, and *earlier* in the evening, than the Virginia Deer, and not seldom were found busily feeding at noon.”

MONODELPHIA INEDUCABILIA.

CHIROPTERA.

In this order, we shall give the characters of the species and higher groups. The suborders and families may be readily determined by the following analysis; the features being subsequently worked out in greater detail:

I. ISTIOPHORA.

Bats with upright appendage on nose PHYLLOSTOMATIDAE

II. GYMNORHINA.

Bats without upright appendage on nose.

- A. Nostrils circular; wing-membranes narrow; tail either much longer or shorter than interfemoral membrane.....NOCTILIONIDAE.
- B. Nostrils subelliptical; wing-membranes ample; tail inclosed in interfemoral membrane; the final joint only in some instances exerted VESPERTILIONIDAE.

FAM. PHYLLOSTOMATIDAE.

Leaf-nosed Bats.

CHARS.—Rostrum surmounted by an upright appendage. This expression, though not diagnostic of the family among all its allies, distinguishes our representative from other North American bats.

Genus **MACROTUS**, Gray.

Macrotus, GRAY, Proc. Zool. Soc., 1843, 21.—ALLEN, Monog., 1.

CHARS.—Teeth: I., $\frac{2-2}{2-2}$; C., $\frac{1-1}{1-1}$; P., $\frac{2-2}{3-3}$; M., $\frac{3-3}{3-3} = \frac{16}{18} = 34$. Skull papery, with inflated cranial and tapering rostral portion and slight sagittal crest. Nose-leaf simple, erect, acuminate, triangular. Under lip cleft. Ears large, joined. End of tail exerted beyond interfemoral membrane.

MACROTUS WATERHOUSII, Gray.**Leaf-nosed Bat.**

Macrotus waterhousii, GRAY, Proc. Zool. Soc. Lond., 1843, 21.

Macrotus californicus, BAIRD, Proc. Phila. Acad., 1858, 117; Rep. Mex. B. Surv., 1859, ii, 4, pl. i, f. 2.—H. ALLEN, Monog., 3.—COUES, Am. Nat., i, 1867, 283.

Macrotus mexicanus, DE SAUSSURE, Rev. Mag. Zool., 1860, 486.

"*Megadermatidæ*, sp.?", J. A. ALLEN, Bull. Mus. Comp. Zool., iii, 175.

CHARS.—Central upper incisors large, chisel-shaped; the lateral small, pointed, converging; canines small, simple; anterior premolar thin, compressed, unicuspid, with small posterior basal snag; lower incisors crowded, obscurely trilobed; canines with basal snag; first and second premolars with basal ridge. Head long; face hairy; head nearly naked behind junction of the ears; eyes rather large, almond-shaped; nose-leaf acuminate, higher than broad; ears very large, oval, sparsely hairy, joined by a membrane. Tragus lanceolate; not quite half as high as auricle. Under lip cleft. Thumb slender, long. End of tail exerted. Heel large. Wing-membrane reaching ankle. Color grizzled or watered—the fur indistinctly tricolor—at base white, then fawn; at the tips gray on the upper parts of the body; white below. Length to end of tail, $3\frac{1}{4}$ –4 inches; expanse, 10–11; tail, $1\frac{1}{4}$ – $1\frac{3}{8}$; ear, about 1 high; fore-arm, $1\frac{1}{3}$ –2; shin, $\frac{2}{3}$ – $\frac{4}{5}$; nose-leaf, $\frac{1}{5}$ high.

HABITAT.—West Indies, Mexico, and southern border of the United States.

No species of this genus appears to have been recorded from the United States until Professor Baird described his *M. californicus*, based upon specimens procured at Fort Yuma, Cal., by Maj. G. H. Thomas, United States Army. Many others from Lower California, taken by Mr. J. Xantus, were subsequently noticed by Dr. H. Allen under the same name. There is little, if any, doubt, however, that this species is the same as the well-known West Indian *M. waterhousii*. The only tangible distinction noted by Dr. Allen is the color of the central portions of the hair—"fawn" instead of "dark brown"—and this may readily have arisen from conditions of alcoholic preservation or other circumstances. This identification is probably confirmed by Mr. J. A. Allen's discovery of a megadermatoid bat in Florida—the first noted from our Atlantic region. It is difficult to find any tangible specific characters in the *M. mexicanus* of De Saussure, after the careful consideration of his article we have made.

FAM. NOCTILIONIDÆ.

Free-tailed Bats.

Rostrum unappendaged. Nostrils circular. Alar membranes narrow, deeply excised. Tail much longer or much shorter than femoral membrane.

The typical *Noctilionidines* differ in figure remarkably from our ordinary bats, owing to the narrowness of the wings and the immense extent of the femoral membrane, which far surpasses the tail; the free tip of the latter resting against the parachute. The following genus, however, does not show these latter peculiarities.

Genus NYCTINOMUS, Geoffroy.

Nyctinomus, ET. GEOFFROY, Hist. Nat. de l'Égypte, 1814, ii.—IS. GEOFFROY, Ann. des Sc. Nat., 1824, i, 337.—CASTELNAU, Expl. d'Amér., Mammif., pl. xii, f. 2.—DE SAUSSURE, Rev. et. Mag. Zoöl., 1860, 283. —ALLEN, Monog., 5.

CHARS.—Teeth: I., $\frac{1-1}{2-2}$; C., $\frac{1-1}{1-1}$; P., $\frac{2-2}{2-2}$; M., $\frac{3-3}{3-3} = \frac{14}{16} = 30$. Upper incisors convergent but separate; first premolar minute, second with a sharp inner cusp; lower incisors sharp, bilobed, crowned; lower canines slender, cusped; lower premolars of equal size, unicusped. Skull inflated, crestless, papery; rostrum large. Snout broad, prominent, piggish; lips thick, pendulous, furrowed; ears (in following species) united over the vertex; tragus broad, obtuse, squarish. Great toe apart from the others. Tail exerted beyond femoral membrane nearly half its length.

This genus belongs to the molossoid group of the family, but is at once distinguished from the large American genus *Mollossus* by having 2-2 instead of 1-1 upper premolars; furrowed instead of smooth lips; well developed tragus instead of a mere point of integument; large joined ears instead of moderate separate ones, etc. We have a single species of the genus, which is extensively distributed, not only in America, but in Africa and Australia.

NYCTINOMUS NASUTUS, (Spix) Tomes.

Snouty Bat.

Molossus nasutus, SPIX, "Sim. Vesp. Bras., 1823, 60, pl. 35, f. 7."

Dysopes nasutus, TEMMINCK, Mon. Mam., i, 1827, 233.—*Id.*, Zoöl. Journ., iii, 1828, 459.—

WAGN., Suppl. Schreber, i, 1844, 474; v, 1855, 711.—SCHINZ, Syn., i, 143.

Nyctinomus nasutus, TOMES, Proc. Zoöl. Soc., 1861, 68.—H. ALLEN, Monog., 7.—J. A.

ALLEN, Bull. Mus. Comp. Zoöl., ii, 174.

Nyctinomus brasiliensis, IS. GEOFFROY, Ann. Sci. Nat., i, 1824, 337, pl. 22; Zoöl. Journ.,

i, 1825, 133; Feruss. Bull. Sci. Nat., ii, 1824, 74.

Nyctinomus murinus, GRAY, MSS.—GRIFFITH, An. King., v, 1827, 66, No. 187.

Dysopes naso, WAGN., Suppl. Schreb., i, 1840, 475.

Nycticea cynocephala, LECONTE, Cuv. An. King. (McMurt. ed.), i, 1831, 442 (S. Car.).

Khinopoma carolinensis, GUND., Arch. Naturg., 1840, 358, *nec* Geoff.—LECONTE, Proc.

Phila. Acad., 1855, 437 (*not of* Geoffroy).

Molossus cynocephalus and *M. fuliginosus*, COOPER, Ann. Lye. N. H., iv, 1837, 65, 67,

pl. iii, figs. 1-4.—WAGN., Suppl. Schreb., v, 1855, 714.

Nyctinomus mexicanus, DE SAUSS., R. M. Z., xi, 1860, 283.

CHARS.—To the generic characters already given may be added: Fur thick, short, and soft, above dark fawn with whitish bases of the hairs, below delicate fawn with ashy bases. It is almost entirely confined to the body, but extends one-third way up the back of the ears, and forms an interbrachial patch on the wing-membrane. Length, $3\frac{1}{4}$ – $3\frac{3}{4}$; expanse, 10–11; tail alone, $1\frac{1}{4}$; fore-arm, $1\frac{2}{3}$; shin, $\frac{1}{2}$; longest finger, 3; ear, about $\frac{1}{2}$.

HAB.—Tropical and warm temperate America from the Southern United States to Chili and Buenos Ayres.

This is a widely distributed species, which, as seen by the above synonymy, has been redescribed under a variety of names, generic and specific, all of which, however, only refer to a single animal. In this country, it is ascertained to occur from South Carolina to Texas and in California. It also inhabits Mexico, the West Indies, Central America, and various parts of South America. Its peculiar physiognomy, only less singular than that of the Leaf-nosed Bat, renders it unmistakable.

FAM. VESPERTILIONIDÆ.

Ordinary Bats.

CHARS.—Rostrum unappendaged, *or* with lateral fleshy excrescences. Alar membranes ample. Tail completely inclosed in the femoral membrane, or only its last joint exerted.

The foregoing is a partial expression of the characters of our largest family of bats, to which all our remaining species belong; it readily distinguishes them collectively from either of the foregoing. The species of *Corynorhinus* is immediately recognized by the curious excrescences on the chaps and the big leafy ears; the other genera we adopt rest mainly upon dentition. In our generic arrangement, we differ somewhat from Dr. Allen, considering certain changes desirable; as we do also in the number of species we think proper to admit, being satisfied that a material reduction is necessary.

Analysis of North American VESPERTILIONIDÆ.

I. Cheeks excrescent; ears immense, etc.:

Genus CORYNORHINUS.

II. Cheeks simple:

a. Incisors, $\frac{1-1}{2-2}$ Genus ANTROZOUS.

b. Incisors,* $\frac{1-1}{3-3}$ Genus ATALAPHA —Molars, $\frac{4-4}{5-5}$ —Subg. *Nycticejus*.

Molars, $\frac{5-5}{6-6}$ —Subg. *Lasiurus*.

c. Incisors, $\frac{2-2}{3-3}$ Genus VESPERTILIO—Molars, $\frac{4-4}{5-5}$ —Subg. *Vesperus*.

Molars, $\frac{5-5}{5-5}$ —Subg. *Vesperugo*.

Molars, $\frac{5-5}{6-6}$ —Subg. *Vesperides*.†

Molars, $\frac{6-6}{6-6}$ —Subg. *Vespertilio*.

Genus CORYNORHINUS, Allen.

Synotus and *Plecotus* of some authors; not *Synotus* of KEYS. and BLAS., Wiegmann's Arch., 1839.

Corynorhinus, H. ALLEN, Proc. Acad. Phila., 1865, 173.

CHARS.—Teeth: I., $\frac{2-2}{3-3}$; C., $\frac{1-1}{1-1}$; P. and M., $\frac{5-5}{6-6} = \frac{16}{20} = 36$. Upper incisors separated at middle line, the centrals larger than laterals; both canines with minute

* Incisors of the *adult* dentition; the young are stated to have $\frac{2-2}{3-3}$.

† Cones, new subgenus.

basal cusp; under incisors minutely serrate. Cheek with excrescence continuous with inner border of ear. Skull rather large; cranium inflated, with protuberant frontal portion. Rostrum depressed; no occipital crest. Ear very large, with exterior border extended as a semicircular flap as far as the tragus, which is well developed, half as high as ear, with well marked basal lobe. Differs from *Plecotus*, its European ally, in absence of a tongue-shaped appendage at base of inner border of ear.

CORYNORHINUS MACROTIS, (LEC.) Allen.

Big-eared Bat.

Plecotus macrotis, LECONTE, McMurtrie's Cuv., app., 1831, 431.

Synotus macrotis, ALLEN, Monog., 63.

Plecotus leontii and *P. townsendii*, COOPER, Ann. Lyc. N. Y., 1837, iv, 72, 73.

Synotus leontii and *S. townsendii*, WAGNER, Schreber's Säug., 1855, v, 720.

Synotus townsendii, ALLEN, Monog., 65.

Corynorhinus macrotis, ALLEN, Proc. Phila. Acad., 1865, 173.

CHARS.—Hair long, fine, and soft, extending moderately on the face; at base of ear, running up the inner border of ear as a delicate line, and sparsely out on back of foot; femoral membrane and base of thumb naked; nostrils almost lateral; lips thin, compressed. Head flat, not very broad; facial profile rising to level of nostrils. Fur above dark at base—almost blackish, at tips more brownish; below similar, but with grayish tips running to whitish toward the pubis. Total length, $3\frac{1}{2}$ – $3\frac{3}{4}$; expanse, 9–11; tail, $1\frac{2}{3}$; fore-arm, $1\frac{2}{3}$; shin, $\frac{2}{3}$; longest finger, $2\frac{1}{2}$ – $2\frac{2}{3}$; ear, 1 or more high.

HAB.—As restricted by Dr. Allen, this species is only known to occupy the Southern States, from the Carolinas to Mississippi, with a probability, as noted, of its occurrence northward to Meadville, Pa. (see Monog., 64, in text). But if, as we have no doubt, the *S. townsendii* of the author mentioned is the same species, the range includes the Upper Missouri region and the Great Basin, and doubtless extends across intermediate ground, as well as into New Mexico and Arizona.

Genus ANTROZOUS, Allen.

Antrozous, ALLEN, Proc. Phila. Acad., 1862, 247; Monog., 66.

CHAR.—Teeth: I., $\frac{1-1}{2-2}$; C., $\frac{1-1}{1-1}$; M., $\frac{4-4}{5-5} = \frac{12}{16} = 28$; thus unique in possession of only 4 under incisors (as in the family *Phyllostomatidae*). Upper incisors large, pointed, with median diastema; lower incisors trilobate, the middle ones in advance of the lateral pair; no small upper premolar; lower canine with strong salient acute basal cusp. Skull long, with greatly declining profile, but little or no frontal depression, crested behind. Snout tumid, blunt. Nostrils apical, their outer borders united above by a transverse line; eyes large; ears longer than head, separate. One known species.

ANTROZOUS PALLIDUS, (LeC.) Allen

The Pale Bat.

Vespertilio pallidus, LECONTE, Proc. Acad. Phila., 1855, 43.—BAIRD, Mex. B. Surv., ii, pt. ii, 1859, pl. 1, f. 1.

Antrozous pallidus, ALLEN, Monog., 68.—COUES, Am. Nat., 1867, 283.

Specimens.

No.	Name.	Locality.	Date.	Collector.	Remarks.
W	<i>Antrozous pallidus</i>	Pueblo, Colo	Oct., 1874	W. D. Wheeler.	
611A	.....do	Apache, Ariz.	June 4, 1873	H. W. Henshaw.	

CHAR.—Ears ample, elliptical, with strongly convex inner border; outer border ending remote from angle of mouth; furred at base behind and slightly on both sides of inner border. Tragus half as high as auricle, lanceolate, nearly straight on anterior border, enlarged and crenulate posteriorly. A wart over the eye, under the jaw, and behind angle of mouth. Interfemoral membrane naked; base of thumb slightly hairy. Colors yellowish-brown or fawn, even pale reddish-brown. Naked muzzle livid. Nose to end of tail, $3\frac{1}{2}$ –4; expanse, $10\frac{1}{2}$ –12; tail, $1\frac{3}{8}$ –2; fore-arm, about 2; shin, $\frac{2}{3}$ – $\frac{4}{5}$; longest finger, 3 – $3\frac{1}{2}$; ear, $\frac{3}{4}$ – $1\frac{1}{8}$.

HAB.—Originally described from “California.” The known range of this species has since been extended through Arizona and New Mexico to Texas; also, down the coast to Cape Saint Lucas and up to Oregon.

The only record of the habits of this peculiar bat of which we are aware is that given by Dr. Coues in the American Naturalist, as above quoted, he having observed it during his stay at Fort Yuma in 1865: “This species is very abundant at Fort Yuma, where, during the hot months, it becomes a decided nuisance. Numbers take up their abode in the chinks and crannies of the officers’ quarters; and the proximity of these retreats actually becomes offensive from the multitudes crowded together. During the daytime, a continual scratching and squeaking, as of so many mice, is heard in their snuggeries; and, at night, they are even more annoying, fluttering by scores about the rooms. They are accused of harboring bed-bugs about their bodies, whether justly or not I cannot say. When caught or disabled, they have a harsh squeak, and, if incautiously handled, bite with vigor and considerable effect. This bat, as its name indicates, is much lighter in color

than most of our species; and it has also a peculiar physiognomy, more repulsive and forbidding than is usual even in this family, none of the members of which have remarkably prepossessing features."

Genus ATALAPHA, Rafinesque.

Atalapha, *Nycticejus*, *Lasiurus*, RAFINESQUE.

Nycticejus et *Lasiurus*, ALLEN, Monog., 11, 14.

CHAR.—*Adult* dentition: I., $\frac{1-1}{3-3}$; C., $\frac{1-1}{1-1}$; M., $\frac{4-4}{5-5}$ (subg. *Nycticejus*) or $\frac{5-5}{5-5}$ (subg. *Lasiurus*) = 30 or 32 teeth. The variable tooth is the anterior premolar, absent in *Nycticejus*, present in *Lasiurus*, but minute and liable to be overlooked, hidden as it is by approximation of the next premolar to the canine.

By the foregoing expression, we wish to indicate and limit a group of bats agreeing in the lack, when adult, of median upper incisors, and thus differing from all the succeeding species we unite under *Vespertilio*. Their only dental discrepancy is the slight one mentioned, which may be held to constitute a subgenus. The several species here united (referred by Allen to the two genera *Lasiurus* and *Nycticejus*) differ considerably among themselves in the depression, massiveness, and other proportions of the skull, and consequently in their physiognomy, as well as in the degree of hairiness or nakedness of femoral membrane; but, as they are variously interrelated in these points, which, moreover, are not strictly correspondent with dentition, it becomes difficult, if not impossible, to draw a generic line between them. Among Rafinesque's names, we adopt *Atalapha*, which, he says, contains "bats without fore teeth" (*i. e.*, lacking the middle upper incisors)—an expression, it is true, not accurate, but still intelligible; and, in the case of this writer's work, we have generally to choose between inaccuracy and unintelligibility, excepting when what he says is *both* erroneous and enigmatical.

NOTE.—The "*Lasiurus intermedius*" of ALLEN, Proc. Phila. Acad., 1862, 146, and Monog., 25, from Matamoras, Mex., will doubtless be found within our limits. It appears to be perfectly distinct from any of the species here described, and to form a connecting link between some of the subgeneric, if not generic, groups. "In size, physiognomy, number of incisors, and character of the distribution of the fur, it resembles the type of *Lasiurus*; while, in shape of the ears and disposition of the molars, it is akin to" the *Vesperus* section of *Vespertilio*. But has not Dr. Allen overlooked the fact that its molar dentition ($\frac{4}{5}$) also corresponds with *Nycticejus*, with which we believe, judging solely from the description, it must be placed, as ATALAPHA (NYCTICEJUS) INTERMEDIUS?

ATALAPHA (NYCTICEJUS) CREPUSCULARIS, (LeC.) Coues.

Twilight Bat.

Vespertilio crepuscularis, LECONTE, McMurtrie's Cuv., i, 1831, 432, and Proc. Phila. Acad., vii, 1855, 433.

Nycticejus crepuscularis, ALLEN, Monog., 12.

Vespertilio creeks, F. CUV., Nouv. Ann. Mus., i, 1832, 18.

CHAR.—Teeth only 30 in all (molars, $\frac{4}{5}$); upper incisors small, slightly convergent, close to canines, which are large, simple; front molar longer and slenderer than the rest. Skull not so flat as in *Vesperus* and *Vesperugo*, yet not so inflated as in *Lasiurus*; longer and more pointed than in *Lasiurus*. Head short, broad, flat; ears small, simple, widely separated; internal border at base strongly curved, outer rather inconspicuous; tragus straight on inner, convex on outer border. Nostrils simple, not produced, very little emarginate. Cheeks tumid. A rather large naked chin space. Eyes small, with a wart above on either side; another between ear and angle of mouth. Interfemoral membrane not hairy, triangular, moderately ample; calcaneal spur slight; tip of tail exserted. Membranes blackish-brown; face black. Fur rather scanty, woolly; excepting a small patch at base of the interfemoral, the membranes are naked both sides. Back lower third of ear hairy. Hairs on upper parts dark fawn for upper half, lower half lighter, bordering on brown; color of the lower parts lighter and more uniform, very plumbeous at base, light brown at tips of the hairs. General expression of species of *Vesperus* and *Vesperugo*, but the naked parts blackish. Length to end of tail, $3\frac{1}{4}$; expanse, $7\frac{1}{2}$ – $9\frac{1}{2}$; tail, $1\frac{1}{3}$; arm, $1\frac{1}{3}$; shin, $\frac{1}{2}$; longest finger, $2\frac{1}{4}$ – $2\frac{3}{4}$; ear under $\frac{1}{2}$.

HAB.—Has been observed from Pennsylvania and Missouri to Georgia and Texas, and doubtless also occurs in New Mexico.

ATALAPHA (LASIURUS) NOVEBORACENSIS, (Erxl.) Coues.

The Red Bat; New York Bat.

Vespertilio noveboracensis, ERXLEBEN, Syst. Anim., 1777, 135.—HARLAN, Fn. Am., 1825, 20.—GODMAN, Am. Nat. Hist., i, 1831, 68, pl. —, f. 1, 2.—COOPER, Ann. Lyc. N. Y., 1837, 57.—DEKAY, Nat. Hist. N. Y., 1842, 6, pl. ii.—LECONTE, Proc. Phila. Acad., 1855, 432.

Nycticejus noveboracensis, LEC., McMurtrie's Cuv., 1831, 432.

Lasiurus noveboracensis, TOMES, Proc. Zool. Soc., 1857, 34.—ALLEN, Monog., 16.

Vespertilio lasiurus, GMELIN, S. N., 1788, 50.

Nycticejus lasiurus, WAGNER, Suppl., Schreb. v, 1855, 772.

Vespertilio rubellus, BEAUVOIS, Cat. Peale's Mus., 1796.

Vespertilio villosissimus, GEOFFROY, Ann. Mus., viii, 1806, 478.

Vespertilio monachus and *tesselatus*, RAFINESQUE, Am. Month. Mag., iv, 1817, 445.

Taphyzous rufus, HARLAN, Fn. Am., 1825, 23.

Vespertilio rufus, WARDEN, Descr. U. S., v, 602.

Lasiurus rufus, GRAY, List Mamm. Br. Mus., 1843, 32.—GOSSE, Nat. in Jam., 1851, 280.

Vespertilio blossevillii, LESS. et GARN., Bull. Sc. Nat., viii, 95.

Vespertilio bonariensis, LESS., Voy. Coq., 1829, p. —.

Nycticejus varius, POEPPIG, Reise Chili, i, 1835, 451.

Red Bat, WILSON.

New York Bat, PENNANT.

CHAR.—Teeth, 32 (molars, $\frac{5}{2}$); anterior upper premolar minute, hidden from view externally, being wedged in between the next premolar and canine; upper incisors small, strongly convergent; lower ones crowded; lower canines pointing backward; front and next under premolars distinct. Skull small, with broad cranial and high occipital regions. Tail entirely included in femoral membrane. Head and face hairy; nose blunt, rounded, slightly emarginate, with semilateral nostrils. Ears subcircular; inner border straight to near the top, where suddenly curved, its base with a strong lobe close to but behind the tragus; outer border with a sharp lobe reaching angle of mouth; a small, bristly wart interposed; tragus half as high as auricle, straight on inner border, but end obtuse and abruptly turned; back surface of auricle furred half way up. Wings extensively furry here and there—the general fur extending upon the membranes on either side to the base of the third finger; a sparse growth on the interbrachial portion; a conspicuous white or whitish tuft at the shoulder; a scattering growth on the back of the fifth finger for about a third of its length, sometimes extending between the fourth and fifth fingers; and a whitish tuft at the base of the thumb. Upper surface of femoral membrane completely and densely furry, like the back; under surface of same furred about half way out from the pubis. Fur everywhere long and silky; each hair at base dark plumbeous, verging to black, then yellowish-brown, passing into a darker or a brighter reddish, or even chocolate, generally white at the tip. Lips and ears *not* edged with black. Length about $3\frac{3}{4}$, of which tail is $1\frac{3}{4}$ –2; extent, $10\frac{1}{2}$ –12; arm, $1\frac{2}{3}$; shin, $\frac{3}{4}$; longest finger, $3\frac{1}{2}$; ear, $\frac{1}{2}$ – $\frac{1}{2}$ high.

HAB.—Abundantly and universally distributed throughout the temperate portions of North America.

This pretty species will be immediately recognized from any excepting the next by its “redness”, together with the dense furriness of the top of the leg-membrane and extensive patches of fur on the wings. Specimens, however, vary much in color, as has been noted by Dr. Allen, and more completely described by Mr. Allen, who has found that some sexual distinctions are usually pronounced. “In some specimens, the terminal band (on individual hairs) of whitish is quite absent, particularly on the anterior part of the body; the subterminal bright red zone being thus continuous to the tips of the hairs. In other specimens, the terminal band of white is developed to a great degree, so as to very much obscure the red or dark chocolate zone beneath. Such specimens strongly approximate to what is called the Hoary Bat, where the terminal white zone reaches its maximum of development, and the subterminal russet zone its greatest intensity. In

a series of about twenty Massachusetts skins, all the males are of a beautiful bright yellowish-red, with scarcely a trace of the apical white; the females, though somewhat more variable, are darker, the light red of the males being replaced in these by dark russet, which is more or less obscured by the whitish tips." The same author continues respecting other points:

"Very little appears to be known respecting the time of copulation or period of gestation of the bats. From Mr. J. G. Shute, of Woburn, Mass., I learn a fact in reference to this point. Soon after sunset one evening in October, he observed a strange object pass him in the air, which seemed to fall to the ground not far from where he was standing. Repairing immediately to the spot, he soon found it, which proved to be a pair of these bats *in coitu*. They were captured and thrown into alcohol, and thus forwarded to the Museum of Comparative Zoölogy." Aërial venery is doubtless practiced by other species, as it is by some birds, like the well-known Chimney Swift for instance.

In most portions of the United States, the Red Bat is one of the most abundant, characteristic, and familiar species, being rivaled in these respects by the Little Brown Bat alone. It would be safe to say that, in any given instance of a bat entering our rooms in the evening, the chances are a hundred to one of its being either one or the other of these two species. The perfect noiselessness and swiftness of its flight, the extraordinary agility with which it evades obstacles—even the most dexterous strokes designed for its capture—and the unwonted shape, associated in popular superstition with the demons of the shades, conspire to revulsive feelings that need little fancy to render weird and uncanny. But the bat is no ghost; on the contrary, a substantial, compact little creature of flesh and blood, much like a mouse with wings, completely animal to the tips of its ears and tail; an erratic yet busy little hunter for insects, out on the fly after bugs, attracted to our apartments not by the light as some suppose, but simply in pursuit of its prey, which is attracted by the light. When captured, which may not be until far on in a breathless attack with brooms, tongs, and hats, during which the furniture is upset and the lamp perhaps put out, the little animal will be found a reddish, furry, flat creature, with membranes of exquisite delicacy, folded on each side like half of a tiny umbrella, of

which the tremendous long fingers are the sticks; humpy about the shoulders, sloping down to a furry expanse behind, with a piggish little head, twisting all ways at once, on a stumpy neck; mouse-like ears, standing straight up; funny, little, snapping, black specks of eyes; and an "open" countenance indeed—for the mouth is deep, bristling with fine needle-like teeth, while from the throat comes a sharp squeaky barking of anger and perhaps defiance, if we can suppose such a pigmy to have so great a soul. Such is the simple creature that excites emotional persons to fancies not wholly lacking an element of terror; and the utmost damage it could do the clumsy giants, its captors, would be a prick from its tiny teeth—pretty sure to be given to an incautious finger-tip.

An anecdote illustrating a tender trait of this animal has been related by Mr. Titian Peale. A person had caught and taken home a young Red Bat. "Three hours afterward, in the evening, as he was conveying it to the museum, in his hand, while passing near the place it was caught, the mother made her appearance and followed the boy for two squares, flying around him, and finally alighted on his breast, such was her anxiety to save her offspring. This faithful creature lived two days in the museum, and then died of injuries received from her captor. The young one, being but half grown, was still too young to take care of itself, and died shortly after."

ATALAPHA (LASIURUS) CINEREUS, (Beauv.) Coues.

The Hoary Bat.

Vespertilio cinereus, PALISOT DE BEAUVOIS, Cat. Peale's Phila. Mus., 1796, 14.—LECONTE, Proc. Phila. Acad., 1855, 433.

Lasiurus cinereus, H. ALLEN, Monog., 21.—J. A. ALLEN, Bull. Mus. Comp. Zoöl., ii, 208.

Vespertilio pruinosus, SAY, Long's Exp. R. Mts., 1823, 67.—HARL., Fn. Am., 1825, 21; Med. & Phys. Res., 1831, 28.—GODM., Am. Nat. Hist., i, 1831, 68, pl. 2, f. 3.—RICH., F. B.-A., i, 1829, 1.—COOP., Ann. Lyc. N. Y., iv, 1837, 54.—DEKAY, N. Y. Fn., i, 1842, 7, pl. 2, f. 2.

Scotophilus pruinosus, GRAY, Mag. Zoöl. Bot., ii, 1838, 498.

Nycticejus pruinosus, TEMM., Mon. Mamm., 1835, 154.—WAGN., Suppl. Schreb., i, 1840, 544; v, 1855, 770.

Lasiurus pruinosus, TOMES, P. Z. S., 1857, 37.

CHARS.—Dentition and other structural characters precisely as in the last species. Size averaging larger; length, 4–5½ inches; tail alone, 2–2½; extent, 10–15, but usually

12-14; arm, 2; longest finger, $3\frac{2}{3}$ - $4\frac{1}{3}$; ear, $\frac{1}{3}$ - $\frac{1}{2}$. Lips and ears marked with black; body colors rich chocolate brown, or smoky fawn color, overlaid with white, giving a brilliant "hoary" appearance.

HAB.—North America at large.

Some reasonable doubt has been expressed respecting the specific distinctness of this species and the last; but further comparison will be required to prove it only a variety. Though very generally distributed, it appears to prefer higher latitudes and more elevated regions, and is the only bat known to occur in the northern regions visited by Kennicott. We have, however, been favored with a specimen from the southern deserts of Arizona, where it was taken by Lieut. C. Bendire, U. S. A. It is comparatively rare. Dr. Allen writes us that he has only seen some twenty or thirty specimens in all.

Two specimens were secured in Thistle Valley, Eastern Utah, by the expedition of 1872.

This species, since Mr. Say described it, in Long's Report of Expedition to Rocky Mountains, has generally been known under the name of *V. pruinosus*; but Major LeConte corrected the error, and ascribed to Palisot de Beauvois the prior name of *V. cinereus*, to which it was entitled. Dr. Allen assents to the determination.

Specimens.

No.	Name.	Locality.	Date.	Collector.	Remarks.
A 4	<i>V. cinereus</i>	Thistle Valley, Utah ..	Aug., 1872	H. W. Henshaw..	
A 4 a	.....do .....	.....do .....	.....do .....	.....do	

Genus *VESPERTILIO*, (L.) Auct.

Vespertilio, L., of AUTHORS.

Scotophilus, LEACH, Trans. Linn. Soc., xiii, 1822, 71.—ALLEN, Monog., 27.

Vesperus, KEYS. & BLAS., Wirb. Eur., 1840, 49.

Vesperugo, *Iid.*, *ibid.*, 45.

Vesperides, COUES, *antea*.

CHARS.—Incisors, $\frac{4}{6}$; molars, $\frac{4-4}{5-5}$ or $\frac{5-5}{5-5}$ or $\frac{5-5}{6-6}$ or $\frac{6-6}{6-6}$; teeth, in all, 32, 34, 36, or 38.

This dental formula sufficiently indicates a generic section that may, without violence, include all the remaining species of North American Bats.

They are collectively distinguished from any of the foregoing *Vespertilionidæ* by the presence of four instead of two upper incisors. They fall in four subgenera, according to peculiarities of the molar dentition. The single species of *Vesperus* has molars $\frac{4-4}{5-5}$, 32 teeth in all. The two or three species of *Vesperugo* have molars $\frac{5-5}{5-5}$, 34 teeth in all. The species of *Vesperides* has $\frac{5-5}{6-6}$. The several species of true *Vespertilio* have molars $\frac{6-6}{6-6}$, 38 teeth in all. The species of *Vesperus* and *Vesperugo* are more nearly related to each other than they are to those of typical *Vespertilio*, and are often together separated generically from the last named; but, as Dr. Allen has observed, in so separating them the differences are difficult to describe. *Vesperus* and *Vesperugo* have heavier wing-membranes, and thicker, more leathery, ears, developing in width rather than in height: *Vespertilio* contains more delicately organized species, with thin wings and ears. "The difference in their facial expression might be compared to that between a mastiff and a terrier dog: the former is massive, with broad head, pendulous lips, and wide ears; the latter is more slender, with a narrower face, and delicate and upright ears." The skull in *Vespertilio* is lighter, with narrower rostrum, more concave frontal outline, and more inflated cranial part.

VESPERTILIO (VESPERUS) FUSCUS, Beauv.

Carolina Brown Bat.

Vespertilio fuscus, PALISOT DE BEAUVOIS, Cat. Peale's Mus., 1796, 14.—LECONTE, Proc. Phila. Acad., 1855, 434.

Scotophilus fuscus, ALLEN, Monog., 31.

Vespertilio carolinensis, GEOFFROY ST. HILAIRE, Ann. du Mus., 1806, viii, 193, pl. xlvii, f. 7.—HARL., Fn. Am., 1825, 9.—GODM., Am. Nat. Hist., i, 1831, 67.—LEC., McMurt. Cuv., i, 1831, 431.—COOP., Ann. Lye. N. Y., iv, 1837, 60.—DEKAY, N. Y. Fn., i, 1842, 10, pl. 2, f. 1.—DESM., Mamm., i, 1820, 136.—TEMM., Mon., ii, 1835, 237.—LEC., Proc. Acad. Nat. Sci. Phila., 1855, 434.—WAGN., Suppl. Schreb., v, 1855, 753.—WOODH., Sitgr. Rep. Zuni and Col. Riv., 1854, p. 43.

Scotophilus carolinensis, ALLEN, Monog., 28.

Vespertilio arcuatus, SAY, Long's Exped., 1823, 167.

Vespertilio phaiops and ? *Eptesicus melanops*, RAFINESQUE, Am. Month. Mag., 1818, 445 (nec Temm.).—LEC., Proc. Acad. Nat. Sci. Phila., 1855, 434.—WAGN., Suppl. Schreb., 1855, 756.

Vespertilio ursinus, TEMM., Mon. Mamm., ii, 1835, 235.—WAGN., Suppl. Schreb., v, 1855, 756.—LECONTE, Proc. Acad. Nat. Sci. Phila., 1855, 434.

? *Vespertilio gryphus*, FR. CUV., Ann. Mus., i, 1837, 15.—WAGN., Suppl. Schreb., v, 1855, 749.

Vespertilio caroli, LECONTE (*nec* Temm.), Proc. Acad. Nat. Sci. Phila., 1855, 435.

CHARS.—Molars, $\frac{4-4}{5-5}$; the front upper one narrower than the rest, corresponding to the third one (last premolar) of *Vespertilio* proper; the two front lower ones smaller than the other three. Incisors, $\frac{2-2}{3-3}$; the lateral upper pair much smaller than the central pair. Base of foot with a rounded swelling. Tip of tail exserted. Wing-membrane reaching base of toes. No extension of fur on the wing-membranes; leg-membrane triangular, furred at basal fifth on upper side, elsewhere more or less perfectly naked. Ears moderate, leathery, furred $\frac{1}{3}$ – $\frac{1}{2}$ way up the back, turned more or less outward, with convex inner and straight or slightly emarginate outer border, and well-developed basal lobe; tragus nearly half as high as auricle, tip never pointed, outer border notched near the base. Nostrils emarginate; head flat. Hairs dark plumbeous, or dark cinereous on the basal part, a variable shade of brown at the ends, usually lighter on the under surface of the body than on the upper. Length, 3–4; tail, alone, $1\frac{1}{3}$ – $1\frac{1}{2}$; extent, 10–12; longest finger, $2\frac{2}{3}$ –3; arm, $1\frac{1}{2}$ –2; shin, $\frac{2}{3}$ – $\frac{3}{4}$; ear, about $\frac{1}{2}$ high.

HAB.—United States.

Dr. Allen has noted three different styles of coloration in this species. In one, the ends of the hairs are chestnut-brown above, grayish-white below; in another, olive-brown above, fawn-russet and whitish below; in a third, deep chestnut above, and scarcely lighter below; while occasionally the whole fur shows white tips (much as in case of *A. cinerea*). The same author expresses the hesitation he felt in separating *V. fuscus* and *carolinensis*, in reuniting which we have none, thus indorsing Mr. J. A. Allen's view.

This species, the dentition of which prevents confusion with any other, has been reported from various and widely-separated localities all over the United States. Mr. Allen says it is "common" in Massachusetts.

Several specimens were collected in Arizona in 1873.

Specimens.

No.	Name.	Locality.	Date.	Collector.	Remarks.
49	<i>V. fuscus</i>	Rio Grande, Colo.	June, 1873	H. W. Henshaw..	
49 a	.....do .....	.....do .....	.....do .....	.....do	
658	.....do	Apache, Ariz	Aug. 9, 1873	Dr. O. Loew	
611	.....do .....	.....do	Aug. 24, 1873	H. W. Henshaw ..	

NOTE.—Specimen 658 has the membrane much more transparent than the others.

VESPERTILIO (VESPERUGO) GEORGIANUS, F. Cuv.

Georgian Bat.

Vespertilio georgianus, F. CUV., Ann. Mus., 1832, 16.—LEC., Proc. Acad. Nat. Sci. Phila., 1855, 436.—WAGN., Suppl. Schreb., i, 1855, 750.

Scotophilus georgianus, ALLEN, Monog., 35.

? *Vespertilio monticola*, BACHMAN, Proc. Acad. Nat. Sci. Phila., 1841, 92.

CHARS.—Molars, $\frac{5-5}{5-5}$; 34 teeth in all. Upper incisors all of about equal size, the central pair bicuspid. Skull small, papery, not so flat as in the species of *Vesperus*. Base of foot without rounded swelling of *Vesperus*. Tragus slender, erect, half as high as auricle. Ear nearly naked, subelliptical, slightly convex on the inner, nearly straight on the outer, border, which terminates near the mouth in a wart. Nose flat, broad, naked; nostrils small, oblique, sublateral. Point of tail exerted; femoral membrane on dorsal surface furred about one-third, on ventral surface with numerous small tufts of fur arranged transversely. Wing-membranes reaching base of toes, furred a little distance from the body on the anterior surface. Base of fur everywhere dark plumbeous; end on upper parts dark rufous brown, on lower parts brighter. Small; length about 3 inches; tail, $1\frac{1}{2}$; extent, $8\frac{1}{2}$ – $9\frac{1}{4}$; arm, $1\frac{1}{4}$ – $1\frac{1}{3}$; shin, $\frac{1}{2}$; longest finger, $2\frac{1}{3}$; ear, $\frac{1}{3}$ – $\frac{1}{2}$.

HAB.—Maine and Missouri to Texas.

This species is readily distinguished from its subgeneric allies by the slender erect tragus and very partially furred femoral membrane as compared with *V. noctivagans*; and bicuspid central incisors as compared with *S. hesperus*. The physiognomy rather approaches that peculiar to *Vespertilio* proper. The original imperfect diagnosis of "*V. georgianus*" has been shown by LeConte and Dr. Allen to be applicable here. The species is apparently most frequent in the Middle and Southern States, but has been reported from the northern and western points above mentioned.

VESPERTILIO (VESPERUGO) HESPERUS, (Allen) Coues.

The Western Bat.

SYN.—*Scotophilus hesperus*, ALLEN, Monog., 43.

CHARS.—Molars, $\frac{5-5}{5-5}$; 34 teeth in all; dentition as in *V. georgianus*, but central upper incisors unicuspid. Skull flat and broad. Base of foot without rounded swelling of *Vesperus*. Tragus short, blunt, curved hardly or not half as high as auricle. Point of tail not exerted. Interfemoral membrane ample, with a small calcaneal lobe, its dorsal surface only very partially furred, as in *V. georgianus*. Head small, flat; face blunt, not hairy; body rather slender; size diminutive; length, $2\frac{1}{3}$ – $2\frac{3}{4}$; extent, 7; tail, 1; arm, 1 – $1\frac{1}{3}$; finger, $1\frac{1}{2}$ –2; shin, $\frac{1}{3}$; thumb, $\frac{1}{10}$; ear, $\frac{1}{3}$. Color above obscure dirty gray, with more or less brownish; below lighter; fur except at tip dark plumbeous.

HAB.—Southern California.

This species, apparently quite distinct, is only known by Dr. Allen's description. It is stated to resemble *V. pipistrellus* of Europe in general external characters, but to differ in color, corresponding in some respects, as of size and shape of ear, with *V. alcythoë* and *V. aristippe* of Europe; it differs from these in having one more upper molar.

VESPERTILIO (VESPERIDES) NOCTIVAGANS LeC.

Silver-Black Bat.

Vespertilio noctivagans, LECONTE, McMurtree's Cuv., i, 1831, 31.—COOPER, Ann. Lyc. N. Y., iv, 1837, 59.—DEKAY, Nat. Hist. N. Y., 1842, 9, pl. 1, f. 1.—WAGN., Suppl. Schreb., v, 1855, 754.

Scotophilus noctivagans,—ALLEN, Monog., 39.—J. A. ALLEN, Proc. Bost. Soc. Nat. Hist., xvii, 1874.

Vespertilio auduboni, HARLAN, Month. Am. Journ., i, 1831, 220, pl. 2; Med. & Phys. Res., 1835, 30, pl. 4.

Vespertilio pulverulentus, TEMM., Mon. Mamm., ii, 1835, 235.—LECONTE, Proc. Phila. Acad., 1855, 435.—MAXIM., Arch. Naturg., 1861, 192.

CHARS.—Molars, $\frac{5-5}{6-6}$; teeth 36 in all (only species with this total); central upper incisors bicuspid. Skull flat, not crested; two shallow depressions anteriorly. Base of foot without the rounded lateral swelling of *Vesperus*. Tragus very short, broad, and blunt, angularly convex along outer border, hardly or not $\frac{1}{3}$ as high as auricle. Ear irregularly oval; inner border running upward and inward to level of head, then upward and outward, ending obtusely. Outer border below folded irregularly, bending inward so as to touch the tragus. Snout naked; nostrils wide apart, opening sublaterally; space between emarginate. Femoral membrane entirely, though scantily, furry on dorsal surface, with numerous minute tufts arranged linearly on ventral surface. Thumb small, slightly furry. Fur long and silky, black, or nearly so; the ends of the hairs usually white or whitish, giving a peculiar powdery aspect; sometimes entirely black. Length, 3; extent, 12; tail, $1\frac{1}{4}$ – $1\frac{1}{2}$; shin, $\frac{1}{2}$; arm, $1\frac{1}{2}$; longest finger, $2\frac{3}{4}$; thumb, $\frac{1}{4}$ – $\frac{1}{3}$; ear, $\frac{1}{2}$; tragus, about $\frac{1}{6}$.

HAB.—North America.

The peculiar dentition and the remarkable coloration will prevent any misconception respecting this bat, which is said to be nearly related to *V. discolor*, a European species. Although Dr. Allen gives its habitat as Atlantic coast to the Rocky Mountains, yet he quotes Pacific-coast specimens, and it seems to be no exception to the general rule in the family of general and extensive dispersion. Mr. J. A. Allen gives it as rather common in Massachusetts.

VESPERTILIO SUBULATUS, Say.

Little Brown Bat.

Vespertilio subulatus, SAY, Long's Exp. R. Mts., 1823, 65.—HARLAN, Fn. Am., 1825, 22.—RICHARDSON, F. B.-A., i, 1829, 3.—GODMAN, Am. Nat. Hist., i, 1831, 71.—COOPER, Ann. Lyc. N. Y., 1837, iv, 61.—DEKAY, Nat. Hist. N. Y., 1842, 8.—LECONTE, Proc. Phila. Acad., 1855, 436.—H. ALLEN, Monog., 51.—J. A. ALLEN, Bull. Mus. Comp. Zoöl., i, 210.—*Id.*, Proc. Bost. Soc. Nat. Hist., xvii, June, 1874, p. —.

Vespertilio caroli, TEMM., Monog., ii, 1835, 236.

Vespertilio domesticus, GREENE, Cab. Nat. Hist., ii, 290.

? *Vespertilio salarii*, *crassus*, and *subflavus*, F. CUV., Ann. du Musée, i, 1832, 16, 17, 18 (may be *V. georgianus*).

? *Vespertilio virginianus*, *californicus*, and *leibii*, AUD. & BACH., Journ. Phila. Acad., 1842, viii, 282, 284, 285.

? *Vespertilio lucifugus*, LECONTE, McMurtrie's Cuv., 1831, 431.—*Id.*, Proc. Phila. Acad., 1855, 436.—ALLEN, Monog., 55.

? *Vespertilio brevirostris*, MAXIM., Verz. Säug. Nord-Am., 1860, 19 (robust var. with short ears and blunt nose).

? *Vespertilio nitidus*, ALLEN, Proc. Phila. Acad., 1862, 247.—*Id.*, Monog., 60 (U. S. west of R. Mts.).

? *Vespertilio evotis*, ALLEN, Monog., 48 (slender form, with longest ears and most-pointed snout).

? *Vespertilio yumanensis*, ALLEN, Monog., 58, and Proc. Phila. Acad., 1866, 283 (four specimens only).

? *Vespertilio affinis*, ALLEN, Monog., 53 (one specimen, Arkansas).

? *Vespertilio macropus*, ALLEN, Proc. Phila. Acad., 1866, 288 (one specimen, California).

? Compare also *Vespertilio obscurus*, *volans*, *exilis*, and *tenuidorsalis*, ALLEN, Proc. Phila. Acad., 1866, 281, 282, 283, all from Cape Saint Lucas.

Specimens.

No.	Name.	Locality.	Date.	Collector.	Remarks.
75 a a	<i>V. subulatus</i>	White Mts., Arizona ..	Aug., 1873	H. W. Henshaw ..	
B 19, 1	..... do	Southern Arizona	Sept., 1873	..... do	
B 20	..... do .....	..... do .....	..... do .....	..... do	
B 21	..... do .....	..... do .....	..... do .....	..... do	
75 a	<i>V. "lucifugus"</i>	White Mts., Arizona ..	Aug., 1873	..... do	
B 19	<i>V. "nitidus"</i>	Southern Arizona	Sept., 1873	..... do	
B 19, 2	..... do .....	..... do .....	..... do .....	..... do	
B 19, 3	..... do .....	..... do .....	..... do .....	..... do	

CHARS.—Molars, $\frac{6-6}{6-6}$; teeth 38 in all. Upper incisors paired off, close to canines, a median space intervening; the middle pair markedly bifid, the lateral ones obscurely

or not so; lower canines with small basal cusp posteriorly; first two upper premolars small, especially the second one, the last one larger, compressed, and bicuspid, the large outer cusp longer than any point of the true molars; lower premolars small, especially the two front ones. Skull thin and papery, crestless, with inflated cranial, and narrow, prolonged rostral part, giving a small face, high forehead, rather pointed muzzle, and foxy or terrier-like physiognomy. Face moderately whiskered. Ears rather large, oval in general contour, but with variously modified details of slightly sinuous border, and blunt tip. Tragus about half as high as auricle, upright, or nearly so, lanceolate, with nearly straight anterior, and moderately divergent posterior, border, at base of which last is a small nick and lobe, variously shaped. Extreme tip of tail more or less obviously exerted. Interfemoral membrane naked on dorsal surface, except a triangular patch of fur at its base, continuous with covering of the back. Wing-membranes naked, very delicate, thin, almost diaphanous, usually rather brown than blackish. Fur dark plumbeous at base, at tip a varying shade of brown, from quite dark to yellowish-brown, usually palest on the belly. General build delicate; size small. Total length, about 3 inches, often less; expanse up to 10, oftener 8-9; tail about $1\frac{1}{2}$; fore-arm about equal to tail; longest finger, $2-2\frac{1}{2}$; ear usually $\frac{2}{3}$, but from $\frac{1}{2}$ to $\frac{3}{4}$.

HAB.—North America at large.

It is impossible for us to believe that more than a single species of bat is included in the above extensive synonymy. Of this, the first sentence of the above paragraph is diagnostic; the rest, fairly descriptive. We will state, before proceeding further, that we are autoptically familiar with little more than the ordinary forms of *V. subulatus*, but that our experience with these is ample, and it tallies precisely with what we have learned in a protracted critical study of various other families of our mammals. For this reason, if for no other, we must not be considered presumptuous in so summarily criticising adversely the labors of one who has made the bats a speciality. But, furthermore, it is notorious that one looking afresh at the general bearings of a subject may discern what another more practiced, yet, so to speak, pre-occupied, eye, has failed to discover. Almost throughout his monograph, Dr. Allen has given diagnoses and descriptions perfectly tangible and satisfactory; but, in this case of the 38-toothed bats, we cannot find, on sifting out his accounts, anything to rest upon. He is perfectly right, we think, in rejecting the nominal species of earlier writers. From what little can be made of them, they seem mostly referable to *V. subulatus*; the remainder of those not identifiable oscillating between this species and *V. georgianus*, which might be superficially described in almost identical terms. But, after this, has he not fallen into precisely the same

erroneous method of study? His descriptions differ in tone from those of his predecessors most decidedly; being rigidly exact, and therefore faithful reflections of certain observed peculiarities, they are, without exception, identifiable. But we are satisfied that he has described *specimens only*—not species—in his monograph; and his discriminations have been pushed to a still more unwarrantable extreme in his subsequent paper (Proceedings of the Philadelphia Academy, 1866, 280 *et seq.*). Of our own positive knowledge, acquired by original investigation, we can affirm, without fear of valid contradiction, that all the characters upon which the $\frac{9}{8}$ - $\frac{9}{8}$ -molared bats he proposes or adopts rest, come fairly within range of individual variation. These characters are without exception comparative, not positive. They are: details of size and contour of the ear and its tragus; amount of exsertion of the point of the tail; extent of attachment of wing-membrane to foot; and shade of color. We have here nothing to rest upon. At first we were inclined to believe there might be a geographical variety at least, *V.* “*nitidus*” constituting the Pacific form; but we took typical *subulatus* in Arizona (as determined by Dr. Allen himself, *loc. cit.*, 288), and specimens from the East will answer the description of *nitidus*. Besides, nearly all that we know of the distribution of our bats is against a supposition of such geographical limitation. We are convinced that Mr. J. A. Allen has struck at the root of the matter in his criticism (*loc. cit.*). We entirely agree with what seems to us to be his timely and judicious review of the case, viz: that there is but one species; that there are no geographically limited varieties; that there may be recognized two “varieties” of ordinary *subulatus*, one—*evotis*—slender, with largest ears and most pointed snout; the other—*lucifugus*—stout, with smallest ears and bluntest snout; both shading imperceptibly into the usual form. They are all, he adds, sometimes found clinging together in the same “festoons”.

The little Brown Bat and the Red Bat are the two species by far the most abundant throughout this country. Of the present species as many as ten thousand, by actual count, have been destroyed in one building alone.

NOTE.—In concluding an account of the *Chiroptera*, it is proper to state that our article is, to some extent, based upon Dr. Allen’s memoir; from which many of the descriptive phrases have been compiled, and much of the synonymy directly borrowed.

RODENTIA.

FAM. ZAPODIDAE.

Genus ZAPUS, Coues MSS.

ZAPUS HUDSONIUS, (Zimm.) C. & G.

Jumping Mouse.

Dipus hudsonius, ZIMM., Geog. Gesch., ii, 1780, 35.—BODD., Elench. An., 1784, 115.—FISCH., Syn., 1829, 340.

Meriones hudsonius, AUD. & BACH., Q. N. A., ii, 1851, 251, pl. 85.

Jaculus hudsonius, BD., M. N. A., 1857, 430, and of most late authors.

Zapus hudsonius, COUES MSS., 1875.

Mus longipes, ZIMM., Penn. Arkt. Zoöl., i, 1787, 131.

Dipus canadensis, DAV., Linn. Tr., iv, 1798, 155.—SHAW, Gen. Zoöl., ii, 1801, 192, pl. 161.

Gerbillus canadensis, DESM., Mamm., ii, 1822, 321.—HARL., Fn. Am., 1825, 155.—

GRIFF., An. Kingd., v, 1827, 240.—GODM., Am. Nat. Hist., ii, 1831, 94.

Dipus americanus, BARTON, Am. Phil. Trans., iv, 1799, 115; vi, 1809, 143.

Jaculus americanus, WAGL., Syst., 1830, 23.

Meriones americanus, DEKAY, N. Y. Zoöl., i, 1842, 70, pl. 24, f. 2.

Mus labradorius, J. SAB., Frankl. Journ., 1823, 661.

Gerbillus labradorius, HARL., Fn. Am., 1825, 157.—GODM., Am. Nat. Hist., ii, 1831, 97.

Meriones labradorius, RICH., F. B.-A., i, 1829, 144, pl. 7.

Jaculus labradorius, WAGN., Suppl. Schreber, iii, 1843, 294.

Meriones microcephalus, HARL., P. Z. S., 1839, 1.

Meriones acadicus, DAWS., Edinb. New Phil. Journ., iii, 1856, 2, pl. 1.

A well known species of general distribution in North America, and undoubtedly occurring in the regions explored, although not represented in the collections.

FAM. MURIDAE.

Subfamily MURINAE.

Genus NEOTOMA, Say & Ord.

Mus (sp.), SAY & ORD, 1818; DESM., 1822.

Arvicola (sp.), HARLAN, 1825.

Lemmus (sp.), FISCH., 1829.

Neotoma, SAY & ORD, J. A. N. S. P., iv, 1825, 346, and of authors; type *N. floridana*.

Myoxus (sp.), RICH., Zoöl. Journ., iii, 1828, 517 (*N. cinerea*).

Teonoma !, J. E. GRAY (same type).

The two species occurring in the region explored may be distinguished as follows:

- I. Tail scantily hairy (nearly as in *Mus*).
 - a. Tail bicolor, barely or not as long as the body without the head.
 - Feet entirely white. Length, 9 inches or less; tail, 6 or less. . FLORIDANA.
- II. Tail densely hairy (as in *Myoxus*), bicolor. Size of the first, or larger. . CINEREA.

NEOTOMA FLORIDANA, Say and Ord.

Wood Rat.

Mus floridana, ORD, Bull. Soc. Philom. Phila., 1818, 181.

Arvicola floridana, HARLAN, Fn. Am., 1825, 141.

Neotoma floridana, SAY & ORD, J. A. N. S. P., iv, 1825, 352, pl. x, figs. 1, 2, 3, 4.—

COUES, Proc. Acad. Nat. Sci. Phila., 1874, 175.

Lemmus floridanus, FISCHER, Syn., 1829, 299.

Neotoma mexicana, BD., P. A. N. S. P., vii, 1855, 333; M. N. A., 1857, 490; Mex. B. Surv., ii, 1859, 44, pl. 24, f. 1, a-g.—COUES, Am. Nat., i, 1867, 399.

Neotoma micropus, BD., P. A. N. S. P., vii, 1855, 333; M. N. A., 1857, 492; Mex. B. Surv., ii, 1859, 44.

HAB.—Southern United States and Northern Mexico. North to Maryland (Audubon), New York (Bell), and Massachusetts (Gibbs). Illinois, Arkansas, Kansas.

This is the ordinary species of Arizona and New Mexico; the following one being chiefly confined to mountains, and being also more abundant farther north.

The Bush Rat (*Neotoma mexicana*) is abundant throughout the Territory, and forms no small item in the economy of the Indians. Not only the numerous tribes of the Colorado, but also the various branches of the Apache family, make great use of them as an article of food. After the destruction of Apache "rancherias," we always found, among other implements and utensils, numerous sticks, about as big as walking-canes, one end of which was bent in the shape of a hook, hardened in the fire, and a little sharpened. These, we were informed and have every reason to believe, were used to probe holes and poke about brush-heaps for rats, and to drag them out when discovered.

This statement may be doubted by those who know of the Bush Rat only as an arboreal species, building a compact globular nest of grasses and sticks in mezquite and other low, thick trees. While this is certainly the case, there is no doubt that, under different circumstances, it may live

under-ground, among rocks, or in brush-heaps. We have seen many heaps of rushes, sticks, and grasses, which could have been the work of no other animal, and formed either the nest itself, or the "vestibule" of a subterranean abode. We have also been informed to the same effect by several hunters and good observers. Dr. Kennerly has found it living under stones. It shows no tendency to modify its primitive habits by taking up its residence with man.

The food of these rats is entirely vegetable, and observers agree in noting their particular fondness for mezquite beans; both the long straight pods of the *Algarobia glandulosa*, and the curious spirally twisted fruit of the "screw mezquite" (*Strombocarpa pubescens*). As might be expected from the nature of their food, their flesh is excellent eating.

The idea of eating rats is doubtless disgusting to most persons—not Chinese nor Indian; but all such must remember that they take their notions from the House Rat, which is a dirty beast, feeding upon garbage and any decaying animal or excrementitious matter which may come in its way. The Bush Rat's food is as cleanly as that of a hare or squirrel, and there is no reason why its flesh should not be as good, as in truth we can assert it to be, having eaten it ourselves.

NEOTOMA CINEREA, (Ord) Baird.

Rocky Mountain Rat.

Mus cinereus, ORD, Guthrie's Geog., 2d Am. ed., ii, 1815, 292 (based on *ash-colored rat, with hairy tail, of the Rocky Mountains*, LEWIS & CLARK, *passim*).

Neotoma cinerea, BD., M. N. A., 1857, 499, pl. liii, f. 4.—COUES, Proc. Acad. Phila. 1874, 175.

Myoxus drummondii, RICH., Zoöl. Journ., iii, 1828, 517.

Neotoma drummondii, RICH., F. B. A., i, 1829, 137, pl. viii.

Neotoma occidentalis, COOPER'S MSS.—BD., P. A. N. S. P., vii, 1855, 335; M. N. A., 1857, 496, pl. liii, f. 3.

HAB.—Western and Northwestern North America, to the Pacific. East to Nebraska, Colorado, etc., and in British America to Hudson's Bay. South to New Mexico, Arizona, and California.

Specimens.

No.	Name.	Locality.	Date.	Collector.	Remarks.
383	N. cinerea.....	Fort Garland, Colo....	June 20, 1873	H. W. Henshaw....	In flesh.
384	.....do.....	.....do.....	.....do.....	.....do.....	Do.
8 A	.....do.....	.....do.....	Nov. 5, 1873	.....do.....	Do.
140	.....do.....	Dayton, Colo.....	Aug. 12, 1873	Dr. J. T. Pothrock..	Do.
350	.....do.....	Rio Grande, Colo.....	June 15, 1873	H. W. Henshaw....	Do.
74	.....do.....	White Mts., Arizona...	Aug. 23, 1873	Dr. C. G. Newberry.	Do.

Genus HESPEROMYS, Waterh.**Subgenus VESPERIMUS, Coues.**

Musculus, RAF., Am. Month. Mag., iii, 1818, 446 (used in connection with *leucopus*, but ineligible for obvious reasons).—*Hesperomys*, BAIRD (with exclusion of *Onychomys* and *Oryzomys*).

Calomys, AUD. & BACH., Q. N. A., ii, 1851, 303 (type *aureolus*; not of Waterhouse).

Vesperimus, COUES, Proc. Acad. Nat. Sci. Phila., 1874, 178.

CHARS.—Teeth strictly sigmodont. Back upper border of orbit not beaded (compare *Onychomys* and *Oryzomys*). Coronoid not attaining level of condyle. Cranial and dental characters in general strictly those of *Hesperomys*. Small but well-developed cheek-pouches! Of medium and small size, lithe form, and quick movement. Eyes large, prominent. Snout pointed. Ears large, rounded, thin, scantily and finely pilous; antitragus evident but not valvular. Fore feet hardly or not half as long as the hinder; palms naked; fore claws not larger than the hinder; digits slender, 3d and 4th subequal and longest, 2d and 5th successively much shorter. Hind feet long, slender; soles 6-tuberculate, naked or scant-furred on the posterior third; 2d, 3d, and 4th subequal and much the longest; 5th shorter; 1st shortest. Tail terete, slender, closely hairy, ranging in length from as long as body alone to a little longer than head and body. Pelage soft, close, glossy, with but few longer bristly hairs; feet and under parts white or whitish; body and tail more or less distinctly bicolor. No woolly tufts of hair about the ears. Type, *V. leucopus*.

HESPEROMYS (VESPERIMUS) AMERICANUS, (Kerr) Coues.**White-footed Mouse.**

American Field Mouse or Rat, PENN., Syn., 1771, No. 303; Hist. Quad., 1781, No. 302; Arct. Zoöl., i, 1784, 131.

American Wandering Mouse, BARTON, Med. & Surg. Journ. Phila., i, 1805, 31.

Mus sylvaticus, var., ERXL., Syst. Av., i, 1775, 390 (based on "New York var." of Pennant).

Mus sylvaticus var. *noveboracensis*, FISCH., Syn., 1829, 318 (the same).

Mus noveboracensis, SELYS-LONGCH., Études Microm., 1839, 67.

Mus agrarius var. *americanus*, KERR'S Linn., 1792, 231 (based on Pennant).

Mus agrarius, GODM., Am. Nat. Hist., i, 3d ed., 1860, 316 (also in the earlier editions).

Cricetus myoides, GAPPER, Zoöl. Journ., v, 1830, 204, pl. 10 (Canada).

Hesperomys myoides, BAIRD, M. N. A., 1857, 472 (Vermont, based on Gapper).

- Arvicola emmonsii*, DEKAY, Rep. Quad. Mass., 1840, 61.
Musculus leucopus, RAF., Am. Month. Mag., iii, 1818, 446.
Mus leucopus, DESM., Mamm., ii, 1822, 307; and of authors.
Hesperomys leucopus, LEC., P. A. N. S. P., vi, 1852, 413; and of authors.
Hesperomys (Vesperimus) leucopus, COUES, Proc. Acad. Nat. Sci. Phila., 1874, 178.
Hesperomys maniculatus, WAGN., Wieg. Arch., ii, 1843, 141, and ii, 1845, 148; Abh. Akad. Wissen., v, 1848, 316 (Labrador).
Hesperomys polionotus, WAGN., Wieg. Arch., ii, 1843, 52 (Georgia).
Hesperomys campestris, LEC., P. A. N. S. P., vi, 1853, 413 (New Jersey).
Hesperomys texanus, WOODH., P. A. N. S. P., vi, 1853, 242 (Texas).
Hesperomys cognatus, LEC., P. A. N. S. P., vii, 1855, 442 (Southern States).
Hesperomys gracilis, LEC., P. A. N. S. P., vii, 1855, 442 (Northwestern States).
Hesperomys austerus, BD., P. A. N. S. P., vii, 1855, 336 (Washington Territory).
Hesperomys boylii, BD., P. A. N. S. P., vii, 1855, 335 (California).
Hesperomys gambeli, BD., M. N. A., 1857, 464 (Pacific coast, United States).
? *Hesperomys indianus*, MAXIM., Arch. f. Naturg., xviii, 1862, 111 (*vide* Allen).

NOTE.—The above synonymy is exclusive of the several geographical varieties of this species which may be recognized.

HAB.—North America generally.

Var. SONORIENSIS.

- ? *Mus leucopus*, RICH., Zoöl. Journ., iii, 1818, and F. B.-A., i, 1829, 142.
Hesperomys sonoriensis, LEC., P. A. N. S. P., vi, 1853, 413 (Sonora).
Hesperomys sonoriensis var. *nebrascensis*, BD., M. N. A., 462, in text.
Hesperomys (Vesperimus) leucopus sonoriensis, COUES, Proc. Acad. Nat. Sci. Phila., 1874, 179.

HAB.—Interior of North America, west of the Mississippi, from Arctic regions to Mexico (usually occupying this range to the exclusion of typical *americanus*, but sometimes associated with it). This is the ordinary species of these regions, as shown by the following series of specimens:

Specimens.

No.	Name.	Locality.	Date.	Collector.	Remarks.
87	H. leu. var. sonor.	Twin Lakes, Colo.	June 11, 1873	Dr. J. T. Rothrock	In flesh.
90	.....do .....	.....do	June 12, 1873	.....do	Do.
89	.....do .....	.....do	June 13, 1873	.....do	Do.
88	.....do .....	.....do .....	.....do .....	.....do	Do.
188 C ♀	.....do .....	.....do	Sept. 3, 1873	.....do	Do.
B 2	.....do	Fort Garland, Colo.	June 5, 1873	H. W. Henshaw	Do.
a	.....do .....	.....do .....	.....do .....	.....do	Do.
364	.....do	Rio Grande, Colo.	June 16, 1873	.....do	Do.
75	.....do	White Mts., Arizona.	Aug., 1873	Dr. C. G. Newberry.	Do.
G	.....do	Apache, Ariz. ....	.....do	H. W. Henshaw	Do.
577	.....do .....	.....do .....	.....do .....	.....do	Do.
J	.....do .....	.....do	Aug. 21, 1874	.....do	Do.
502	.....do	El Moro, N. Mex.	July, 1873	.....do	Do.

Var. EREMICUS.

Hesperomys eremicus, BAIRD, Mamm. N. A., 1857, 479.—COUES, Am. Nat., i, 1867, 398.

Hesperomys (Vesperimus) leucopus eremicus, COUES, Proc. Acad. Nat. Sci. Phila., 1874, 180, (valley of the Gila and Colorado).

The following species of this same section will probably be found in Arizona :

HESPEROMYS (VESPERIMUS) CALIFORNICUS, (Gamb.) Bd.

Californian Mouse.

Mus californicus, GAMB., P. A. N. S. P., iv, 1848, 78 (Monterey).

Hesperomys californicus, BAIRD, M. N. A., 1857, 478.

Hesperomys parasiticus, COOPER'S MSS.—BD., *op. cit.*, 479 (in text).

Hesperomys (Vesperimus) californicus, COUES, Proc. Acad. Nat. Sci. Phila. 1874, 180.

HAB.—Southern and Lower California.

Subgenus ONYCHOMYS, Baird.

Hypudæus (sp.), MAXIM., Reise, ii, 1841, 99, *nec auct.*

Mus (sp.), AUD. & BACH., Q. N. A., ii, 1851, 327 (*missouriensis*).

Hesperomys subg. *Onychomys*, BAIRD, M. N. A., 1857, 458 (type *Hypudæus leucogaster*, Maxim.).—COUES, Proc. Acad. Nat. Sci. Phila., 1874, 182.

To the single known species of this genus, Dr. Coues lately added a second, discovered in Arizona. The two may be thus distinguished :

- a. Tail much less than half the head and body, scarcely twice the hind foot. Fore foot more than half the hind foot. Ear about 0.50 high. Beneath snow-white; above mouse-brown with darker dorsal area LEUCOGASTER.
- b. Tail nearly half the head and body, about $2\frac{1}{2}$ times the hind foot. Fore foot only half the hind foot. Ear about 0.75 high; beneath tawny white; above brownish-fulvous, without darker dorsal area (var.?) TORRIDUS.

HESPEROMYS (ONYCHOMYS) TORRIDUS, Coues.

Hesperomys (Onychomys) torridus, COUES, Proc. Acad. Nat. Sci. Phila., 1874, 183.

DIAG.—Resembling *O. leucogaster*; tail longer, ears larger, soles less hairy, fore claws weaker. Coloration much more yellowish; no darker dorsal area; snout, feet, and all under parts tawny-white; dusky stripe on top of tail very narrow, not reaching the tip. Length of head and body, 3.75; of tail, 2.00; of fore foot, 0.40; hind foot, 0.80; ear about 0.75 above notch. Only two pair (inguinal) of teats discovered. (Type No. 9886, Mus. S. I.)

HAB.—Arizona.

Genus OCHETODON, Coues.

Mus (sp.), AUD. & BACH.

Hesperomys (sp.), WAGNER.

Reithrodon, LECONTE, P. A. N. S. P., 1853, 413.—BAIRD, M. N. A., 1857, 447; *but not of Waterhouse.*

Ochetodon, COUES, Proc. Acad. Nat. Sci. Phila., 1874, 184 (type *O. humilis*).

OCHETODON HUMILIS, (Aud. & Bach.) Coues.

- Mus humilis*, AUD. & BACH., P. A. N. S. P., i, 1841, 97; J. A. N. S. P., viii, 1842, 300; Q. N. A., ii, 1851, 103, pl. lxx (South Atlantic States).
Hesperomys humilis, WAGNER, Wieg. Arch., 1843, 51.
Reithrodon humilis, BD., M. N. A., 1857, 448.
Ochetodon humilis, COUES, Proc. Acad. Nat. Sci. Phila., 1874, 185.
Mus leontii, AUD. & BACH., J. A. N. S. P., viii, 1842, 307; Q. N. A., iii, 1854, 324 (no fig.), (South Carolina).
Hesperomys leontii, WAGN., Wieg. Arch., 1843, 51.
Reithrodon leontii, LEC., P. A. N. S. P., vi, 1853, 413.
 ? *Mus carolinensis*, AUD. & BACH., J. A. N. S. P., viii, 1842, 306; Q. N. A., iii, 1854, 332 (South Carolina).
 ? *Hesperomys carolinensis*, WAGN., Wieg. Arch., ii, 1853, 51.
 ? *Reithrodon carolinensis*, BD., M. N. A., 1857, 452.
Reithrodon megalotis, BD., M. N. A., 1857, 451; Rep. Mex. B. Surv., ii, pt. ii, 1859, 43, pl. vii, fig. 4 a-c, pl. xxiv, fig. 4 a-g (Sonora).
 HAB.—United States, southerly. South Carolina to Texas. Kansas, Missouri, Iowa, Nebraska, Utah, Sonora.

Although not observed by the expedition, the known range of this species, as may be gathered from the foregoing, includes New Mexico and Arizona. The following species may also occur in the regions explored :

OCHETODON LONGICAUDA, (Baird) Coues.

- Reithrodon longicauda*, BAIRD, M. N. A., 1857, 451.—? TOMES, P. Z. S., 1861, 284 (Guatemala).
Ochetodon longicauda, COUES, Proc. Acad. Nat. Sci. Phila., 1874, 186.
 HAB.—California (? south thence to Guatemala).

Subfamily ARVICOLINAE.

Genus ARVICOLA, Lacép., emend.

- Mus* (sp.), LINN., Syst. Nat., i, 1766, *et auct. antiq.*
Mures cunicularii, PALL., N. Sp. Glir., 1778, 77.
Lemmus, LINCK, FISCHER, *et al.*
Myodes, PALL., Zoog. R. A., i, 1811, 172 (not *Myodes* of SELYS-L., 1839, which = *Hypudæus*, KEYS. & BLAS. = *Evotomys*, COUES).
Arvicola, LACÉPÈDE, Tabl., 1803, *et auct. recent.* (includes *amphibius* and *arvalis*).
Hypudæus, ILL., Prod., 1811 (not of KEYS. & BLAS., nor of BAIRD; includes *lemmus*, *amphibius*, and *arvalis*).
Myonomes, RAFINESQUE, (type "Wilson's Meadow Mouse" = *Arvicola pennsylvanica* Ord).
Psammomys, LEC., Ann. Lyc. N. Y., 1829, 132 (type *pinetorum*; not of RUEPPEL).
Pitymys, McMURTRIE'S ed. Cuvier, i, 1831, 434 (type *A. pinetorum*).
Hemiotomys, SELYS-L., Études, 1839, 85 (*amphibius*, *terrestris*, etc.).
Microtus, SELYS-L., Études, 1839, 86.

Pinomys, LESSON, Nouv. Tabl. R. A., 1842, 12 (type *pinetorum*).

Hemiotomys, BD., M. N. A., 1857, 515 (type *A. riparius*, ORD).

Pedomys, BD., *op. cit.*, 517 (type *A. austerus*, LEC.).

Chilotus, BD., *op. cit.*, 516 (type *A. oregonus*, BACH.).

The four sections into which the North American species of this difficult genus fall may be thus distinguished:

- A. Back upper molar with 2 external triangles and a posterior crescent.
Middle upper molar with 2 internal triangles. Front lower molar with 3 internal and 2 or 3 external lateral triangles. Ears unrimmed in front. Soles 6-tuberculate. Fore claws not longer than the hinder ones. Tail about $\frac{1}{3}$ the length of head and body, or more. Pelage ordinary. Size maximum and medium..... MYONOMES.
- B. Back upper molar with only 1 external triangle and a posterior trefoil.
Middle upper molar with 1 internal triangle. Front lower molar with 3 internal and 2 or 3 external triangles (as in *Myonomes*). Ear with a rim in front of meatus, the anterior and posterior roots of the auricle there meeting. Soles 5-tuberculate (?). Fore claws not larger than the hinder. Tail about $\frac{1}{3}$ the head and body. Pelage ordinary. Size minimum..... CHILLOTUS.
- C. Back and middle upper molars as in the last. Front lower molar with only 2 internal and 1 external triangle. Ear unrimmed. Soles 5-tuberculate. Fore claws not larger than the hinder. Tail $\frac{1}{3}$ the head and body, or rather less. Pelage ordinary. Size medium..... PEDOMYS.
- D. Molars all as in *Pedomys*. Ears unrimmed. Soles 5-tuberculate. Fore claws larger than the hinder. Tail about $\frac{1}{4}$ the head and body, or less. Pelage dense, silky, mole-like. Size small..... PITYMYS.

Subgenus MYONOMES, Raf.

Arvicola of most American writers.

Arvicola, A, *Hemiotomys*, BAIRD, M. N. A., 1857, 515 (type *riparius*. Not of Selys-L.).

Myonomes, RAF., (type *M. pratensis*, Raf., based on "Wilson's Meadow Mouse" = *A. pennsylvanica*, Ord. = *A. riparius*, Ord).—COUES, Proc. Acad. Nat. Sci. Phila., 1874, 189.

ARVICOLA (MYONOMES) RIPARIUS, Ord.

Campagnol or Meadow Mouse of Pennsylvania, WARDEN, Descr. U. S., v, 625.

Meadow Mouse, WILS., Am. Orn., vi, pl. 50, f. 3.

Arvicola pennsylvanica, ORD, Guthrie's Geog., 2d Am. ed., ii, 1815, 292 (based on the foregoing).—HARLAN, Fn. Am., 1825, 144 (in part; quotes Ord, but describes *pinetorum*).

Arvicola riparius, ORD, J. A. N. S. P., iv, 1825, 305 (Philadelphia).

Arvicola riparius longipilis, KENN., Agric. Rep. U. S. Patent Office, 1856, 304 (West Northfield, Ill.; in winter pelage).

- Arvicola xanthognatha*, HARLAN, Fn. Am., 1825, 136 (also of Godman, Say, DeKay, and Linsley, but not of Leach nor of Richardson).
Arvicola alborufescens, EMMONS, Rep. Quad. Mass., 1840, 60 (albino).
Arvicola hirsutus, EMMONS, *loc. cit.*
Arvicola nasuta, BACHM., J. A. N. S. Phila., viii, 1842, 296 (Massachusetts).
Arvicola oneida, DEKAY, N. Y. Fn., i, 1842, 88, pl. xxiv, f. 1 (New York).
Arvicola rufescens, DEKAY, *op. cit.*, 85, pl. xxii, f. 1 (New York).
Arvicola occidentalis, PEALE, Mamm. U. S. Ex. Ex., 1848, 45 (Puget Sound).
Arvicola californica, PEALE, *op. cit.*, 46 (California).
Arvicola montana, PEALE, *op. cit.*, 44 (California).
Arvicola edax, LEC., P. A. N. S. P., vi, 1853, 405 (California).
Arvicola borealis, LEC., *op. cit.*, 407 (Rhode Island), (not of Rich.).
Arvicola townsendi, BD., M. N. A., 1857, 529 (in text), (California).
Arvicola longirostris, BD., *op. cit.*, 530 (California).
Arvicola modesta, BD., *op. cit.*, 535 (Rocky Mountains), (very young).
Arvicola rufidorsum, BD., *op. cit.*, 526 (Mass.), (reddish specimen).
Arvicola breweri, BD., *op. cit.*, 525 (Muskeget, Mass.; bleached insular race).

Specimens.

No.	Name.	Locality.	Date.	Collector.	Remarks.
185	A. (M.) riparius ..	Taylor River, Colo.....	Aug., 1873	Dr. J. T. Rothrock..	In flesh.
188 A ♀	.....do	Twin Lakes, Colo.....	Sept., 1873	.....do	Do.
188 B ♂	.....do .....	.....do .....	.....do .....	.....do	Do.
B 1	.....do .....	.....do	Aug., 1873	.....do	Do.
B 3	.....do .....	.....do .....	.....do .....	.....do	Do.
106	.....do	Fairplay, Colo.....	July, 1873	Lt. W. L. Marshall..	Do.
196	.....do	Del Norte, Colo	Sept., 1873	.....do	Do.
200	.....do .....	.....do	Oct., 1873	.....do	Do.
172	.....do	Half Moon Creek, Colo..	Aug., 1873	Dr. J. T. Rothrock..	Do.
62	.....do .....	.....do .....	.....do .....	.....do	Do.
74	.....do	White Mts., Arizona....	.....	Dr. C. G. Newberry..	Do.
742	.....do	Mount Graham, Arizona.	Oct. 19, 1874	H. W. Henshaw....	Do.

Numerous specimens attest the abundance of this species in the regions explored. Only one other is certainly known from the same portion of the continent, the *A. curtata* of Cope, a variety of *Pedomys austerus*, the synonymy of which last is also subjoined for comparison :

Subgenus PEDOMYS, Baird.

Pedomys, BD., M. N. A., 1857, 517 (type, *A. austerus*, LEC.).

For characters of this subgenus. see table, p. 106.

ARVICOLA (PEDOMYS) AUSTERUS, LeC.

Arvicola austerus, LeC., P. A. N. S. P., vi, 1853, 405 (Wisconsin).

Arvicola (Pedomys) austerus, BD., M. N. A., 1857, 532, pl. liv (Wisconsin and Missouri to Louisiana).—COUES, Proc. Acad. Nat. Sci. Phila., 1874, 190.

Arvicola (Pedomys) cinnamoma, BD., *op. cit.*, 541, pl. liv (Minnesota).

Arvicola (Pedomys) haydeni, BD., *op. cit.*, 543 (Nebraska).

HAB.—Western States and adjoining Territories, especially Illinois, Missouri, and Michigan. Kansas. Louisiana.

ARVICOLA (PEDOMYS) AUSTERUS CURTATUS, (Cope) Coues.

Arvicola curtata, COPE, Pr. A. N. S. Phila., Jan., 1868, 2 (Owen's Valley, California).

Arvicola pauperrima, COOPER, Am. Nat., ii, Dec., 1868, 535 (Washington Territory).

HAB.—United States, west of the Mississippi. California. Colorado. Kansas and Nebraska, where becoming mixed up with true *austerus*.

We ascertain, by inspection of the type specimens of both, that Dr. Cooper's species is the same as Prof. Cope's.

Genus FIBER, Cuvier.

Castor, LINN., S. N., i, 1766, 78 (not type).

Mus, GM., S. N., i, 1788 (not type).

"*Myocastor*, KERR'S Linn., 1792", partly (type, *Myopotamus coypus*).

Fiber, CUV., Leçons, i, 1800 (type, *Castor zibethicus*, L.).

Lemmus, FISCHER, Syn., 1829 (partly).

Ondatra, WATERH., Charlesw. Mag., iii, 1839 (type, *O. zibethicus*).

FIBER ZIBETHICUS, (L.) Cuv. .

Castor zibethicus, LINN., S. N., i, 1766, 79.

Mus zibethicus, GM., S. N., i, 1788, 125.

Myocastor zibethicus, "KERR'S Linn., 1792".

Fiber zibethicus, CUV., R. A., i, 1817, 172; and of authors.

Lemmus zibethicus, FISCH., Syn., 1829, 289.

Ondatra zibethicus, WATERH., Charlesw. Mag., iii, 1839, 594.

Fiber osoyensis, LORD, P. Z. S., 1863, 95 (British Columbia).

HAB.—North America.

Found throughout entire area of North American continent. Seen by members of the expedition, but none secured. Common upon all the streams throughout the Territory of Utah; a great number being captured every year for their skins, which meet with a ready sale in Salt Lake City.

FAM. SACCOMYIDÆ.

Subfamily DIPODOMYINÆ.

Genus DIPODOMYS, Gray.

DIPODOMYS PHILLIPSI ORDI, (Woodh.), Coues.

Kangaroo Rat.

Dipodomys ordii, WOODHOUSE, Proc. Acad. Nat. Sci. Phila., 1853, 235; Sitgr. Rep. Expl. Zuñi & Colorado R., 1853, 50, pl. 4.—LEC., Proc. Acad. Nat. Sci. Phila., 1853, 224.—AUD. & BACH., Q. N. A., iii, 1854, 317.—BAIRD, Mamm. N. A., 1857, 410, pl. 5, f. 1; pl. 21, f. 1; pl. 51, f. 1, 2; P. R. R. Rep., x, 1859, Gunnison's & Beckwith's routes, mamm., 8; Whipple's route, 14.—COUES, Am. Nat., i, 1867, 395.—GRAY, P. Z. S., 1868, 201.—ALLEN, Proc. Bost. Soc., 1874, 42.

Dipodomys phillipsi ordi, COUES, Proc. Acad. Phila., 1875, 326.

Dipodomys montanus, BAIRD, Proc. Acad. Phila., 1855, 334.

Common on slopes of Rocky Mountains, extending southward into Mexico, and north to the Upper Missouri.

Specimens.

No.	Name.	Locality.	Date.	Collector.	Remarks.
W	<i>D. ordii</i>	Twin Lakes, Colo.	Aug., 1873	Dr. J. T. Rothrock..	
M	.....do	Arizona	—, 1874	.....do	Alcoholic.

Subfamily PEROGNATHIDINÆ.

Genus CRICETODIPUS, Bd.

CRICETODIPUS FLAVUS, Bd.

Yellow Kangaroo Mouse.

Perognathus flavus, BD., Proc. Acad. Nat. Sci. Phila., 1855, 332; Mamm. N. A., 1857, 423, pl. 8, f. 2; pl. 21, f. 3 *a-f* (assigned to *Cricetodipus*).—COUES, Am. Nat., i, 1867, 397.—HAYD., Trans. Am. Phil. Soc., xii, 1862, 147.—ALLEN, Proc. Bost. Soc. Nat. His., xxii, 1874, 42.

Cricetodipus flavus, GRAY, P. Z. S., 1868, 203.—COUES, Proc. Acad. Nat. Sci. Phila., 1875, 300.

Very common throughout Utah. A number of specimens obtained. It was obtained some years since at Fort Whipple, Ariz., by Dr. Coues, who has latterly found that its range extends to British America.

Genus **PEROGNATHUS**, Maxim.**PEROGNATHUS PENICILLATUS**, Woodh.**Tuft-tailed Kangaroo Mouse.**

Perognathus penicillatus, WOODH., Proc. Acad. Nat. Sci. Phila., 1852, 200; Sitg. Rep. Expl. Zuñi & Colorado R., 1853, 49, pl. 3.—AUD. & BACH., Q. N. A., iii, 1854, 298.—BAIRD, M. N. A., 1857, 418, pl. 20, f. 5.—COUES, Am. Nat., i, 1867, 397.—GRAY, P. Z. S., 1868, 201.—COUES, Proc. Acad. Phila., 1875, 287 (monographic).

Originally described from the region embraced in the present report, of which it is a characteristic species.

Other individuals of this genus, or of *Cricetodipus*, were secured as indicated below, but have not as yet been identified.

Specimens.

No.	Name.	Locality.	Date.	Collector.	Remarks.
657	? <i>Perognathus</i> (sp.)..	Arizona	Sept., 1873	Dr. O. Loew	
2	.....do	New Mexico	June, 1873	Dr. C. G. Newberry.	

? **PEROGNATHUS MONTICOLA**, Baird.

Perognathus monticola, BAIRD, M. N. A., 1857, 422, pl. 51, figs. 3 *a-h*.—SUCKL., P. R. R. Rep., xii, pt. ii, 1860, 101.—COUES, Proc. Acad. Nat. Sci. Phila., 1875, 293.

We refer to this species, with some doubt, two specimens collected by Mr. Henshaw on Otter Creek, Utah. These are apparently young animals, but, as they are not accompanied with the skulls, the point cannot be determined. Owing to their taxidermal condition, the relative proportions of body and tail cannot now be ascertained. The specimens are quite small; in a somewhat over-stuffed condition, they measure about $2\frac{1}{2}$ inches, but were probably little, if any, over 2 inches from nose to root of tail; hind foot 0.80; and in fact they resemble, at first sight, a species of *Cricetodipus* rather than of *Perognathus*. But the soles are naked, along a narrow strip, quite to the heel; the antitragus has a prominent lobe; and we determine, without appreciable risk of error, that the ear has the peculiar structure of *P. monticola*. The pelage is remarkably soft; the coloration is different from that of any other *Perognathus* we have seen, being plumbeous, with little

admixture of lighter color; while the sides show a decided fulvous stripe. But these specimens exhibit the fore leg colored quite to the wrist, and we are inclined to attribute the dark color to their immaturity. For the present, then, we provisionally assign them to *P. monticola* with a mark of doubt. The species is one with which we are still imperfectly acquainted, as may be seen on reference to Dr. Coues's memoir on the subject above cited.

Specimens.

No.	Name.	Locality.	Date.	Collector.	Remarks.
163	? <i>Perognathus monticola</i> .	Otter Creek, Utah ..	Sept. 14, 1872	H. W. Henshaw..	Skin.
.....	..... do .....	..... do .....	..... do .....	..... do	Do.

FAM. GEOMYIDÆ.

Genus GEOMYS, Raf.

GEOMYS CASTANOPS, (Bd.) LeC.

Chestnut-faced Gopher.

Pseudostoma castanops, BD., Stansbury's Rep. Expl. Great Salt Lake, 1852, 313.—AUD. & BACH., Q. N. A., iii, 1854, 304.
Geomys castanops, LEC., Proc. Acad. Nat. Sci. Phila., 1852, 163.—BD., M. N. A., 1857, 384; P. R. R. Rep., x, 1859, Gunnison's & Beckwith's Route, mamm., 8, pl. 10, f. 2.—COUES, Powell's Expl. Colorado R., 1875, 233 (monographic).
Geomys clarkii, BAIRD, Proc. Acad. Nat. Sci. Phila., 1855, 232; M. N. A., 1857, 383, pl. 50, f. 1. *a-g*; U. S. Mex. B. Surv., ii, pt. ii, 1859, p. —.—KENNERLY, P. R. R. Rep., x, 1859, Whipple's Route, mamm., 13.

The original specimen of this species was taken near Bent's Fort, New Mexico. Dr. Coues has lately shown that the supposed *G. clarkii* is the same species.

Genus THOMOMYS, Maxim.

THOMOMYS TALPOIDES UMBRINUS, (Rich.) Coues.

Black-faced Gopher.

Geomys umbrinus, RICHL., F. B. A., i, 1829, 202; Rep. Brit. Assoc., v, 1836 (1837), 157.—WATERH., Charlesw. Mag., iii, 1839, 596, f. 71.—DEKAY, N. Y. Fn., 1842, 92.—SCHINZ, Syn. Mamm., ii, 1845, 137.—LECONTE, Proc. Acad. Nat. Sci. Phila., 1852, 162.
Ascomys umbrinus, WAGN., Suppl. Schreb., iv, 1843, 389.

Pseudostoma umbrinus, AUD. & BACH., Quad. N. A., iii, 1854, 307.

Thomomys umbrinus, BAIRD, Mamm. N. A., 1857, 399.

Thomomys talpoides umbrinus, COUES, Powell's Exp. Col. R., 1875, 261 (monographic.)

Geomys fulvus, WOODH., Proc. Acad. Nat. Sci. Phila., 1852, 201; Sitgreave's Rep. Expl. Zuñi & Colorado R., 1853, 51, pl. 5.

Pseudostoma (Geomys) fulvus, AUD. & BACH., Q. N. A., iii, 1854, 300.

Thomomys fulvus, BD., M. N. A., 1857, 402; U. S. Mex. B. Surv., ii, pt., 1859, mamm., p. —.—KENN., P. R. R. Rep., x, 1859, Whipple's Route, mamm., 14, pl. 12, f. 2.—COUES, Am. Nat., i, 1867, 394; Proc. Acad. Nat. Sci. Phila., 1867, 135.

Specimens.

No.	Name.	Locality.	Date.	Collector.	Remarks.
484	<i>Thomomys umbrinus</i>	Provo, Utah.....	Dec. 1, 1872	Dr. H. C. Yarrow...	Skin.
761	.....do.....	Mt. Graham, Arizona..	Sept. 19, 1874	H. W. Henshaw...	Do.
739	.....do.....	.....do.....	.....do.....	.....do.....	Do.
(?)	.....do.....	.....do.....	.....do.....	.....do.....	Do.
(?)	.....do.....	.....do.....	.....do.....	.....do.....	Alcoholic.

In these specimens, we recognize fully the *Thomomys umbrinus* of Baird, as described at length by that author in the work above quoted. Professor Baird appears to refer the species to the *Geomys umbrinus* of Richardson with some doubt, in view of certain discrepancies between the subjects of his article and the description of Richardson's—a doubt apparently removed by Dr. Coues's article above cited. We present in detail the characters of our specimens.

The species is among the smaller ones of the genus. Mature specimens, excellently prepared, and thus probably giving reliable measurements, are not over six inches in length from the nose to the root of the tail, which member measures $2\frac{1}{2}$ inches. Fore foot, with longest claw, measured from the wrist, $\frac{3}{4}$ to $\frac{4}{5}$; longest claw, about 0.40. Hind foot, with claw, 1 inch, as nearly as possible. Measurements of the head cannot now be well taken; but the distance from the eye to the ear is about $1\frac{2}{5}$, with the eye nearly midway. In form, the species coincides with others of the genus.

The cheek-pouches, fully everted, are seen to be of a squarish or rather trapezoidal shape, with decided corners, like a small pillow-case. The anterior corner is quite acute; the posterior is more rounded off. The antero-posterior diameter of the pouch is something less than an inch; its depth

along the fore border is an inch, along the opposite border much less. The length of the slit leading into the pouch is an inch. These dimensions are as they appear in the dried state; in life, it will be remembered, the parts are very mobile and distensible. The pouch is thickly furry on the side next the body, more thinly so on the opposite wall. The whiskers are numerous, the longest about equaling the head, and so extremely delicate that they are best seen held up to the light. The eye is minute, about two-tenths long. The ear appears chiefly as a slight circular raised border, and is little larger than the eye. Of the fore feet, the third claw is the longest, about half the total length of the foot; the second and fourth are subequal, and about a tenth of an inch shorter; the fifth does not reach half way to the end of the fourth; the first does not attain the base of the second. All are much compressed, curved, and acute. The palm is naked; the back of the hand is clothed with bristly hairs, the longer of which overhang the bases of the claws. The soles are naked, like the palms; the hind foot is contained about two and a half times in the length of the tail; the second and third digits, with claws, are longest and subequal to each other; the fourth is considerably shorter; the first and fifth much shorter still; the latter rather the shortest. The tail is cylindric-tapering, without much enlargement at the extreme base. It is well clothed with short hairs, and contained about $2\frac{2}{3}$ times in the length of head of and body.

On viewing a dried specimen, with everted pouches, the most striking feature of coloration is observed in the contrast between the nearly pure white lining of the pouches and the sooty-blackish of the face. On the side next the body, where the pouches are most furry, they look quite white; less so on the opposite walls, where the skin shows through the scant hairs. The middle parts of the head above the snout, cheeks, and chin are sooty-blackish; in some specimens with a white throat-patch (*confer Richardson*); in others without this. This sooty color is prolonged over the nape as an obscure dark median band, and also particularly tinges the auricular region and temples. The general coloration is difficult of description, and varies, too, in different specimens. Selecting the most heavily colored example, No. 739, it is seen to be of a rich, ruddy-brown or reddish-chestnut, brightest on the sides, where it is almost "red", obscured on the back with sooty-

blackish like that of the face, which tends to form an obscurely indicated dorsal stripe, but spreads and blends so completely with the chestnut that special marking is hardly recognizable. The same rich reddish of the sides occupies with little diminished intensity all the under parts; but here it is confined to a narrower space at the ends of individual hairs, so that the dark leaden-gray of the basal parts of the hairs shows through and interrupts the continuity of the chestnut. The tail is of an indefinite dark color, sometimes whitening toward the end. The upper surfaces of both fore and hind feet are whitish, or quite purely white, in decided contrast with the body-colors.

In the other extreme, of grayness, with the same sooty-blackish face and wash on the upper parts, and the same white pouch and feet, the body-colors are notably different in lacking nearly all of the rich, ruddy-brown tints, which are chiefly apparent along the sides, especially of the head and chest. The upper parts are gray, obscured with sooty, faintly relieved with a rufous tinge; the under parts are hoary-gray, showing the darker leaden-gray of the basal part of the fur, and faintly tinged with brownish on the belly.

The third specimen, like others we have examined, is exactly intermediate between the extremes above noted. The significance of these differences remains to be ascertained. Professor Baird considered the gray state to be indicative of old age; season and sex may also influence the coloration, or much of the difference may be purely fortuitous.

The species appears to be abundant in the region where these specimens were procured. It is not necessary to suppose that Richardson's type came from anywhere in the State of Louisiana as at present mapped. "Louisiana" was formerly a very vague term, covering much ground, especially upon the labels of specimens of natural history.

NOTE.—Since the foregoing description was penned, Major Powell's Report of the Exploration of the Colorado River has appeared, containing Dr. Coes's monograph of *Geomysidæ*, which may be consulted for further account of the character and relationships of this form of *Thomomys*.

FAM. SCIURIDAE.

SCIURUS ABERTI, Woodhouse.

Tuft-eared Squirrel.

Sciurus dorsalis, WOODH., Pr. A. N. Sc. Phil., vi, June, 1852, 110 (name pre-occupied).

Sciurus aberti, WOODHOUSE, Pr. A. N. Sc. Phil., vi, Dec., 1852, 220; Sitgreave's Zuñi Exped., 1853, 53, mammals, pl. vi.—AUD. & BACH., Q. N. A., iii, 1854, 262, pl. 153, f. 1.—BAIRD, Mamm. N. A., 1857, 267.—COUES, Am. Nat., i, 1867, 355.—COUES, Proc. Acad. Nat. Sci. Phila., 1867, 134.—ALLEN, Proc. Bost. Soc., xvi, 1874, p. —.

Sciurus castanotus, BAIRD, Proc. Acad. Nat. Sci. Phila., 1855, 332 (typographical error for *castanonotus*).

Sciurus castanonotus, BD., Mamm. N. A., 1857, 266.—BD., Mex. B. Surv., ii, 1859, mammals, 35, pl. 5.

A fine specimen of this species of squirrel was obtained on the expedition of 1872 on the southern slope of Bill Williams' Mountain. Several others were secured, always in hilly districts. It was found to be very common in New Mexico and Arizona, and numerous specimens were secured during the expeditions of 1873 and 1874. One specimen was taken in Northwestern Colorado, which is probably its most northern limit.

Specimens.

No.	Name.	Locality.	Date.	Collector.	Remarks.
A 4	<i>S. aberti</i>	Tierra Amarilla, Colo..	Oct. 25, 1873	Lt. W. L. Marshall..	In flesh.
A	.....do	Camp Apache, Ariz....	Sept., 1873	Dr. Loew.....	Skin and cranium.
17	.....do	Mt. Taylor, N. Mex....	July 5, 1873	Dr. Newberry	Skin.
108	.....do	Bowie, N. Mex.....	Oct., 1873	.....do	In flesh.
697	.....do	Apache, Ariz	Sept., 1873	H. W. Henshaw....	Skin.
659	.....do . . . . .	.....do . . . . .	.....do . . . . .	.....do	Do.
395	.....do	Santa Fé, N. Mex.....	Aug., 1874	Dr. H. C. Yarrow...	Do.
394	.....do . . . . .	.....do . . . . .	.....do . . . . .	.....do	Do.

These specimens are particularly interesting, as they demonstrate a hitherto unrecognized range of variation of the species. A part of them have no trace of the dorsal chestnut stripe, usually conspicuous. In this state, they are curiously similar to *Sciurus fessor*, though, of course, distinguishable by the tufted ears, dark lateral stripe, and other characters. The amount of tufting of the ears is very variable, however; the tufts being

sometimes wanting altogether in individuals that at other times possess them. This feature seems to depend mainly upon season, as the tufts are probably shed periodically. The condition of complete melanism has lately been determined to occur in this as in other species of the genus.

SCIURUS ARIZONENSIS, Coues.

Arizona Gray Squirrel.

Sciurus arizonensis, COUES, Am. Nat., i, 1867, 357 (Fort Whipple, Ariz.).—COUES, Proc. Acad. Nat. Sci. Phila., 1867, 134.

"Rather smaller than the eastern Gray Squirrel; of the same form and body-colors; the tail longer, fuller, and much broader. Ears moderate, untufted, both sides furred. Palm 5-tuberculated, nearly naked, but a little hairy on the concavities of the fingers; 4th finger longest; 3d nearly equal; 2d equal to 5th. Soles 6-tuberculated, naked to the heels, but furred rather far around on their sides; 4th toe longest; 2d and 3d nearly equal, and but little shorter. Tail to end of vertebræ equaling length of body from nose to root of tail; the hairs projecting $3\frac{1}{2}$ inches beyond terminal vertebra. Above, from nose to root of tail, a uniform mixture of gray, black, white, and tawny; the latter predominating. On the sides of the body and outside of the limbs, the tawny and black disappear, leaving a clear grizzle of gray and white. Below, from chin to anus, with the inside of the limbs, pure white, very trenchantly defined against the color of the upper parts and sides. Eyelids and cheeks, about the nose, white; woolly space at base of ears ochraceous white. The tail from above is basally of the same color as outside of thighs, the tawny of the back stopping abruptly at its base; in the rest of its extent it is black, broadly fringed with white, and having white hairs scattered sparsely through its black portion. Viewed from below, the tail is tricolor, being centrally tawny, bordered with black, which is in turn fringed with white.

"*Dimensions*.—Nose to anterior canthus of eye, 1.1 (inches and tenths); to root of tail, 9.5; tail to end of vertebræ, 9.5; to end of hairs, 13.00; its width, at broadest part, fully 6.00. Height of ear, 0.8. Longest whisker, 3.3. Palm to end of longest finger, with claw, 1.6; from olecranon to ditto, 3.6. Heel to end of longest toe and claw, 2.3; greatest width of sole, 0.7."—(*Descr. orig.*)

This squirrel was discovered by Dr. Coues at Fort Whipple in 1865, and the single specimen then procured remains unique. Its characters cannot be reconciled with those of any other United States species known. Mr. Allen, in his late critical studies of this group, does not account for the species, though he writes us that possibly it may be the same as one of the Mexican species. In default, however, of any such identification, we continue to regard it as distinct.

SCIURUS HUDSONIUS FREMONTI, (Townsend) Allen.

Frémont's Chickaree.

Sciurus fremontii, TOWNSEND, *apud* AUD. & BACH., Quad. N. Am., iii, 1853, 237, pl. 149.—BAIRD, Mamm. N. A., 1857, 272.—COUES, Am. Nat., i, 1867, 356; Proc. Acad. Nat. Sci. Phila., 1867, 134.

Sciurus hudsonius var. *fremonti*, ALLEN, Proc. Bost. Soc. Nat. Hist., xvi, 1874, p. —.

Specimens.

No.	Name.	Locality.	Date.	Collector.	Remarks.
170	<i>S. hudsonius fremonti</i> ...	Twin Lakes, Colo.	Aug. 18, 1873	Dr. J. T. Rothrock.	Skin & cranium.
170 A	..... do .....	..... do .....	..... do .....	..... do	Do.
206	..... do .....	..... do	July 10, 1873	..... do	In flesh.
246 ♂	..... do	Chihuahua Creek, Colo.	July 4, 1873	H. W. Henshaw..	Do.
245 ♂	..... do	Fort Garland, Colo. ....	..... do .....	..... do	Do.
299 ♀	..... do .....	..... do	June 3, 1873	..... do	Do.
247 ♂	..... do .....	..... do .....	..... do .....	..... do	Do.
301	..... do .....	..... do .....	..... do .....	..... do	Do.
301 A	..... do .....	..... do .....	..... do .....	..... do	Do.
301 B	..... do .....	..... do .....	..... do .....	..... do	Do.
301 C	..... do .....	..... do .....	..... do .....	..... do	Do.
L 1	..... do .....	..... do	Aug., 1873	Dr. C. G. Newberry	Do.
D D	..... do	Camp Apache, Ariz. ....	..... do .....	..... do	Do.
76	..... do	White Mts., Ariz. ....	..... do .....	..... do	Do.
76 a	..... do	El Moro, N. Mex.	July, 1873	H. W. Henshaw..	Do.
121	..... do	Sangre de Cristo Pass, Colo.	Aug. 9, 1874	C. E. Aiken.....	Skin.

Very numerous in mountains of Colorado, New Mexico, and Arizona. Ranges from Rocky Mountains, south of 43°, to the Pacific coast. Sixteen specimens collected in the different Territories visited.

TAMIAS QUADRIVITTATUS, (Say) Rich.

Four-striped Squirrel.

Sciurus quadrivittatus, SAY, Long's Exped. R. Mts., ii, 1823, 45.—HARLAN, Fn. Am., 1825, 180.—GRIFF., An. Kingd., v, 1827, 255.—WAGN., Suppl. Schreb., iv, pl. 204, A.

Sciurus (*Tamias*) *quadrivittatus*, RICH., Zoöl. Journ., iii, 1828, 519; F. B.-A., i, 1829, 184, pl. 16.—FISCH., Syn., 1829, 350.

Tamias quadrivittatus, WAGN., Suppl. Schreb., iii, 1843, 234.—AUD. & BACH., Quad. N. A., i, 1849, 195, pl. 24.—BAIRD, Mamm. N. A., 1857, 297.—ALLEN, Proc. Bost. Soc. Nat. Hist., xvi, 1874, p. —
Tamias minimus, BACH., Journ. Acad. Nat. Sci. Phila., 1839, 71; Towns. Narr., 1839, 323.—WAGNER, Wieg. Arch., ii, 1843, 44.

Specimens.

No.	Name.	Locality.	Date.	Collector.	Remarks.
118	T. quadrivittatus....	Twin Lakes, Colo....	July 26, 1873	Dr. J. T. Rothrock..	In flesh.
A 9	.....do.....	.....do.....	.....do.....	.....do.....	Do.
242	.....do.....	Fort Garland, Colo....	June, 1873	H. W. Henshaw....	Do.
242 A	.....do.....	.....do.....	.....do.....	.....do.....	Do.
242 B	.....do.....	.....do.....	.....do.....	.....do.....	Do.
242 C	.....do.....	.....do.....	.....do.....	.....do.....	Do.
242 D	.....do.....	.....do.....	.....do.....	.....do.....	Do.
27	.....do.....	Fort Wingate, N. Mex.	July, 1873	.....do.....	Do.
1104 a	.....do.....	Santa Fé, N. Mex....	June, 1874	.....do.....	Do.
1104 b	.....do.....	Arizona.....	—, 1874	.....do.....	Do.
1104 c	.....do.....	.....do.....	.....do.....	.....do.....	Do.
1104 d	.....do.....	.....do.....	.....do.....	.....do.....	Do.
1104 e	.....do.....	Mt. Graham, Ariz....	June, 1874	Dr. J. T. Rothrock..	Do.
1104 f	.....do.....	.....do.....	.....do.....	.....do.....	Do.
1104 g	.....do.....	.....do.....	.....do.....	.....do.....	Do.

First seen at Provo, Utah, and thence westward into Eastern Nevada and throughout Southern Utah.

Widely distributed throughout the West from Rocky Mountains to the Pacific coast. Very numerous in mountains of Colorado, where a number of specimens were secured.

TAMIAS QUADRIVITTATUS PALLIDUS, Allen.

Pale Four-striped Squirrel.

Tamias quadrivittatus var. *pallidus*, ALLEN, Proc. Bost. Soc. N. H., xvi, 1874, p. —.

Specimens.

No.	Name.	Locality.	Date.	Collector.	Remarks.
463	T. quadrivittatus pallidus....	El Moro, N. Mex....	July 25, 1873	H. W. Henshaw	In flesh.
.....	.....do.....	Apache, Ariz.....	Aug. 23, 1873	.....do.....	Do.

TAMIAS QUADRIVITTATUS DORSALIS, (Baird) Allen.

Gila Chipmunk.

Tamias dorsalis, BAIRD, Proc. Acad. Nat. Sci. Phila., 1855, 332; Mamm. N. A., 1857, 300; U. S. Mex. B. Surv., ii, pt. ii, 1859, mamm., 37, pl. 6, f. 1.—COUES, Am. Nat., i, 1867, 358.—COUES, Proc. Acad. Nat. Sci. Phila., 1867, 134.

Tamias quadrivittatus var. *dorsalis*, ALLEN, Proc. Bost. Soc. Nat. Hist., xvi, 1874, p. —.

This form, originally described from the Mimbres, and afterward found by Dr. Coues at Fort Whipple, is more distinct than the other lately recognized "varieties" of *T. quadrivittatus*; in fact, we do not feel confident that Mr. Allen's late assignment of it to this species may not require reconsideration. For the present, however, we accept this determination.

TAMIAS LATERALIS, (Say) Allen.

Rocky Mountain Chipmunk.

Sciurus lateralis. SAY, Long's Exp., ii, 1823, 46.—HARL., Fn. Am., 1825, 181.—GRIFF., An. Kingd., v, 1827, 255.—FISCH., Syn., 1829, 350.—GODM., Am. Nat. Hist., ii, 1831, 144.—WAGN., Suppl. Schreb., iv, pl. 214, B.

Arctomys (Spermophilus) lateralis, RICH., Zoöl. Journ., iii, 1828, 519; F. B. A., i, 1829, 174, pl. 13.

Spermophilus lateralis, F. CUV., Suppl. Buffon, i, 1831, 335.—WAGN., Suppl. Schreb., iii, 1843, 252.—AUD. & BACH., Q. N. A., iii, 1853, 62, pl. 114.—BD., M. N. A., 1857, 312.—NEWB., P. R. R. Rep., vi, 1857, 57.

Otospermophilus lateralis, BRANDT, Bull. Acad. St. Petersb., ii, 1844, 379.—GIEB., Säug., 1855, 638.

Tamias lateralis, ALLEN, Proc. Bost. Soc. Nat. Hist., xvi, 1874, 17; Bull. Essex Inst., vi, 1874, 57, 61, 66.

Specimens.

No.	Name.	Locality.	Date.	Collector.	Remarks.
175	<i>T. lateralis</i> ...	Dayton, Colo.	Aug., 1873	Dr. J. T. Rothrock	Skin and cranium.
175 A	... do ...	... do ...	... do ...	... do ...	Do.
(?)	... do ...	Arizona ...	Sept., 1873	(?)	Do.
209	... do ...	Twin Lakes, Colo.	Aug., 1873	Dr. J. T. Rothrock.	Do.
A 1	... do ...	... do ...	... do ...	... do ...	In flesh.
A 2	... do ...	... do ...	... do ...	... do ...	Do.
A 3	... do ...	... do ...	... do ...	... do ...	Do.
A 4	... do ...	... do ...	... do ...	... do ...	Do.
A 5	... do ...	... do ...	... do ...	... do ...	Do.
A 6	... do ...	... do ...	... do ...	... do ...	Do.
A 7	... do ...	... do ...	... do ...	... do ...	Do.
250	... do ...	Fort Garland, Colo.	June, 1873	H. W. Henshaw..	Skin and cranium.
232	... do ...	... do ...	Aug., 1873	... do ...	In flesh.
514	... do ...	Apache, Ariz ...	—, 1873	C. E. Aiken.....	Skin.
123	... do ...	Sangre de Christo, Colo.	Aug. 10, 1874	H. W. Henshaw..	Alcoholic.

Found northward from New Mexico in Rocky Mountains (Allen). But two specimens secured from Arizona, which increases its known range southward.

SPERMOPHILUS HARRISI, Aud. & Bach.

Spermophilus harrisi, AUD. & BACH., Q. N. A., iii, 1854, 267, pl. 154, f. 1.—BAIRD, M. N. A., 1857, 313.—ALLEN, Proc. Bost. Soc. Nat. Hist., xvi, 1874.

Very numerous in Southern Utah, living among the lava-beds.

SPERMOPHILUS TRIDECIM-LINEATUS, (Mitch.) Aud. & Bach.

Striped Prairie Squirrel.

Sciurus tridecem-lineatus, MITCH., Med. Rep., xxi, 1821, 248.—DESMAR., Mammif., ii, 1822, 339.

Arctomys tridecem-lineatus, HARLAN, Fn. Am., 1825, 164.—GODM., Am. Nat. Hist., ii, 1831, 112.

Spermophilus tridecem-lineatus, AUD. & BACH., N. A. Quad., i, 1849, 117, pl. 39.—HOY, Rep. U. S. Pat. Office for 1853 (1854), agric., p. —.—KENN., Rep. U. S. Pat. Office, agric., for 1856 (1857), 74, pl. viii.—WOODH., Sitgr. Rep., 1854, 52.—BD., Stansbury's Rep., 1852, 312; M. N. A. 1857, 316.—COUES, Am. Nat., i, 1867, 361.—ALLEN, Proc. Bost. Soc., xvi, 1874, p. —; *ib.*, xvii, 1874, 43.

Arctomys hoodii, SABINE, Linn. Trans., xiii, 1822, 590, pl. xxix.—SAB., Franklin's Journal, 663.—GRIFFITH'S CUV., iii, 1827, 186, pl. —; v, 1827, 247.—FISCHER, Synopsis, 1829, 544.—WAGNER, Suppl. Schreber, iv, pl. 210, C (no text).

Arctomys (Spermophilus) hoodii, RICH., F. B. A., i, 1829, 117, pl. xiv.

Spermophilus hoodii, F. CUV., Suppl. Buff. Mamm., 1831, 337.—PR. MAX., Reise N. A., i, 1839, 449.—WAGNER, Suppl. Schreb., iii, 1843, 251.

Écureil de la Fédération, DESM., Mamm., ii, 1822, 339.

Specimens.

No.	Name.	Locality.	Date.	Collector.	Remarks.
141	S. 13-lineatus.	South Park, Colo.	Aug. 13, 1873	Dr. J. T. Rothrock.	Skin and cranium.
207	..... do .....	..... do .....	..... do .....	..... do	Do.
250 A	..... do	Fort Garland, Colo.	June, 1873	H. W. Henshaw..	Do.
191 ♀	..... do .....	..... do .....	..... do .....	..... do	Do.
100	..... do	Twin Lakes, Colo.	Aug. 1873	Dr. J. T. Rothrock.	In flesh.
19	..... do	Tierra Amarilla, N. Mex	Oct., 1873	..... do	Do.

Very numerous and widely distributed on prairie from Arkansas northward to the Saskatchewan.

SPERMOPHILUS GRAMMURUS, (Say) Bach.

Line-tailed Squirrel.

Sciurus grammurus, SAY, Long's Exped. Rocky Mts., ii, 1823, 72.—HARL., Fu. Am., 1825, 182.—GRIFF., An. Kingd., v, 1827, 255.—FISCH., Syn., 1829, 350.

Spermophilus grammurus, BACH., Charlesworth's Mag., iii, 1839, 390.—WAGN., Suppl. Schreb., iii, 1843, 253.—BAIRD, Proc. Acad. Nat. Sci. Phila., 1855, 334; M. N. A., 1857, 310.—COUES, Am. Nat., i, 1867, 360.—ALLEN, Proc. Bost. Soc. Nat. Hist., xvi, 1874.

Spermophilus couchii, BAIRD, Proc. Acad. Nat. Sci. Phila., 1855, 332.—BAIRD, M. N. A., 1857, 311 (melanotic).

Spermophilus buckleyi, SLACK, Proc. Acad. Nat. Sci. Phila., 1861, 314.

NOTE.—The above synonymy is exclusive of the Pacific forms *beecheyi* and *douglassi*.

Specimens.

No.	Name.	Locality.	Date.	Collector.	Remarks.
526	S. grammurus...	Arizona	Sept., 1873	H. W. Henshaw..	Skin.
626	..... do	New Mexico	Oct., 1873	..... do	Do.
706	..... do	Apache, Ariz	Sept., 1873	..... do	Skin and cranium.
	..... do	Arizona	—, 1873	..... do	Alcoholic.
	..... do .....	..... do .....	..... do .....	..... do	Do.
X	..... do	Colorado	Aug., 1873	Dr. J. T. Rothrock.	Skin.
X 1	..... do .....	..... do .....	..... do .....	..... do	Do.
	..... do	Arizona	—, 1874	H. W. Henshaw..	Alcoholic.
1105	..... do	Gallinas Creek, N. Mex..	Oct., 1874	Dr. H. C. Yarrow.	Do.

Found from Rocky Mountains to Mexico; tolerably common. Prof. S. F. Baird, in the work above quoted, states, with regard to this species, as follows: "posterior half of upper portion of back having the white replaced by pale yellowish-brown." This coloration is not at all normal, and is not seen in young specimens, but is produced by the wearing away of the upper ends of the hairs from the animal backing into his hole. This fact was carefully observed by Mr. Henshaw, who procured several fine specimens. Mr. Allen, in his paper already cited, gives *S. couchii*, Baird, and *S. buckleyi*, Slack, as synonyms of melanistic examples of this animal from Texas.

"The rocky hill-sides, covered with volcanic *débris*, in the neighborhood of Camp Bowie, Arizona, afford a home for numbers of this species, and in our collecting trips in this neighborhood we frequently saw them hurrying away to their subterranean burrows, their utmost efforts to progress rapidly

resulting in an awkward scrambling gait. Among the confused masses of rock, however, they are more at home, and pass swiftly and with little apparent effort over and among them. They are gifted with considerable curiosity, and, having gained the mouths of their retreats, will often stop and gaze for some time upon the strange form of the intrusive stranger. This trait, however, never causes them to become forgetful of their own safety, as upon the first show of hostility they disappear as if by magic. Occasionally, we noticed a burrow in the more open ground, partially screened by bushes; this, however, is rare, the broken lavaic rocks being their chosen home. Upon inquiry, we learned that this little animal was well known in this section (Camp Bowie) for its depredations on the hen-coops, its aim being the eggs, which it was often successful in carrying off. Dr. Freeman informed us that many had been taken in traps set for this purpose, and that upon one occasion he himself had detected an individual in the act of taking his departure with an egg in his mouth."—(*Henshaw*.)

Genus **CYNOMYS**. Raf.

CYNOMYS COLUMBIANUS, (Ord) Allen.

Arctomys columbianus, ORD, Guthrie's Geog., 2d Am. ed., ii, 1815, 292, 302 (from Lewis & Clark).

Cynomys columbianus, ALLEN, Proc. Bost. Soc. Nat. Hist., xvi, 1874, p. —.

Anisonyx brachyura, RAF., Am. Monthly Mag., ii, 1817, 45 (from Lewis & Clark).

Arctomys brachyura, HARL., Fn. Am., 1825, 304.—FISCH., Syn., 1829, 345.

Arctomys lewisi, AUD. & BACH., Q. N. A., iii, 1853, 32, pl. cvii.

Cynomys gunnisoni, BD., Proc. Acad. Nat. Sci. Phila., 1855, 334.—BAIRD, Mamm. N. A., 1857, 335.—COUES, Am. Nat., i, 1867, 362.

Specimens.

No.	Name.	Locality.	Date.	Collector.	Remarks.
339 J. V.	<i>C. columbianus</i>	Rio Grande, Colo.	June, 1873	H. W. Henshaw ..	In flesh.
1 A	..... do	Twin Lakes, Colo.	Aug., 1873	Dr. J. T. Rothrock.	Do.
208	..... do .....	..... do .....	..... do .....	..... do	Skin and cranium.
176	..... do .....	..... do	Aug. 18, 1874	..... do	Do.
176 A	..... do .....	..... do .....	..... do .....	..... do	Do.
118 A	..... do .....	..... do .....	..... do .....	..... do	Do.
118 B	..... do .....	..... do .....	..... do .....	..... do	Do.
140	..... do	Pueblo, Colo.	Oct. 14, 1874	C. E. Aiken	Do.

Very numerous in parks and plains in and near the Rocky Mountains; westward to the plains of the Columbia.

Observed in but two localities in Utah, viz, near Panquitch Lake and Dog Valley, Middle Utah. Very numerous in Dog Valley and at Twin Lakes, Colorado.

As originally suggested by Professor Baird in describing "*gunnisoni*", this species proves, with further material examined by Mr. Allen, to be the same as the *columbianus* of Say, with which *brachyura* and *lewisii* are synonymous. Specimens show a decided brick-red color above, and tinge of the same below.

Genus **ARCTOMYS**, Schreber.

ARCTOMYS FLAVIVENTER, Aud. & Bach.

Yellow-bellied Marmot.

Arctomys flaviventer, AUD. & BACH., Proc. Acad. Nat. Sci. Phila., 1841, 99; Journ. Acad. Nat. Sci. Phila., viii, 1842, 309; Quad. N. A., iii, 1853, 160, pl. 134.—BAIRD, Mamm. N. A., 1857, 343.

Specimens.

No.	Name.	Locality.	Date.	Collector.	Remarks.
36	A. flaviventer...	Georgetown, Colo.....	June 16, 1873	Dr. J. T. Rothrock.	Skin and cranium.
36 A	.....do.....	.....do.....	.....do.....	.....do.....	Do.
359 ♀ ad.	.....do.....	Fort Garland, Colo.....	June 4, 1873	H. W. Henshaw..	Do.
360 jun.	.....do.....	Rio Grande, Colo.....	June 16, 1873	.....do.....	In flesh.
396	.....do.....	Santa Fé, N. Mex.....	Aug., 1874	Dr. H. C. Yarrow.	Skin.

Rocky Mountains westward to the Pacific coast. Rather scarce in Colorado, where, however, several specimens were secured.

FAM. CASTORIDAE.

Genus **CASTOR**, L.

CASTOR (FIBER var. ?) CANADENSIS, Kuhl.

American Beaver.

Castor canadensis, KUHL, Beiträge zur Zoöl., 1820, 64.—FISCHER, Syn., 1829, 288.—BD., M. N. A., 1857, 355.—COUES, Am. Nat., i, 1867, 362.

Castor americanus, F. CUV., Hist. des Mamm., 1821.—BRANDT, Beiträge Kennt. Säugt. Russ., 1855, 64, pls. i, ii, iii.

Castor fiber, SAY, Long's Exped. to Rocky Mountains, i, 1823, 464.—HARLAN, Fn. Am., 1825, 122.—GODMAN, Am. Nat. Hist., ii, 21.—DOUGHTY'S Cab. N. H., iii, 1833, pl. 1.—WATERHOUSE, Charlesw. Mag. N. H., iii, 1839, 593.—DEKAY, N. H. N. Y., i, 1842, 72, pl. xx.—MARCY, Rep. Red. River, 1852, 200.—WOODH., Sitgr. Rep. Zuñi & Colorado, 1854, 47.—ALLEN, Proc. Bost. Soc. Nat. Hist., xvii, 1874, 47.

Castor fiber, americanus, RICH., F. B. A., i, 1829, 105; Zoöl. Beechey's Voy., 1839, 6.—AUD. & BACH., Quad. N. Am., i, 1849, 347, pl. xlvi.

Castor Beaver, PENN., Hist. Quad., 1781, No. 251.—*Id.*, Arct. Zoöl., i, 1784, 98.

Le Castor de Canada, GEOFF. & F. CUV., Hist. Nat. des Mamm., iii, 1819.

Distributed throughout entire area of North America, in suitable localities, excepting where population has driven it away. Seen by different members of the expedition in great numbers from South Park, Colorado, south to the New Mexican boundary, near foot-hills and parks of main range.

Quite common throughout the Territory of Utah, but particularly abundant in Bear Valley, near Parowan, upon a small stream, one of the tributaries of the Sevier. Exceedingly shy, none being captured. Quite a traffic is carried on in their skins between the Indians and Mormons. A portion of one of their dams was broken down in order that their efforts to replace it might be perceived, but without success, although a careful watch was kept for two nights.

This animal is very common near Camp Verde, Ariz., in the various streams emptying into the Rio Verde, especially Beaver Creek. It also occurs at various places along the Colorado River, where cottonwoods and willows abound.

FAM. HYSTRICIDAE.

Genus ERETHIZON, F. Cuvier.

ERETHIZON EPIXANTHUS, Brandt.

Yellow-haired Porcupine.

Erethizon epixanthus, BRANDT, Mém. Acad. St. Petersb., 1835, 389, 416, pl. 1, pl. 9, f. 1-4.—SCHINZ, Syn., ii, 1845, 266.—WATERH., Nat. Hist. Mamm., ii, 1848, 442.—BAIRD, Mamm. N. A., 1857, 569.—COUES, Am. Nat., i, 1867, 531.—ALLEN, Proc. Bost. Soc. Nat. Hist., xvii, June, 1874, p. —.

Several seen on the Arkansas River, and in Colorado and New Mexico.

A single individual of this species was killed by Mr. E. E. Howell of the party upon Mount Nebo, near Nephi, Utah. According to the accounts of the settlers, it is quite common in the Wahsatch range, sometimes attaining a large size.

This species appears to be perfectly distinct from the eastern one, *E. dorsatus*, which it replaces, as far as known, in North America west of the plains. It has a wide range in latitude, from Mexico to Alaska, and corresponding regions in British America. Dr. Coues lately found it quite numerous in the Rocky Mountains at latitude 49° N.

FAM. LAGOMYIDAE.

Genus LAGOMYS, Cuv.

LAGOMYS PRINCEPS, Rich.

Little Chief Hare; Pika; "Coney" of mountaineers.

Lepus (Lagomys) princeps, RICH., Zoöl. Journ., 1828, 520; Fn. Bor.-Am., i, 1829, 227, pl. 19.—BACH., Journ. Acad. Nat. Sci. Phila., vii, 1837, 354.

Lagomys princeps, WATERHOUSE, Nat. Hist. Mamm., ii, 1848, 28.—AUD. & BACH., Quad. N. A., ii, 1851, 244, pl. 83.—BAIRD, M. N. A., 1857, 619.

Specimens.

No.	Name.	Locality.	Date.	Collector.	Remarks.
97	<i>L. princeps</i>	Argentine Pass, Colo....	July, 1873	Dr. J. T. Rothrock	Skin and cranium.
124	..... do	Fort Garland, Colo.....	May, 1873	H. W. Henshaw..	Do.
124 A	..... do .....	..... do .....	..... do .....	..... do	Do.
125	..... do .....	..... do .....	..... do .....	..... do	In flesh.
125 A	..... do .....	..... do .....	..... do .....	..... do	Do.
908	..... do	Apache, Ariz	Oct., 1873	..... do	Skin and cranium.

Quite numerous in the mountains, extending, according to Richardson, from the Rocky Mountains northward to 60° 4'. It generally inhabits the higher peaks, above timber-line, in the loose lava and scoria, where it hides, but, in some latitudes, descends to the edges of valleys in the mountains, or even to the foot-hills. At latitude 49°, it was found by Dr. Coues very abundant below 5,000 feet.

FAM. LEPORIDAE.

Genus *LEPUS*, Linn.*LEPUS AMERICANUS BAIRDI*, (Hayd.) All.**Baird's Hare.**

Lepus bairdii, HAYDEN, Am. Nat., iii, 1869, 113, fig. — (Wind River Mountains).—MERIAM, U. S. Geol. Surv. Terr. for 1871 (1872), 667 (Wyoming).

Lepus americanus var. *bairdii*, ALLEN, Proc. Bost. Soc. Nat. Hist., xvii, 1875, 434.

A single specimen of this interesting late discovery was procured—an unexpected acquisition, largely extending the known range of the species. The specimen is recognized by its sooty-blackish ears, sharply bordered with white, giving an unusual aspect. The rump is of the same dark color.

Specimen.

No.	Name.	Locality.	Date.	Collector.	Remarks.
122	<i>Lepus bairdi</i> ...	Mountains west of Taos, N. Mex.	Aug., 1874	Dr. H. C. Yarrow.	Skin.

LEPUS CALLOTIS, Wagler.**Jackass Rabbit.**

Lepus callotis, WAGLER, Nat. Syst. Amph., 1830, 25; Isis, 1831, 511.—WAGN., Suppl. Schreb., iv, 1844, 106, pl. 233, E.—WATERH., Nat. Hist. Mamm., ii, 1848, 138.—AUD. & BACH., Q. N. A., ii, 1851, 95, pl. 63.—MARCY, Exp. Red Riv., 1854, 201.—GIEBEL, Säug., 1855, 449.—BAIRD, Mamm. N. A., 1857, 590.—COUES, Am. Nat., i, 1867, 531.—ALLEN, Proc. Bost. Soc., xvii, 1875, 435.

Lepus nigricaudatus, BENNETT, Proc. Zool. Soc. Lond., i, 1833, 41.—BACHM., Journ. Acad. Nat. Sci. Phila., 1839, 84.

Lepus flavigularis, WAGLER, Suppl. Schreb., iv, 1844, 106.

Lepus texianus, WATERHOUSE, N. H. Mamm., ii, 1848, 136.—AUD. & BACH., Q. N. A., iii, 1853, 156, pl. 133.

Specimens.

No.	Name.	Locality.	Date.	Collector.	Remarks.
893	<i>L. callotis</i>	San Pedro, N. Mex.	Sept., 1873	H. W. Henshaw..	In flesh.
×	.....do	Arizona	—, 1874	.....do	Alcoholic.

The commonest and most characteristic hare of the southwestern plains. Quite a number of specimens were secured; but two only were brought in.

This animal is very abundant in the southeastern portion of California, some parts of Nevada, especially the western, and in various places in the lower part of Arizona.

It has often been found in the most barren deserts, and many miles from water.

Very common throughout Utah and Nevada, forming a great part of the subsistence of the Indians; the fur furnishing clothing for the squaws in winter. In November, it is the custom of the Pah-Utes, Gosh-Utes, and Pah-van Indians to resort to a large valley near Cedar City, Utah, for the purpose of having a grand hunt, and thousands of these rabbits are thus annually slaughtered. If properly cooked, the flesh is nutritious and tender.

LEPUS CALIFORNICUS, Gray.

California Hare.

Lepus californicus, GRAY, Mag. N. H., i, 1837, 586.—BACHM., J. A. N. Sc. Phil., viii, pt. i, 1839, 86.—WAGNER, Suppl. Schreb., iv, 1844, 110.—WATERH., Nat. Hist. Mamm., ii, 1848, 131.—AUD. & BACH., N. Am. Quad., iii, 1853, 53, pl. cxii.—GIEBEL, Säugt., 1855, 450.—BAIRD, Mamm. N. A., 1857, 594.—ALLEN, Proc. Bost. Soc. Nat. Hist., xvii, 1875, 435.

Lepus richardsonii, BACH., J. A. N. Sc., viii, i, 1839, 88.

Lepus bennettii, GRAY, Zool. Voy. Sulphur, mamm., 1844, 35, pl. xiv.

Found south of the Pinal Mountains, near the Gila River (?), and in Owen's Valley, California. Skins obtained.

LEPUS CAMPESTRIS, Bach.

Northern Prairie Hare.

"*Lepus virginianus*, var. ?", HARL., Fn. Am., 1825, 310 (based on Lewis & Clark).

Lepus virginianus ["HARL."], RICH., F. B. A., i, 1829, 224 (not of Harlan).—MAXIM., Reise, i, 1839, 508.

Lepus campestris, BACHM., Journ. Acad. Nat. Sci. Phila., vii, pt. ii, 1837, 349; viii, pt. i, 1839, 80 (in winter pelage).—WATERH., N. H. Mamm., ii, 1848, 127.—GIEB., Säug., 1855, 449.—BD., M. N. A., 1857, 585.—NEWB., P. R. R. Rep., vi, 1857, 63.—COOP. & SUCKL., N. H. Wash. Terr., 1860, 104, 131.—HAYD., Tr. Am. Phil. Soc., xii, 1862, 148.—MAXIM., Verz. Nord-Am. Säug., 1862, 193.—ALLEN, Bull. Essex Inst., vi, 1874, 52, 58, 61, 66.—AMES, Bull. Minn. Acad. Nat. Sci., 1874, 70.—COUES, Bull. Essex Inst., vii, 1875, 73 (monographic).—ALLEN, Proc. Bost. Soc. Nat. Hist., xvii, 1875, 433.

Lepus townsendii, BACH., Journ. Acad. Nat. Sci. Phila., viii, 1839, 90, pl. 2.—TOWNS., Narr., 1839, 325.—AUD. & BACH., Q. N. A., i, 1849, 25, pl. 3.

Found in mountains to the eastward of Kanab, Utah; said to be quite

common. It is, however, essentially a more northern species, reaching only to Upper California, and attaining the regions explored chiefly at higher altitudes. It is the characteristic species of the Upper Missouri region. A full account of the species is given in Dr. Coues's article above cited.

LEPUS SYLVATICUS, Bach.

Gray Rabbit; Cotton-tail.

- "*Lepus nanus*, SCHREB., Säug., ii, 1792, 881, pl. 234, B. (in part)."—DEKAY, N. Y. Fauna, i, 1842, 93, pl. 27, f. 1.—WAGN., Suppl. Schreb., iv, 1843, 114.
- Lepus americanus*, DESM., Mamm., ii, 1822, 351 (*nee* Erxl.).—HARL., Fn. Am., 1825, 193.—AUD., Orn. Biog., ii, 51, pl. —.—BACH., Journ. Acad. Nat. Sci. Phila., vii, 1837, 326, pl. 16, f. 3, 4.—THOMPS., Vermont, 1842, 48.—GODMAN, Nat. Hist., ii, 157.
- Lepus sylvaticus*, BACHM., Journ. Acad. Nat. Sci. Phila., viii, 1839, 78.—WATERH., Nat. Hist. Mamm., ii, 1848, 116.—AUD. & BACH., Q. N. A., i, 1849, 173, pl. 22.—WOODH., Sitgr. Exp. Zuñi & Col. Riv., 1854, 54.—MARCY, Red Riv., 1854, 200.—BAIRD, Mamm. N. A., 1857, 597.—ALLEN, Proc. Bost. Soc. Nat. Hist., xvii, 1875, 434; and of late authors generally.

Specimens.

No.	Name.	Locality.	Date.	Collector.	Remarks.
416	<i>L. sylvaticus</i>	Fort Garland, Colo....	June, 1873	H. W. Henshaw..	Skin and cranium.
249 ♀	..... do .....	..... do .....	..... do .....	..... do	Do.
218 ♀	..... do .....	..... do .....	..... do .....	..... do	Do.
294 ♀	..... do .....	..... do .....	..... do .....	..... do	Do.
251 ♂	..... do .....	..... do .....	..... do .....	..... do	Do.
293 ♀	..... do .....	..... do .....	..... do .....	..... do	Do.
331 ♀	..... do	Rio Grande, Colo .....	..... do .....	..... do	Do.

Numerous on western plains. Large *suite* of specimens secured, mostly females.

LEPUS SYLVATICUS NUTTALLI, (Bach.) Allen.

Sage Rabbit.

- Lepus nuttallii*, BACH., Journ. Acad. Nat. Sci. Phila., vii, 1837, 345.
- Lepus sylvaticus* var. *nuttalli*, ALLEN, Proc. Bost. Soc. Nat. Hist., xvii, 1875, 434.
- Lepus artemisia*, BACH., J. A. N. Sc. Phila., viii, pt. i, 1839, 94.—WATERH., Nat. Hist. Mamm., ii, 1848, 126.—AUD. & BACH., Q. N. A., ii, 1851, 272, pl. 88.—BAIRD, Mamm. N. A., 1857, 602.—COUES, Am. Nat., i, 1867, 534.—MARCY, Red River, 1854, 201.

RODENTIA—LEPORIDAE—LEPUS SYLVATICUS NUTTALLI. 129

Lepus artemisiacus, WAGNER, Suppl. Schreber, iv, 1844, 114.

Lepus bachmani, WATERH., P. Z. S., 1838, 103; Nat. Hist. Mamm., ii, 1848, 124.—
BAIRD, M. N. A., 1857, 606.

Common in the Territories visited.

Found in the desert portions of Arizona near the Gila river, though very few were either seen or obtained.

Specimen.

No.	Name.	Locality.	Date.	Collector.	Remarks.
833 B	<i>L. sylvaticus nuttalli</i> .	Southern Arizona	—, 1873	H. W. Henshaw..	Skin and cranium.

A number of other specimens belonging to this family, mostly young, were secured, but have not yet been identified.

Specimens.

No.	Name.	Locality.	Date.	Collector.	Remarks.
248	<i>Lepus</i> ———?..	Fort Garland, Colo.....	June, 1873	H. W. Henshaw..	In flesh.
499 ♂ ad.	.....do	El Moro, N. Mex.....	July, 1873	.....do	Skin and cranium.
435	.....do	Fort Wingate, N. Mex...	Sept., 1873	.....do	Cranium.
410	.....do	Arizona.....	—, 1874	.....do	Skin.
122	.....do	Sangre de Cristo, Colo...	Aug. 9, 1874	C. E. Aiken	Do.
264	.....do	Pueblo, Colo	July, 1874	.....do	Do.
410	.....do	Arizona	—, 1874	H. W. Henshaw..	Do.

RECAPITULATION OF SPECIES OF MAMMALS TREATED.

Families.	Species.	Families.	Species.
Felidæ	3	Saccomyidæ	4
Canidæ	5	Geomyidæ	2
Mustelidæ	7	Zapodidæ	1
Procyonidæ	1	Muridæ	10
Ursidæ	2	Sciuridæ	10
Bovidæ	3	Castoridæ	1
Antilocapridæ	1	Hystriidæ	1
Cervidæ	3	Lagomyidæ	1
Phyllostomatidæ	1	Leporidæ	6
Noctilionidæ	1		
Vespertilionidæ	10	Total	73

CHAPTER III.

REPORT

UPON

THE ORNITHOLOGICAL COLLECTIONS

MADE IN PORTIONS OF

NEVADA, UTAH, CALIFORNIA, COLORADO, NEW MEXICO, AND ARIZONA,

DURING

THE YEARS 1871, 1872, 1873, AND 1874,

BY

H. W. HENSHAW.

CHAPTER III.

The following report is based upon the material gathered by the regular collectors of the expeditions, which has been increased by some few specimens from other of the survey assistants, during the field-seasons of 1871, 1872, 1873, and 1874. In 1871, the collection of birds, made mostly by Mr. F. Bischoff, was quite small, comprising sixty-four species, represented by eighty-eight specimens.* These came from various parts of Nevada and Arizona, the greater portion being found in the latter Territory, and were interesting as illustrating, in several instances, valuable facts regarding the geographical distribution of certain forms. The entire loss of Mr. Bischoff's manuscript notes is greatly to be regretted, since doubtless was recorded in them much information concerning the birds making up the collection, which would have added very much to the value of the report.

Besides the report of 1871, and in addition to my own work, which extends through the seasons of 1872, 1873, and 1874, it also includes the results in this department of Dr. H. C. Yarrow in 1872, whose labors, as well as my own, were confined chiefly to Utah. In 1873, the general results were further swelled by a collection of some two hundred birds, made by the joint exertions of Dr. J. T. Rothrock and Dr. C. G. Newberry. In 1874, besides much aid received from Dr. Rothrock and Mr. Jas. M. Rutter, who, with myself, were engaged during the entire season chiefly in Arizona, a valuable collection of fine skins, amounting to over three hundred specimens, representing no less than one hundred and fifteen species, were gathered in Colorado by Mr. C. E. Aiken, who accompanied the expedition as general naturalist. Besides many valuable specimens, which, by their labors, were added to the collection, I am indebted to each of these gentlemen for certain information respecting the habits and range of species, some of which were not met with by myself at all.

* These, at least, were all that were received at the office. Some of the season's results were lost by fire.

All such notes have been made available, and in each instance will be found accredited to its proper source. In 1872, the months inclusive from July 15th to December were spent in the field, during which time over six hundred birds were collected by Dr. Yarrow and myself, including one hundred and sixty-five species. The route taken was a varied one; but, in general, the line of travel may be stated as a southern or southwestern one, from Salt Lake City to Saint George, the extreme southwestern settlement in the Territory. Many of the lines of travel led over plains of sage-brush and wastes of sand, remarkable for little else save the desolate character seen in every feature of the landscape and the paucity of animal life. In the neighborhood of the streams, however, where vegetation always grows luxuriantly, and especially in the vicinity of the towns, birds were found in considerable numbers, and often the number of species was considerable. The mountains, too, furnished some interesting varieties, though less time was spent among them than would have been desirable, since it is in the more elevated regions that the heavy growths of forest and profuse vegetation, attain their greatest luxuriance, dependent as they are almost entirely upon the amount of annual rain-fall, which, in the high mountains of these regions, is very considerable.

In 1874, the time was spent in sections of country far more favorable to the successful prosecution of zoölogical work in general, while certain points proved especially interesting to the ornithologist. As a result of the season's labors of Dr. Rothrock, Dr. Newberry, and myself, more than two hundred species of birds were obtained, included in an aggregate of very nearly twelve hundred specimens, many of which were of great rarity, and one (*Eugenes fulgens*) new to our fauna. Others also were noted, and their identity ascertained beyond doubt, of which no specimens were secured.

The following brief *résumé* of the season's work, indicating the points where any considerable intervals of time were spent, may prove of interest.

In accordance with orders received, I made an early start, and arrived in Denver the 5th of May, 1873, intending to proceed directly to Fort Garland, Col., a locality which had been selected as affording a promising field for zoölogical work, more especially in ornithology. Through the unavoidable detention of my collecting material, my stay in Denver was prolonged for more than two weeks. This interval till the 22d of May

was spent in making daily excursions in the vicinity of the city, more especially along the banks of the Platte River, which is here tolerably well timbered, principally with cottonwoods, and on Cherry Creek. At the time of my arrival, I found the season quite backward, and the vegetation was little, if any, in advance of what I left in the vicinity of Boston. But few of the trees had fairly begun to leaf out, though before my departure the cottonwoods and many others were far advanced in this respect. The observations made at this time are believed to be possessed of very considerable value, as giving the time of arrival of a large number of species; while the capture of quite a number is of especial interest, as extending their range much farther to the west than was hitherto known. The fauna in the vicinity of Denver is perhaps best compared with the Carolinian of the Eastern Province; but the list presents such a number, as would naturally be expected from the early season at which the collection was made, which are to be regarded merely as migrants, and which spend the summer far to the northward.

Fort Garland is situated in Southern Colorado, on the lowest bench of the Sierra Blanca Mountains, distant twenty miles east of the Rio Grande, in latitude $37^{\circ} 25'$ north, longitude $105^{\circ} 26'$ west, and has an elevation of 7,600 feet above the level of the sea. Immediately surrounding the post is a sage brush plain, which to the northward and westward stretches away for many miles, presenting the same unvarying characteristics, but to the north and east is broken up by volcanic ridges, which are soon lost in the foot hills of the mountains. The foot hills are well clothed with piñons and cedars. From May 24 till June 3, the time was spent in making collections in the immediate vicinity of the fort, more particularly upon the creeks which flow through the plain, and are well timbered with cottonwoods, and in many places skirted by heavy brush. As might be expected, the immediate neighborhood of these streams affords a home for large numbers of birds; the number of species, however, not being great, and of these by far the larger part are of the smaller insectivorous kinds. The almost total absence of the large rapacious birds was very noticeable, and during my whole stay in the region I saw but two (*Buteo calurus* and *Bubo arcticus*).

A week's camp in the pine woods at the base of Mount Baldy, some

twelve miles to the north of the fort, at an approximate elevation of 9,500 feet, added numerous varieties to the list, many of which were not met with at all farther down, and also afforded an opportunity of observing the vertical range of many of the species. The timber consists mainly of the yellow pine, which here attains a large size, interspersed with more or less spruce. Of the deciduous trees, the aspens were the only numerous representatives; these grew in thick groves on slopes of the mountains, and often attain a great elevation, sometimes, indeed, forming the timber limit above the pine. The small streams are thickly skirted with many deciduous bushes and shrubs, prominent among which are the willows and alders. The fauna at this point is analogous to the Canadian.

On returning to Fort Garland, I was afforded an opportunity of making a week's trip to the summer cavalry camp established on the banks of the Rio Grande, ninety miles northeast of the fort. Here I was most kindly received by Captain Carraher and Lieutenant Pond, officers in charge, who extended to me every courtesy and aid.

The number and variety of the birds found along the Rio Grande at this point did not differ in any noteworthy respect from those in the vicinity of Fort Garland, and the collecting trips made into the mountains, which rise a few miles from the banks, gave similar results to those obtained at Mount Baldy. Returning to the post June 19, a short trip was made to a series of alkali lakes, thirty miles northwest, and some interesting facts obtained regarding the nidification of the water birds. The remaining time, till July 2, was occupied in making daily excursions from the fort.

In conclusion, I cannot refrain from mentioning the uniform courtesy I received from each and all of the officers of the post. To Colonel Alexander, the commanding officer, to Captain Jewett, and to Lieutenant Hartz, whose hospitality I enjoyed during my stay at the post, I am greatly indebted. Every possible aid in the prosecution of my work was extended.

Leaving Southern Colorado July 2, I arrived at Fort Wingate, N. Mex., the 12th. During a week's delay, attendant on fitting out the several parties, short trips were made into the neighboring region; Dr. Newberry and myself accompanying the party on each occasion, and making collections in zoölogy. Owing to the rather desolate nature of the country,

these, however, were not very extensive; the birds especially being found rather scarce. Starting from Fort Wingate July 19, a southwesterly course was pursued, our destination being Camp Apache, Ariz., where we arrived August 2. During this interval, as we moved slowly, I was enabled to spend considerable time in making collections, and some very interesting results were obtained, especially in the way of birds. From August 2 till September 6, collections were made by Dr. Newberry and myself in the vicinity of Camp Apache and the adjoining White Mountains. This region proved very interesting ornithologically; and, indeed, the general collections made here were perhaps larger than during any other equal period through the season. From here southward, quite a distinct change in the character of the avifauna was noticed, and a number of species were noted either in the vicinity of Camp Apache or a few miles to the northward, that probably find their northward limit here. Such are *Pyrranga hepatica*, *Peucaea ruficeps* var. *boucardi*, *Cyanocitta ultramarina* var. *arizonæ*, *Setophaga picta*, *Melanerpes formicivorus*, etc.

The Gila River was crossed at a point some sixty miles south of Camp Apache, and a few days' stay along the river gave valuable results in zoölogy. We arrived at Camp Bowie, Ariz., the southernmost point reached, October 6. From here our route led northward to the Gila River, which was followed to its sources in New Mexico, after which a general northward course was taken for Fort Wingate, which was reached November 27, when the field work ended.

Though no new species were detected, one (*Eugenes fulgens*) was added to our fauna, and numerous specimens secured of rare and little known species, while the geographical range of quite a number was widely extended. During the last month, the results in zoölogy, owing to the lateness of the season, were rather meager. Thus, the region in which most of the observations following were made may be stated in general terms to be the southeastern portion of Arizona and Southwestern New Mexico.

Mr. Aiken's route during the season of 1874 may be briefly indicated as follows: From the 23d of July till the 5th of August, the time was spent in the neighborhood of Pueblo, Colo., careful observation here, at this rather unfavorable time, resulting in the note of no less than fifty species

of birds, all of which had without doubt nested here at an earlier period. Pursuing a southwestern course from Pueblo, over the plains, skirting the Green-Horn Mountains, Fort Garland was reached on the 14th of August, through the Sangre de Cristo Pass.

Among the birds obtained here was the Rufous-backed Humming Bird (*Selasphorus rufus*), not hitherto known from this region. The mountains to the eastward of Fort Garland were next entered, and here was noted a quite unexpected paucity of bird life, both in the number of species and the number of individuals. The capture here of the Band-tailed Pigeon (*Columba fasciata*), and the ascertained fact that it is a summer resident at this point, proves a most interesting item in the history of the species, whose range is thus extended far to the eastward. Leaving Fort Garland, Mr. Aiken's party proceeded to the southwest, through the San Luis Valley, afterward ascending to the sources of the Conejos River. In the cañon of this river, the Townsend's Warbler, a bird unknown from this region, was secured. At Blaine's Peak, at an altitude of 13,000 feet, Mr. Aiken enjoyed an opportunity of seeing and obtaining quite a number of specimens of the White-tailed Ptarmigan (*Lagopus leucurus*). Reaching Pagosa Springs on the 5th of September, two weeks were spent in the vicinity, including a trip into the Gallinas Mountains, New Mexico, and no fewer than eighty species of birds were ascertained to occur in this region within an area of fifty miles; this proving to be the most productive as well as the most interesting ground of the season. Leaving Pagosa on the 21st of September, a more or less direct route was followed back to Fort Garland, thence to Pueblo. The Alkali Lakes near Fort Garland, mentioned previously, were first visited, and large numbers of water-fowl, ducks, geese, and waders seen. Besides the collection of some three hundred and twenty-five birds made during this brief period, a large number, when is taken into consideration the unfavorable time of year and the haste which necessarily attended the movements of the party to which Mr. Aiken was attached, many of the notes which he was able to make are of great value, and several important items of distribution were elucidated.

The route pursued by the zoölogical history party composed of Dr. J. T. Rothrock, Mr. J. M. Rutter, and myself coincided in general with the one followed in 1873; but, as the party was organized mainly with a view to the

prosecution of zoölogical and botanical work, far more success attended our efforts than ever before, since it was possible to regulate our movements, to a greater or less extent, according as the nature of the region traversed afforded favorable or unfavorable opportunities for work.

At Santa Fé, the point of our departure, a vexatious detention of nearly three weeks was experienced at the outset, owing to an unavoidable delay in means of transportation. This was the more disastrous, since it occurred in June; and being the time when nearly all the birds are breeding, a most valuable opportunity was lost of learning the history of the birds at the most interesting period of the year, as well as obtaining the nests and eggs of many species of whose nidification nothing or next to nothing is known.

The time here, however, was by no means lost, though the rather desolate barren foot-hills in the neighborhood of the town presented by no means an attractive field to the ornithologist. Once on the road, we lost no time in reaching Fort Wingate, N. M., and from there made speedy marches to Camp Apache, Ariz., where the opportunities for ornithological work may be said to have commenced in earnest. Our orders not allowing at this time a more thorough research through the White Mountains of this region, a section, it may be remarked in passing, possessed of much interest to the ornithologist, and one which would amply repay a careful examination, a few days only were spent here, perhaps the most important result being the discovery of the *Cardellina rubrifrons*, a Mexican bird, thus ascertained to be a resident of our territory, some point, not much if any, to the north of here constituting probably its extreme northern limit.

Keeping to the north, we crossed the Gila River at the same point as on the previous season. As I had looked forward with great interest to the study of the avifauna at this point, and had anticipated some valuable developments with respect to the distribution of species, I was much disappointed that circumstances made it necessary for us to proceed without delay.

A thorough study of the birds of the valley here would probably be found to show that in its general character the avifauna approximates very closely to the character of that of the Colorado Valley, and hence is much more southern in its aspect than is the region immediately to the south, and

that indeed to find features as distinctively southern in character it will be necessary, passing over the intervening region to the south, to reach nearly or quite to the extreme southern border. Simultaneously with our arrival on the Gila, and accompanying us to the southward, we noticed two species, Cassin's Finch (*Peucaea cassini*) and the Hooded Oriole (*Icterus cucullatus*), while the Abert's Finch (*Pipilo aberti*), noted in great abundance on the Gila both at this time and later, disappeared finally as we left the valley.

Reaching Camp Grant August 1, two or three days spent in collecting along the creeks as they flow from the mountains and sink in the sand a few miles out on the plain, with several days occupied in the pineries of the neighboring Mount Graham, were well rewarded. The *Cardellina rubrifrons*, first noted near Camp Apache, was at the last named locality found in abundance; while another, the Mexican Snowbird (*Junco cinereus*), supposed to be an exclusive inhabitant of Mexico, was found to be a common resident of the pine woods. In addition, the *Eugenes fulgens*, a humming-bird, mentioned above as new to the fauna, was found breeding at an elevation of 9,500 feet, and the nest secured.

Camp Bowie, where the next halt was made, proved a most excellent station, and, besides the capture of quite a number of little known species, a beautiful humming-bird (*Doricha enicura*) was here found for the first time within our limits. From here our route led to the southwest, and in the neighborhood of old Camp Crittenden some two weeks were profitably spent, and no less than three additions to the number of our birds were here made: *Myiodynastes luteiventris*, *Circe latirostris* (the Circe Humming-bird), and *Picus stricklandi* (Strickland's Woodpecker); the last named of which, a rare species even in Mexico, heretofore its only known habitat, was found to be common, while of the two former, several specimens of each were procured.

Our next objective point was Camp Lowell, where the few days, during the first of September, we were able to spend gave valuable results in the acquisition of two species hitherto almost unknown, *Harporhynchus bendirei* and *Peucaea carpalis*. Turning northward from here, a second visit was made to Mount Graham, September 18, with results fully equal to those of the preceding reconnaissance. Three specimens of the Olive-headed Warbler (*Peucedramus olivacea*), a species supposed to belong only to Mexico,

were secured, and the Mexican Crossbill (*Curvirostra mexicana*) ascertained to be a common resident of these mountains.

From here our progress northward was by nearly the same route used in coming; the lateness of the season preventing any very extensive collections being made, the field work practically ending at Camp Apache about the middle of October, a week's trip into the mountains at this date showing an almost total absence of birds. The Dusky Grouse (*Tetrao obscurus*) was ascertained to occur high up in the mountains, a fact of much interest, as it has been stated that none of this family even entered the Territory. The collection of birds made by the party during the season amounted to rather more than one thousand specimens, while in other departments of zoölogy the results were equally large. Eight species, new to our fauna, were obtained, while a ninth (*Urubitinga anthracina*) was observed.

In the report, I have endeavored to bring together all the material gathered by the efforts of the different members of the survey, and to make it a complete exponent of what has been added, as the results of the survey, to our ornithological knowledge. No birds have been introduced that have not actually been taken or observed by the expedition. In all cases where I have utilized the notes of observers other than members of the survey, attention is called to the fact. It is, of course, greatly to be regretted that in so many instances the notes are meager, presenting, instead of a complete biography, only a detached, and, in too many cases, a very unsatisfactory, portion of the history. It will be remembered, however, that the circumstances under which most of the collections have been made have been in the last degree unfavorable to obtaining a minute detailed knowledge of the species which have fallen under observation. The character of a topographical survey necessitates frequent changes from one place to another, and the naturalist must seize his opportunities as they occur, while he is frequently compelled, by the exigencies of the general work, to forego many excellent chances, and to pass rapidly over sections which would well repay most careful scrutiny, or, in some instances, to forego all work on account of the needed time, which, when it comes, may find him in a region but little calculated to invite attention. Added to these considerations is the fact that the time of year at which the parties have been able

to take the field has generally been too late for any investigations into the nesting habits of the birds, and for this reason the notes relative to their peculiarities at this period are nearly wanting.

The classification and nomenclature followed for the Land Birds is that adopted by Baird, Brewer, and Ridgway, in their recent work on "North American Birds"; for the Water Birds, that given by Dr. Coues in his "Check List" is used.

As being less cumbersome, the technical names have been followed only by the original describer's name, this being inclosed in parentheses when not also the authority for the nomenclature. In many cases, each species is followed by a complete list of the birds collected, the date and exact locality of their capture, with the collector's name, this being a ready method of indicating with precision the locality from which they were derived; while a large number of measurements have also been taken, where the rarity of the species has seemed to make this a matter of importance, and also when the specimens have been collected at widely separated points, to show the amount of variation produced by climatic and other causes, as also the amount of individual variation. In many cases, however, it has not been thought advisable to present a full enumeration; the context sufficiently showing the results of the investigations, of which the specimens are merely the indices. Probably not more than one-half of the three thousand birds—for the number of the four years' work reaches quite to this figure—are thus mentioned.

In the preparation of the synonymatic lists, endeavor has been made to bring together only such references as have a bearing more or less directly upon the region embraced by our investigations, and, within this scope, to make them as nearly complete as possible; the value of such references in their bearing upon the facts of geographical distribution being well known. In this part of the work, the labor has been much lightened by the admirably full tables given by Dr. Coues in his recent work on the "Birds of the Northwest." To this gentleman, and also to Mr. Robert Ridgway, of the Smithsonian Institution, and to Dr. H. C. Yarrow, I am under obligations for much kindly advice and assistance.

ORDER PASSERES: PERCHERS.

FAM. TURDIDAE: THRUSHES.

TURDUS MIGRATORIUS, L.

Robin.

Turdus migratorius, LINN., Syst. Nat., i, 1766, 292.—WOODH., Sitgr. Exp. Zuni & Col. R., 1854, 72.—BD., Ives' Colorado, 1857-58, pt. iv, 5.—NEWB., P. R. R. Rep., vi, 1857, 81.—BD., B. N. A., 1858, 218.—HEERM., P. R. R. Rep., x, pt. iv, 1859, 45.—XANTUS, Proc. Acad. Nat. Sci. Phila. 1859, 190.—COOP. & SUCK., P. R. R. Rep., xii, 1860, pt. ii, 172.—HAYD., Trans. Am. Phil. Soc., xii, 1862, 159.—BD., Rev. A. B., 1864, 28.—CS., Proc. Acad. Nat. Sci. Phila., 1868, 82.—COOP., B. Cal., i, 1870, 7.—SNOW, Birds Kansas, 1872, 6.—ALLEN, B. M. C. Z., 1872, 173.—CS., Key N. A. Birds, 1872, 71, fig. 13.—YARROW & HENSHAW, Rep. Orn. Sp., 1872, Wheeler's Exp., 1874, 5.—HENSHAW, A. L. N. H. N. Y., xi, 1874, 2.—*Id.*, A. L. B. U., 1872, Wheeler's Exp., 1874, 2.—HENSHAW, Rep. Orn. Sp., 1873, Wheeler's Exp., 1874, 56, 70, 96.—B. B. & R., N. A. B., i, 1874, 25, pl. ii, fig. 3.—ALLEN, Proc. Bost. Soc. Nat. Hist., 1874, 15, 18.

Turdus (Planesticus) migratorius, CS., Proc. Acad. Nat. Sci. Phila., 1866, 64.—MERRIAM, U. S. Geol. Surv. Terr., 1872, 670.

Planesticus migratorius, HENRY, Proc. Acad. Nat. Sci. Phila., 1859, 106.

The Robin, so well known in the East and so great a favorite with all, was met with at various points throughout Utah, Colorado, New Mexico, and Arizona. In Utah, it was usually found in the neighborhood of settlements, building close to the houses, and exhibiting the same traits of sociability and confidence as elsewhere. At Provo, it was very common, where a few years since it was unknown; the advent of this, as of several other well known birds, following the occupation of the soil and its subsequent tillage by the settlers. At Denver, where it began to nest about May 10, and near Fort Garland, in Southern Colorado, it was a moderately common species; the nests being frequently seen in the cottonwoods along the streams. Here the birds had availed themselves of the presence of sheep in the neighborhood, and several nests were examined, which were composed almost wholly of wool. In Arizona and New Mexico, the species was less common, but in the fall was occasionally met with in the timber lining the streams

and in the piny woods of the mountains. At the Old Crater, forty miles south of Zuñi, N. Mex., the species was present in large flocks the 2d of November. The surrounding hills are covered with low scrubby cedars, and upon the berries this and other species largely subsist at this late season. It winters in many of the cañons of Southern Utah, where food may be had in plenty, as also in the lower portions of Arizona.

No.	Sex.	Locality.	Date.	Collector.	Wing.	Tail.	Bill.	Tarsus.
27	♀ ad.	Fort Wingate, N. Mex.	July 12, 1873	Dr. C. G. Newberry.	5.23	4.10	0.73	1.15
64	♀ ad.	South Park, Colo.	June 27, 1873	Dr. J. T. Rothrock..	5.32	4.28	0.83	1.24
2	♂ jun.	Pueblo, Colo.	July 23, 1874	C. E. Aiken	5.14	4.17	0.72	1.27

TURDUS PALLASI, Cab., var. AUDUBONI, Bd.

Audubon's Thrush.

Turdus auduboni, BD., Rev. Am. Birds, 1864, 16.—RIDGW., Proc. Acad. Nat. Sci. Phila., 1869, 129.—STEVENSON, U. S. Geog. Surv. Terr., 1870, 463.

Turdus pallasi var. *auduboni*, CS., Key N. A. B., 1872, 72.—HENSHAW, Rep. Orn. Sp., 1873, Wheeler's Exp., 1874, 71.—*Id.*, A. L. N. H. N. Y., xi, 1874.—*Id.*, A. L. B. U., 1872, Wheeler's Exp., 1874, 39.—CS., U. S. Geol. Surv. Terr., B. N. W., 1874, 3.

Turdus pallasi, ALLEN, Bull. Mus. Comp. Zool., iii, 1872, 173 (mountains of Colorado from 8,000 feet to timber-line; Ogden, Utah).

The Audubon's Thrush appears to be a common summer inhabitant of the high Rocky Mountains from Utah to the southward; its chosen retreats being the deep recesses of the pine woods, but ranging thence upward in the more open groves of aspens to the tops of the highest peaks wherever the limit of trees and shrubbery extends so far. At this season, it appears not to be found lower than 8,000 feet. A temporary camp, near Mount Baldy, in Southern Colorado, was made at this elevation; and my occasional tramps up the mountain sides in the early morning were often rewarded by choruses, in which these birds were the chief performers, that elsewhere I have never heard equaled. So numerous were they that, after remaining quiet for a few moments, till the alarm caused by the noise of my approach through the tangled masses of uprooted trees had subsided, I have been able to count distinctly eight of these birds. The effect of this burst of melody

in the pure, rarefied atmosphere of these lofty regions, where the solitude is unbroken save by the voices of the birds, may be better imagined than described. Though perhaps lacking somewhat of the power possessed by the song of the Wood Thrush of our eastern woods, yet, in sweetness and modulation of tone, it is certainly worthy of comparison with that renowned songster.

In the same locality mentioned above, I found a single nest, the only one I have ever seen. It was quite bulky, composed almost wholly of strips of bark and coarse grasses, completely covered on the outer surface with mosses. This was placed in the open cavity of a broken pine-stub, about three feet from the ground. It contained a single light-blue egg. The female was on the nest at the time of its discovery, and when disturbed glided off among the bushes, uttering a few complaining notes.

A second nest, found by Mr. Merriam in Montana, differs little in construction from the one above, and, like it, was placed in a pine-tree, "about eight feet from the ground;" the two examples thus differing from the position selected by the Hermit Thrush of the East, which is always, so far as known, upon the ground. In 1874, this species was found to be quite common in the mountains of Arizona as far south as Mount Graham, where the young, scarcely fledged, were noticed with the old birds still attending them during the first few days of August. Returning to this point, the middle of September, the species was found, apparently still in pairs, but, during the last few days of the month, the woods were fairly filled with these thrushes, which had evidently migrated from farther north, and were still pursuing their southward course. The timid disposition and retiring habits of this thrush were always remarked.

As will be seen below, in the table of measurements, there is a very considerable discrepancy in size between the birds first taken at Mount Graham, and which are natives of this southern region, and those coming later, which had evidently been reared much farther to the north.

No.	Sex.	Locality.	Date.	Collector.	Wing.	Tail.	Bill.	Tarsus.
205	♂ ad.	Near Fort Garland, Colo.	May 30, 1873	H. W. Henshaw	3.85	3.00	.....	1.20
287	♀ ad.	.....do.....	June 7, 1873	.....do.....	3.98	2.95	0.50	1.09
288	♂ ad.	.....do.....	.....do.....	.....do.....	3.75	3.04	0.54	1.12
261	♀	Mount Graham, Ariz	July 3, 1874	.....do.....	3.86	3.12	0.57	1.15
255	♀ ad.	.....do.....	Aug. 1, 1874	.....do.....	3.90	2.00	0.53	1.11
262	♀	.....do.....	Aug. 3, 1874	.....do.....	3.88	3.05	0.57	1.15
277	♀ jun.	.....do.....	.....do.....	.....do.....	2.96	3.12	0.51	1.12
289	♂ ad.	Pagosa, Colo	Sept. 19, 1874	C. E. Aiken	3.85	3.00	0.54	1.22
776	♂ ad.	Mount Graham, Ariz	Sept. 21, 1874	H. W. Henshaw	3.95	3.13	0.48	1.12
777	♀ jun.	.....do.....	.....do.....	.....do.....	3.67	2.97	0.54	1.13
832	.....	.....do.....	Sept. 22, 1874	.....do.....	4.24	3.45	0.55	1.15
832	.....	.....do.....	.....do.....	.....do.....	4.25	3.35	0.56	1.16
834	♂	.....do.....	.....do.....	.....do.....	4.08	3.17	0.58	1.15
804	♂ ad.	.....do.....	Sept. 23, 1874	.....do.....	4.00	3.16	0.53	1.17
814	♂	.....do.....	.....do.....	.....do.....	4.22	3.45	0.57	1.12
819	.....	.....do.....	.....do.....	Dr. J. T. Rothrock	3.75	3.00	0.53	1.10
826	♂	.....do.....	Sept. 24, 1874	H. W. Henshaw	4.00	3.15	0.57	1.15
826	♀	.....do.....	.....do.....	.....do.....	3.98	3.15	0.57	1.09
827	.....	.....do.....	.....do.....	.....do.....	4.08	3.30	0.55	1.17
828	♀	.....do.....	.....do.....	.....do.....	4.08	3.23	0.55	1.12
831 ^a	♂	.....do.....	.....do.....	.....do.....	3.93	3.17	0.55	1.10
831	♂	.....do.....	.....do.....	.....do.....	4.15	3.30	0.58	1.15
874	♀	.....do.....	.....do.....	.....do.....	3.77	3.05	0.57	1.16
877	♂	.....do.....	.....do.....	.....do.....	4.12	3.13	0.53	1.15
873	♂	.....do.....	Sept. 25, 1874	.....do.....	3.97	3.10	0.57	1.05
878	♀	.....do.....	.....do.....	.....do.....	3.98	3.12	0.58	1.13
827	.....	.....do.....	——, 1874	Dr. J. T. Rothrock	4.07	3.18	0.52	1.10

TURDUS PALLASI, Cab., var. NANUS, Aud.

Dwarf Hermit Thrush.

Turdus nanus, AUD., Orn. Biog., v, 1839, 201, pl. cci.—BD., B. N. A., 1858, 213.—*Id.*, Mex. B. Surv., ii, pt. ii, 1859, birds, 9 (Frontera, Texas).—XANTUS, Proc. Acad. Nat. Sci. Phila., 1859, 190 (Fort Tejon, Cal.).—HEERM., P. R. R. Rep., x, pt. iv, 1859, 45.—HENRY, Proc. Acad. Nat. Sci. Phila., 1859, 106 (New Mexico).—BD., Rev. A. B., 1864, 15.—RIDGW., Proc. Acad. Nat. Sci. Phila., 1869, 129.—COOP., B. Cal., i, 1870, 4.

Turdus (Hylocichla) nanus, CS., Proc. Acad. Nat. Sci. Phila., 1866, 65 (Fort Whipple).

Turdus pallasi var. *nanus*, CS., Key, 1872, 72.—HENSHAW, Rep. Orn. Sp., 1873, Wheeler's Exp., 1874, 96.—BD., B. & R., N. A. B., i, 1874, 20, pl. i, fig. 7.

This dwarf variety of the Hermit Thrush was met with October 19, 1873, along the small streams in the mountain-cañons, near Camp Bowie, Southeastern Arizona, and along the Gila River to its sources in New Mexico, where I

found it as late as November 8. It would seem to be far from common so far east; California and the Sierra Nevadas appearing to include its general range. None were found in 1874 in Arizona, though looked for in much the same localities as the previous year. Its habits seem to differ in no noteworthy respect from the allied forms. It appears fond of solitude, and prefers the thickest and shadiest thickets, where it is constantly busied in searching among the leaves for seeds and insects. Its small size is apparent at first sight, and serves, even when alive, to distinguish it from either var. *auduboni* or *pallasi*.

N ^o .	Sex.	Locality.	Date.	Collector.	Fresh.		Wing.	Tail.	Bill.	Tarsus.
942	♂	Near Camp Bowie, Ariz.	1874. Oct. 19	H. W. Henshaw	.....	.....	3.45	2.81	0.45	1.08
943	♀	.....do.....	.....do.....	.....do.....	6.25	10.00	3.37	2.74	0.45	1.12
944	♀	.....do.....	.....do.....	.....do.....	6.12	9.74	3.25	2.55	0.49	1.04
945	♀	.....do.....	.....do.....	.....do.....	6.25	10.18	3.49	2.74	0.42	1.10
982	♂	.....do.....	Nov. 5	.....do.....	6.55	10.87	3.61	2.74	0.49	1.14

TURDUS SWAINSONI, Cab.

Olive-Backed Thrush.

Turdus swainsoni, CAB., Tschudi's Fauna Peruana, 1844-46, 188.—BD., B. N. A., 1858, 216.—*Id.*, Rev. A. B., i, 1864, 19.—RIDGW., Proc. Acad. Nat. Sci. Phila., 1869, 128.—COOP., B. Cal., i, 1871, 6.—ALLEN, Bul. Mus. Comp. Zool., iii, 1872, 173 (Eastern Kansas).—SNOW, Birds Kansas, 1872, 6.—CS., Key N. A. B., 1872, 72.—HENSHAW, Ann. Lyc. N. H. N. Y., xi, 1874.—*Id.*, Rep. Orn. Sp., 1873, Wheeler's Exp., 1874, 56.—CS., U. S. Geog. Surv. Terr., B. N. W., 1874, 4.

Observed by Mr. Ridgway in the Wahsatch Mountains, where it was common, being one of the most characteristic summer birds of that region, and inhabiting the shrubbery along the streams of the cañons, but not extending upward to the pine region. In the vicinity of Denver, the species makes its appearance about the 10th of May, and by the 17th the thickets and partially open ground in swampy localities were fairly swarming with these birds. They were perfectly silent, and busied themselves after the usual manner of the family in scratching and seeking among the leaves for food. The males preceded the arrival of the females by at least a full week.

So far as I am aware, they occur in Colorado only as migrants, none remaining through the summer.

No.	Sex.	Locality.	Date.	Collector.	Wing.	Tail.	Bill.	Tarsus.
49	♂ ad.	Denver, Colo.	May 12, 1873	H. W. Henshaw.....	3.93	2.95	0.51	1.09
109	♂ ad.	..... do	May 17, —	..... do	3.90	3.02	0.55	1.04
110	♂ ad.	..... do .....	..... do .....	..... do	3.98	3.07	0.49	1.09
111	♂ ad.	..... do .....	..... do .....	..... do	4.04	3.05	0.52	1.02
112	♂ ad.	..... do .....	..... do .....	..... do	4.00	2.93	0.48	1.09
113	♂ ad.	..... do .....	..... do .....	..... do	4.10	3.11	0.50	1.03
114	♂ ad.	..... do .....	..... do .....	..... do	3.30	2.93	0.50	1.00
115	♂ ad.	..... do .....	..... do .....	..... do	4.02	2.98	0.48	1.08
118	♂ ad.	..... do .....	..... do .....	..... do	3.98	2.93	0.50	1.12

TURDUS FUSCESCENS, Steph.

Tawny Thrush.

Turdus fuscescens, STEPHENS, Shaw's Gen. Zoöl., Birds, xi, 1817, 182.—BD., B. N. A., 1858, 214.—*Id.*, Rev. A. B., i, 1864, 17.—RIDGW., Proc. Acad. Nat. Sci. Phila., 1869, 127.—Cs., Key, 1872, 73.—ALLEN, Bull. Mus. Comp. Zoöl., iii, 1872, 173 (mountains of Colorado up to about 8,500 feet).—SNOW, Birds Kansas, 1872, 6.—BD., B. & R., N. A. B., i, 1874, 9, pl. i, f. 5.—HENSHAW, Ann. Lyc. N. H. N. Y., xi, 1874.—*Id.*, An. List B. U., 1872, Wheeler's Exp., 1874, 39.—*Id.*, Rep. Orn. Sp., 1873, Wheeler's Exp., 1874, 56, 71.—Cs., U. S. Geog. Surv. Terr., B. N. W., 1874, 5.—ALLEN, Proc. Bost. Soc. Nat. Hist., June, 1874, 15, 18.

Though an abundant summer resident in both Utah and Colorado, the Wilson's Thrush was not met with by any of our parties to the southward in New Mexico and Arizona, nor does it appear to have been detected farther south by others. On the streams, in the neighborhood of Fort Garland, Southern Colorado, and below an altitude of about 8,000 feet, the species was quite a common one, and the wierd music of its beautiful song was heard, often in early morning and again toward twilight, issuing from the deep swampy thickets, which are its chosen home. Two nests were found, both built on the ground. As is well known, many, and, indeed, it may be said, most, species of birds manifest much attachment to a neighborhood which has once been selected as a home, and where, undisturbed, they continue to repair to the same vicinity, frequently to the same tree. Often, indeed, though molested in their domestic happiness time after time, they

still cling to the place which the memory of past joys has endeared to them. This attachment to locality is well illustrated by a nest of this species found here, which had been modeled in and above the one of the previous season. Doubtless, the same pair, returning and finding the old home too dilapidated for repairs, had thus obviated the necessity for a removal to a perhaps in their eyes less favored spot. Eggs blue, slightly darker than those of the Audubon's Thrush.

No.	Sex.	Locality.	Date.	Collector.	Wing.	Tail.	Bill.	Tarsus.
108	♂ ad.	Denver, Colo.....	May 17, 1873	H. W. Henshaw.....	4.18	3.28	0.55	1.12
142	♂ ad.	Fort Garland, Colo....	May 26, 1873	..... do	4.05	3.28	0.60	1.07
170	♂ ad.	..... do	May 28, 1873	..... do	4.19	3.29	0.60	1.16
376	♀ ad.	..... do	June 19, 1873	..... do	3.94	3.11	0.57	1.07
577	♂ ad.	..... do .....	..... do .....	..... do	4.07	3.13	0.57	1.12

OREOSOPTES MONTANUS, Towns.

Sage Thrasher.

Orpheus montanus, TOWNSEND, Jour. Acad. Nat. Sci. Phila., vii, ii, 1837, 192.

Mimus montanus, WOODH., Sitgr. Exp. Zuñi & Col. Riv., 1854, 73.—HEERM., P. R. R. Rep., x, pt. iv, 1859, 44.

Oreoscoptes montanus, BD., Ives' Colorado, 1857-58, pt. iv, 6.—*Id.*, B. N. A., 1858, 347.—KENNERLY, P. R. R. Rep., Whipp. Route, 1859, 25.—BD., Mex. B. Surv., ii, pt. ii, 1859, birds, 12.—HENRY, Proc. Acad. Nat. Sci., Phila., 1859, 107 (New Mexico).—HAYD., Trans. Phil. Soc., vol. 12, 1862, 163.—BD., Rev. A. B., i, 1864, 43.—CS., Proc. Acad. Nat. Sci. Phila., 1866, 65 (Arizona generally).—STEV., U. S. Geol. Surv. Terr., 1870, 464 (Wyoming).—COOP., Pr. Cal. Acad., 1870, 75 (Colorado River).—*Id.*, B. Cal., i, 1870, 13.—HOLD., Pr. Bost. Soc. Nat. Hist., 1872, 194 (Black Hills).—ALLEN, B. M. C. Z., iii, 1872, 174 (west edge of the plains, Colo.; Ogden, Utah).—CS., Key, 1872, 74.—MERRIAM, U. S. Geol. Surv. Terr., 1872, 670.—ALLEN, Proc. Bost. Soc. Nat. Hist., June, 1874, 19.—BD., B. & R., N. A. B., i, 1874, 32, pl. iii, f. 6.—YARROW, Rep. Orn. Sp., Wheeler's Exp., 1874, 34.—YARROW & HENSHAW, Rep. Orn. Sp., 1872, Wheeler's Exp., 1874, 6.—HENSHAW, Rep. Orn. Sp., 1873, Wheeler's Exp., 1874, 71, 97.—*Id.*, An. Lyc. Nat. Hist. N. Y., xi, 1874.—*Id.*, An. List B. U., 1872, Wheeler's Exp., 1874, 46.—CS., U. S. Geog. Surv. Terr., B. N. W., 1874, 7.

Through nearly every portion of the country traversed by the survey each season, this thrush has been found common. As an expression of the peculiar localities favored by this bird, and its powers of song, the name of

Mountain Mocker is by no means an appropriate one; for, so far as I am aware, and, in this respect, the observations of Mr. Ridgway and others correspond with my own, it never imitates the notes of others, but relies upon its own musical ability, which is, indeed, of a quite high order. During the vernal season, it is rarely seen in the broken mountainous districts, where, however, when the family duties are completed, small parties of from three to eight may often be met with, but shows a decided preference at this time for the sage-brush plains, where, from the top of some low bush, its beautiful, low, warbling song comes, often the only sound which breaks the quiet of the desolate plain, and sounds perhaps the sweeter in contrast to the otherwise painfully monotonous solitude.

Its nest, a bulky and inartistic structure of coarse twigs, lined with grasses and fine rootlets, is sometimes placed in a sage shrub; but more often the bird selects one of the higher bushes, which, armed with sharp, stiff thorns, serves as an admirably secure platform for the clumsy nest, and affords additional security from its winged and four-footed enemies. A nest, which I examined near Fort Garland, was thus placed, and some eight inches above it was a device, which, though it may have been the result of mere accident, certainly seemed to me to bear in the method of its construction the evidences of design, and, if the supposition be true, would argue for the designers no small degree of intelligence. This was a platform of twigs, so placed as to screen the setting bird from the rays of an almost tropical sun. The material of which it was composed was precisely similar to that used in the construction of the nest, and it had been made at about the same time.

The eggs are of a greenish-blue color, marked heavily with spots of dark brown and lilac. I have found the young just from the nest as early as June 20, and a nest found near Fort Wingate, N. Mex., July 14, by Dr. C. G. Newberry, contained eggs, just ready to hatch. They probably rear two broods in a season. In the fall, they become shy and suspicious, and, though often seen as in Utah, in the neighborhood of settlements, evince little of that familiarity so conspicuous in others of this family.

No.	Sex.	Locality.	Date.	Collector.	Wing.	Tail.	Bill.	Tarsus.
.....	.....	Nevada.....	June 20, 1871	F. Bischoff.....	.....	.....	.....	.....
157	♂ jun.	Fairfield, Utah.....	Aug. 1, 1872	Dr. H. C. Yarrow.....	.....	.....	.....	.....
114	♀ jun.	Fountain Green, Utah.	Aug. 20, 1872	H. W. Henshaw.....	.....	.....	.....	.....
113	♂ jun.	..... do.....	..... do.....	..... do.....	.....	.....	.....	.....
143	♂ ad.	Salina, Utah.....	Sept. 5, 1872	..... do.....	.....	.....	.....	.....
156	♀ ad.	Fairfield, Utah.....	Aug. 1, 1872	Dr. H. C. Yarrow.....	.....	.....	.....	.....
171	♂ ad.	Panquitch, Utah.....	Sept. 17, 1872	H. W. Henshaw.....	.....	.....	.....	.....
313	♂ ad.	Toquerville, Utah.....	Oct. 16, 1872	H. W. Henshaw and Dr. H. C. Yarrow.	.....	.....	.....	.....
A 2	.....	(Alcoholic).....	.....	..... do.....	.....	.....	.....	.....
401	♂ ad.	Alkali Lakes, Colo.....	June 22, 1873	H. W. Henshaw.....	3.98	3.83	0.77	1.17
513	♀ ad.	Cave Spring, Ariz.....	Aug. 1, 1873	H. W. Henshaw.....	3.86	3.80	0.68	1.17
712	♂ ad.	Camp Apache, Ariz.....	Sept. 7, 1873	..... do.....	3.92	4.02	0.65	1.15
780	♀ jun.	Gila River, Arizona.....	Sept. 15, 1873	J. L. McGee.....	3.92	3.90	0.66	1.17
601	♀ jun.	Camp Goodwin, Ariz.....	Sept. 19, 1873	H. W. Henshaw.....	3.90	3.66	0.62	1.13
126	Jun.	Camp Bowie, Ariz.....	Oct. 10, 1873	Dr. C. G. Newberry ..	3.77	3.89	0.65	1.17
14	♀ jun.	..... do.....	Oct. 7, 1873	..... do.....	3.75	3.65	0.75	1.19
614	♀ ad.	Camp Lowell, Ariz.....	Sept. 15, 1874	H. W. Henshaw.....	3.82	3.68	0.65	1.16
225	♀	Navajo Creek, N. Mex.	Sept. 11, 1874	C. E. Aiken.....	3.83	3.72	0.70	1.14
102	♂ jun.	Colorado.....	Aug. 6, 1874	..... do.....	3.88	3.78	0.66	1.14

MIMUS POLYGLOTTUS (L.).

Mocking-bird.

Turdus polyglottus, LINN., Syst. Nat., 10th ed., 1758, 169; 12th ed., 1766, 293.

Mimus polyglottus, WOODH., Sitgreave's Exp. Zuñi & Col. Riv., 1854, 72.

Merinus [*sic*] *polyglottus*, BD., Ives' Col. Exped., 1857-58, pt. iv, 5.—*Id.*, Birds N. A., 1858, 344.—HEERM., P. R. R. Rep., x, pt. iv, 1859, 44.—BD., U. S. & Mex. Bound. Surv., ii, pt. ii, 1859, birds, 12.—KENNERLY, P. R. R. Rep., Whipp. Route, 1859, 25.—BD., Proc. Acad. Nat. Sci. Phila., 1859, 303 (Cape St. Lucas).—COUES, Proc. Acad. Nat. Sci. Phila., 1866, 65.—COOPER, Birds Cal., i, 1870, 21.—SNOW, Birds Kan., 1872, 8.—COUES, Key N. A. Birds, 1872, 74, f. 16.—ALLEN, Bul. Mus. Comp. Zool., iii, 1872, 174 (Eastern and Middle Kansas).—HENSHAW, Rep. Orn. Specs., 1873, Wheeler's Exped., 1874, 97.—COUES, U. S. Geol. Surv. Terr., 1874, 8.—BD., BREW. & RIDG., N. A. Birds, i, 1874, 49.

The Mocking-bird was not observed in the vicinity of Santa Fé; its absence here being doubtless due rather to the nature of the locality being unfavorable to its habits than to any other cause. A few miles to the south, the species began to appear on the heavily brushed streams, and the varied and melodious notes of its many tongued songs frequently enlivened our day's weary march. As we passed southward, their numbers continually increased, until, in the neighborhood of Camp Bowie, in early August, it was

one of the most numerously represented species. Their food at this season is quite varied, and their habits differ to a corresponding degree. During the summer, insects, worms, etc., constitute the bill of fare, and as a consequence they spend much of the time on the ground, or in the low bushes, though they are by no means inexperienced in catching insects on the wing. During the fall months, however, they seem to prefer the small fruits and soft berries to all other food; and near Camp Bowie the bushes were crowded with these birds, and one or two other species, and, by their combined numbers, the fruit was stripped off as fast as it ripened, the greedy gluttons feasting till they became fairly gorged with the fruit, and their feathers stained with the juices. Later still, but not till this rich harvest is all exhausted, they retire to the cedars, and subsist largely upon the berries. In nesting, they often select one of the many species of cactus found through this region, particularly the *Choia* cactus; and the structure, composed of thorny twigs and briers, and placed in one of these plants, is encircled on all sides by spear-like points, impervious to all creatures unless provided with wings. To get at their contents myself I have often been compelled to hew a path through with my hunting-knife. By July 20 all the nests examined contained young.

No.	Sex.	Locality.	Date.	Collector.	Wing.	Tail.	Bill.	Tarsus.
15	♀ ad.	Pueblo, Colo.	July 24, 1874	C. E. Aiken	4.08	4.82	0.72	1.26
361	♂ ad.	Camp Bowie, Ariz.	Aug. 11, 1874	J. M. Rutter	4.30	5.00	0.70	1.28
365	♀ ad.	..... do .....	..... do .....	..... do	4.10	4.63	0.73	1.26
344	♂ jun.	..... do	Aug. 10, 1874	..... do	4.32	3.95	0.60	1.30
332	♂ jun.	..... do	Aug. 9, 1874	Dr. J. T. Rothrock....	3.47	4.93	0.60	1.22
387	♀ jun.	..... do	Aug. 12, 1874	..... do	4.27	4.93	0.42	1.25

GALEOSCOPTES CAROLINENSIS (L.).

Catbird.

Muscicapa carolinensis, LINN., Syst. Nat., i, 1766, 328.

Mimus carolinensis, BD., Birds N. A., 1858, 346.—COOPER, Am. Nat., iii, 1869, 73 (common across Rocky Mountains to Cœur d'Alêne Mission).—SNOW, Birds Kan., 1872, 9.—ALLEN, Bul. Mus. Comp. Zool., iii, 1872, 174 (Eastern and Middle Kansas; Colorado; Ogden, Utah).—COUES, Key N. A. Birds, 1872, 74.—ALLEN, Proc. Bost. Soc. Nat. Hist., June, 1874, 15, 17, 19.—COUES, U. S. Geol. Surv. Terr., 1874, 8.

Mimus caudatus (*canadatus* error), BD., B. N. A., 1858, 345.—XANTUS, Proc. Acad. Nat. Sci. Phila., 1859, 191 (Fort Tejon, Cal.).—COOPER, Proc. Cal. Acad., 1870, 75.—YARROW, Rep. Orn. Spec., 1871, Wheeler's Exped., 1874, 34.—YARROW & HENSHAW, Rep. Orn. Specs., 1872, Wheeler's Exped., 1874, 6.

Galeoscoptes carolinensis, BD., Rev. Am. Birds, i, 1864, 54.—STEV., U. S. Geol. Surv. Terr., 1870, 464.—MERRIAM, U. S. Geol. Surv. Terr., 1872, 670.—HENSHAW, Rep. Orn. Specs., 1873, Wheeler's Exped., 1874, 56-71.—*Id.*, An. Lyc. Nat. Hist. N. Y., xi, 1874.—*Id.*, An. List Birds Utah, 1872, Wheeler's Exped., 1874, 40.

The well-known Catbird in its extensive range inhabits nearly all portions of the West, and in many parts of Utah its familiar notes may be heard coming from the shrubbery on the outskirts of the towns or even from the gardens; for it seems to court the presence of man here with the same assiduity as in the East. Indeed, its range seems more or less dependent upon the advance of civilization; for in Colorado I never noticed it save in the immediate neighborhood of some settlement, and in New Mexico and Arizona it appears not to occur at all, or, if so, it must be very rarely, for none of our parties have ever detected it, nor do I find it mentioned elsewhere from this region. At Fort Garland, Southern Colorado, a few pairs were found established in the thickets of the streams, and several nests, built in low bushes and containing freshly laid eggs, were taken about the middle of June. Their habits and notes seem but the counterpart of those at the East, and are too well known to need description here.

No.	Sex.	Locality.	Date.	Collector.	Wing.	Tail.	Bill.	Tarsus.
126	♀ ad.	Arizona.....	Nov. 30, 1871	Bischoff.....	.....	.....	.....	.....
49	♂ jun.	Provo, Utah.....	July 25, 1872	H. W. Henshaw and Dr. H. C. Yarrow.	.....	.....	.....	.....
141	♀ ad.	..... do	Aug. 1, 1872	..... do .....	.....	.....	.....	.....
88	♂ ad.	Denver, Colo.....	May 14, 1873	H. W. Henshaw.....	3.75	4.20	0.63	1.03
126	♀ jun.	Fort Garland, Colo....	Aug. 6, 1874	C. E. Aiken	3.58	3.98	0.56	1.08

HARPORHYNCHUS RUFUS, (L.)

Brown Thrasher.

- Turdus rufus*, LINN, Syst. Nat., 10th ed., 1758, 169 (based on CATESBY, Tab., 19).
Harporthynchus rufus, BD., Birds N. A., 1858, 353.—HAYD., Trans. Phil. Soc., 12, 1862, 163.—COOPER, Am. Nat., iii, 1869, 296 (Upper Missouri, breeding).—ALLEN, Bul. Mus. Comp. Zool., iii, 1872, 174 (Eastern Kansas; west edge of the plains, Colo., in mountains up to 7,500 feet).—SNOW., Birds Kan., 1872, 9.—COUES, Key N. A. Birds, 1872, 75.—HENSHAW, Rep. Orn. Specs., 1873, Wheeler's Exped., 1874, 57.—BD., BREW., & RIDG., N. A. Birds, i, 1874, 37, pl. iii, f. 1.—ALLEN, Proc. Bost. Soc. Nat. Hist., Journ., 1874, 15, 17, 19.—COUES, U. S. Geol. Surv. Terr., 1874, 9.
Harporthynchus rufus var. *longicauda*, BD., Birds N. A., 1858, 353 (in text).—STEV., U. S. Geol. Surv. Terr., 1872, 464.

In its western range, this species appears to be restricted by the Rocky Mountains, to the west of which it is not known to occur. In the vicinity of Denver, it appears to be not very uncommon, as it was noted here by both Dr. Rothrock and myself. It was also observed by Mr. Allen near Colorado City. I have never seen it in Arizona or New Mexico, and do not think it occurs. So far as I noticed them, their habits here are entirely correspondent with those at the East.

No.	Sex.	Locality.	Date.	Collector.	Wing.	Tail.	Bill.	Tarsus.
13	.....	Denver, Colo. ....	.....	Dr. J. T. Rothrock	4.04	5.07	0.85	1.31
60	♂ ad.	..... do	May 12, 1873	H. W. Henshaw	4.42	5.71	1.02	1.30

HARPORHYNCHUS CINEREUS, Xantus, var. BENDIREI, Cs.

Bendire's Thrush.

- Harporthynchus bendirei*, COUES, Am. Nat., vii, 1873, 330, f. 69.—BD., BREW. & RIDG., N. A. Birds, 1874, iii, app. p. 500.

This thrush was first described by Dr. Coues in June, 1873, from specimens collected near Camp Lowell, Southern Arizona, by Capt. Charles Bendire. During a few days' reconnaissance the past season in the same locality, I procured three individuals of this species, which exhibit, when compared with the type specimens in the Smithsonian Institution, certain

decided differences, which seem to indicate that the true relationship of this form is with the *H. cinereus* of Cape Saint Lucas, as was strongly hinted by Dr. Coues in his description referred to above; and, furthermore, that it is separable from the Cape Saint Lucas Thrush only as a variety. It may be remarked that the two specimens in the Smithsonian are in the worn summer dress, and have all the faded appearance peculiar to that plumage, while the specimens taken by myself are in the freshly assumed fall dress. They thus have a prevailing ashy tinge, particularly above; this being peculiar to the autumnal plumage, and strictly coincident with the like seasonal changes to be seen in the Palmer's Thrush (var. *palmeri*) of the same locality. In the types, the markings below are very faint, being just perceptible; while, in the specimens before me, the arrow-shaped spots on the lower throat and breast are very conspicuous, and in their character show a decided approach to the markings of the true *cinereus*. The variation in curvature of bill in the three specimens is quite considerable; the bill in one being as much curved as in many examples of *cinereus*. In each case, however, as shown also in the two types, the bill is considerably shorter than is ever found to be the case in *cinereus*. The same striking difference in the length of bill is seen in var. *palmeri*, of the same region, when compared with the true *curvirostris*. The color of the lower mandible light brown, sometimes almost flesh color at base, dark at tip, a salient point of distinction is common to both *cinereus* and *bendieri*, and to them alone; all the other species, so far as I am aware, having a black unicolored bill.

The wide separation of the two forms in question, and the fact that the Cape Saint Lucas bird is restricted to the coast, while the Bendire's Thrush inhabits the dry, almost waterless, plains of the interior, will sufficiently account for the discrepancies between them.

The Bendire's Thrush seems to be a rather rare inhabitant, as compared at least with its congeners, the Palmer's and Crissal Thrush of the wild cactus covered desert in the vicinity of Camp Lowell, Ariz. Elsewhere, it has not been met with, and, though I looked most carefully for it, I did not detect its presence till I reached this neighborhood, and upon leaving here, on my way north, the species was immediately lost sight of. The speci-

mens taken by our party were found among the cactus plants, a predilection for which they seem to share with the following variety. They were found breeding by Captain Bendire; and by him I am informed that, unlike the Palmer's Thrush, which almost invariably selects a cactus plant as the site of its nest, the present bird as invariably places its nest in bushes, especially in the mesquite shrubs, and that to find a nest in one of these is almost a guarantee of its ownership. In habits, they are wild and shy, at least in the fall and winter, and, when alarmed, skulk from cactus to cactus, and from one clump of bushes to another, so that it is no easy matter, even after they are found, for one to procure the coveted prize. In the very brief opportunity I enjoyed for seeing this species, I detected nothing in its habits peculiarly distinguishing it from the following.

No.	Sex.	Locality.	Date.	Collector.	Wing.	Tail.	Bill.	Tarsus.
607	♂	Camp Lowell, Ariz....	Sept. 6, 1874	H. W. Henshaw.....	4.03	4.71	0.72	1.28
608 do .....	..... do	Dr. J. T. Rothrock....	4.03	4.75	0.93	1.31
611 do .....	..... do	H. W. Henshaw.....	4.18	4.95	0.72	1.33

HARPORHYNCHUS CURVIROSTRIS (Sw.) var. PALMERI, Ridgw.

Palmer's Thrush.

Harporhynchus curvirostris, COUES, Proc. Acad. Nat. Sci. Phila., 1868, 83.

Harporhynchus curvirostris var. *palmeri*, RIDGW., Rep. King's Exp., v, 1872.—COUES, Am. Nat., vii, 1873, 329, fig. 68.—*Id.*, Key N. A. Birds, 1872, app., 351.—BD., BREW., & RIDG., N. A. Birds, i, 1874, 43, app., 500.

This species appears to be as exclusive an inhabitant of the dreary desert region as the preceding, and, like it, was met with by our party but in the one locality mentioned above. Unlike the Bendire's Thrush, it was here quite a common species, and its form easily distinguishable from all other birds of the district, save the one just mentioned, by the peculiarities of flight, and especially by the long tail, the weight of which seems, when flying, to actually encumber the bird, and, as it were, to drag it down.

Near a water-hole, some thirty miles from Camp Lowell, where is found a meager supply of the precious fluid, which, from long standing, becomes so stagnant and thick with mud that the thirsty animals which pass through,

though suffering terribly from the effects of many miles' weary travel over the burning sands, often reject it, considerable numbers of these thrushes were noticed in the throngs of the commoner kinds, as the Sparrows and White-winged Blackbirds, which resort here through the day to slake their thirst. The brink of the pool was often crowded with hundreds of birds brought thus together from common necessity, and forgetful of aught else save the urgent need which impelled them to seek this spot from great distances.

In its flight and manner of obtaining food, it reminded me much of the Brown Thrush of the East. It frequents the edge of the mesquite thickets, where it hops easily and lightly over the ground, peering about with its sharp eyes for insects. It skims swiftly and lightly through the air, keeping close to the ground, and, when alarmed, retreats from one thicket to another, and strives to escape search by hiding in the thick brush. When startled, it often ascended quickly to the tops of the tall mesquites, and moving quickly about, with nervous jerks of its long tail, emitted a succession of loud clucking notes, which resemble those the Wood Thrush utters when expressing anger or alarm. Its disposition in general was wild and suspicious, and it was only by observing great care that I succeeded in getting sufficiently close to learn anything of its habits. I observed hundreds of their deserted nests built in the large Choia cactus; but at this season, September 1 to 10, they had long ceased to breed, and but a single young bird in nesting-plumage was found. Their eggs must be deposited quite early in the season.

No.	Sex.	Locality.	Date.	Collector.	Wing.	Tail.	Bill.	Tarsus.
611	♀ ad.	Water-hole, Ariz.....	Sept. 7, 1874	H. W. Henshaw.....	4. 10	5. 09	1. 14	1. 28
615	♀ jun.	Camp Lowell, Ariz. . .	..... do .....	..... do	4. 35	5. 48	1. 10	1. 28
612	Ad.	..... do .....	..... do .....	..... do	4. 08	5. 02	1. 23	1. 23
616	Ad.	..... do	Sept. 8, 1874	..... do	4. 36	5. 12	1. 08	1. 35
617	♀ ad.	..... do .....	..... do .....	..... do	4. 04	4. 93	1. 08	1. 28
652	♀	..... do	Sept. 9, 1874	..... do	4. 14	5. 10	1. 16	1. 15
708	♀ ad.	..... do	Sept. 12, 1874	..... do	4. 18	5. 12	1. 14	1. 25
712	♂ jun.	..... do	Sept. 12, 1874	..... do	4. 23	4. 45	1. 02	1. 28
713	♂ jun.	..... do	Sept. 13, 1874	Dr. J. T. Rothrock....	4. 42	4. 18	1. 15	1. 34
717	♂ ad.	..... do	Sept. 13, 1874	..... do	4. 17	5. 08	1. 11	1. 25

HARPORHYNCHUS CRISSALIS, Henry.

Red-vented Thrasher.

Harporyhynchus crissalis, BD., Ives' Col. Exped., 1857-58, pt. iv, 6.—HENRY, Proc. Acad. Nat. Sci. Phila., May, 1858, p. —.—BD., Birds N. A., i, 1858, 351.—HENRY, Proc. Acad. Nat. Sci. Phila., 1859, 107 (New Mexico).—BD., Rev. Am. Birds, i, 1864, 47.—COUES, Proc. Acad. Nat. Sci. Phila., 1866, 65 (Fort Mojave, Cooper).—COOPER, Birds Cal., i, 1870, 18.—COUES, Am. Nat., vi, 1872, 370.—*Id.*, Key, N. A. Birds, 1872, 75.—*Id.*, Am. Nat., vii, 1873, 328.—BD., BREW., & RIDG., N. A. Birds, pt. i, 47, pl. iv, f. 1, app. 500.—YARROW & HENSHAW, Rep. Orn. Specs., 1872, Wheeler's Exped., 1874, 6.—HENSHAW, An. Lyc. Nat. Hist. N. Y., xi, 1874.—*Id.*, An. List Birds Utah, 1872; Wheeler's Exped., 1874, 40.—*Id.*, Rep. Orn. Specs., 1873, Wheeler's Exped., 1874, 97.

The great rarity of the Crissal Thrush hitherto in collections seems to be the result of its shy, retiring habits, and the rough nature of the country it inhabits, rather than to the scarcity of the bird; for it is found over a large extent of country, and is in certain regions by no means uncommon. According to my experience, it is not a bird of the plains, but inhabits by preference the rough sides of rocky cañons or the hill sides covered with broken *débris*, interspersed with straggling bushes. With apparently the same general habits of the two preceding species, varied somewhat to suit the different nature of its habitat, it is far more shy and wary than either, and a moment's glimpse of its peculiar form, often hardly sufficient to enable one to make sure of its identity, as it darts far ahead from some low bush into the thick brush, or over some low dividing ridge of rocks, is often the only proof to be had of its presence. Near Camp Lowell, Ariz., this species appeared to be quite common, and I obtained several specimens from the heavy brush that skirted the stream. This was the only time I had noticed them in such a locality, and doubtless they had been attracted down from the contiguous rocky hills by the presence below of berries and a greater abundance of insect food.

This, as the other Curve-billed Thrushes, is said to possess remarkable powers of song, which, in sweetness of tone and modulation, is almost unrivaled. In the fall, which is the only season I have ever observed them, they are very silent, and only when disturbed utter notes similar to those mentioned as belonging to the Palmer's Thrush. The nest is said to be a

rude structure of coarse sticks, loosely put together, and lined with finer material. The eggs, of a uniform blue color, very similar to those of the common Robin, but lighter. In this respect, therefore, they would seem to differ from all others of the genus, which are spotted, often quite heavily, with different shades of brown.

No.	Sex.	Locality.	Date.	Collector.	Wing.	Tail.	Bill.	Tarsus.
799	♂ jun.	Mount Turnbull, Ariz.	Sept. 19, 1873	H. W. Henshaw	3.92	5.75	1.14	1.32
310	♀	Camp Bowie, Ariz.	Aug. 8, 1874	..... do	3.98	5.25	1.18	1.32
386	♂ ad.	..... do	Aug. 12, 1874	Dr. J. T. Rothrock	4.08	5.73	1.39	1.28
391	♀ ad.	..... do	Aug. 13, 1874	H. W. Henshaw	3.68	5.08	1.32	1.18
635	♀ ad.	Camp Lowell, Ariz.	Sept. 9, 1874	..... do	3.84	5.70	1.26	1.25
(?)	(?)	(?)	(?), 1874	(?)	3.80	5.70	1.30	1.29
654	♀ ad.	..... do .....	..... do	H. W. Henshaw	3.77	5.27	1.28	1.20
684	.....	..... do	Sept. 11, 1874	..... do	4.08	6.00	1.29	1.28

FAM. CINCLIDAE: DIPPERS.

CINCLUS MEXICANUS, Sw.

Water Ouzel.

Cinclus mexicanus, SWAINS. Phil. Mag., 1827, 368.—NEWB., P. R. R. Rep., vi, 1857, 80.—HEERM. P. R. R. Rep., x, pt. iv, 1859, 44.—COUES, Proc. Acad. Nat. Sci. Phila., 1866, 66.—BD., Rev. Am. Birds, i, 1864, 60.—COOPER, Birds Cal., i, 1870, 25.—COUES, Key N. A. Birds, 1872, 77.—MERRIAM, U. S. Geol. Surv. Terr., 1872, 671 (nesting).—ALLEN, Bul. Mus. Comp. Zoöl., iii, 1872, 174 (mountains of Colorado; Ogden, Utah).—YARROW & HENSHAW, Rep. Orn. Specs., 1872, Wheeler's Exped., 1874, 6.—HENSHAW, Rep. Orn. Specs., 1873, Wheeler's Exped., 1874, 97.—*Id.*, An. Lyc. Nat. Hist. N. Y., xi, 1874.—*Id.*, An. List Birds Utah, 1872, Wheeler's Exped., 1874, 46.—BD., BREW., & RIDG., N. A. Birds, i, 1874, 56, pl. 5, fig. 1.—COUES, U. S. Geol. Surv. Terr., 1874, p. 10.

Hydrobata mexicana, BD., Birds N. A., 1858, 229.—XANTUS, Proc. Acad. Nat. Sci. Phila., 1859, 190 (Fort Tejon, Cal.).—HENRY, Proc. Acad. Nat. Sci. Phila., 1859, 116 (New Mexico).—COOP. & SUCKL., P. R. R. Rep., 12, pt. ii, 1860, 175.—COOPER, Am. Nat., iii, 1869, 32 (Montana).—HOLD., Proc. Bost. Soc. Nat. Hist., xv, 1872, 194 (Black Hills).

The Water Ouzel is a common inhabitant along the swift mountain-torrents of the Rocky Mountains. It was found in several localities in Utah, and was particularly numerous for a long distance on the Provo River, where the stream glides through a deep rocky cañon, and at every turn makes

one of the noisy rapids, which this little bird, with its semi-aquatic habits, so loves to frequent. It is almost devoid of shyness, and, when busied, as it almost always is, in searching among the eddies for food, will allow its movements to be scrutinized at leisure by a person standing quietly a few paces away. It is constantly in motion, now flying swiftly from rock to rock with quick strong vibrations of its short wings, now wading into the shallows, and with quick dash securing some unlucky crustacean or water-beetle. Even when standing for a moment, and watching for the appearance of the prey, its body is kept in motion by constant downward jerks, not of the tail alone, but of the whole body, much like the Rock Wrens (*Salpinctes* and *Catherpes*), which are very grotesque, and give the bird the appearance of constantly bowing. It dives and swims under water, no matter how strong the current, with the greatest facility, though it finds it unnecessary to practice this on the shallow streams, where I have most often seen it, and in the greatest numbers. Its song I have never heard, as it is silent after the young are reared, save the chattering notes which accompany its short flights from point to point. It winters on many of the streams of Utah, as also in Arizona, where, however, it appears to be not nearly so abundant as farther north; many streams seemingly well adapted to its peculiar habits being uninhabited. On some few of the streams in the White Mountains, Ariz., however, quite a number were seen, and here I noticed an unusual and interesting departure from the usual habits. On a small pond among the high pine woods, occupying a perfectly isolated position, having neither inlet nor outlet, was a pair of these birds, and seemingly as perfectly at home on the borders of this quiet sheet of water as on the most turbulent rushing stream. I thought, too, that, in keeping with their surroundings, they had become less active, and their motions lacked somewhat of the quick, business like energy which usually characterizes them.

No.	Sex.	Locality.	Date.	Collector.	Wing.	Tail.	Bill.	Tarsus.
990	♀	Diamond Creek, N. Mex.	Nov. 11, 1873	H. W. Henshaw.....	3.53	2.20	0.65	1.10
992	♀	..... do .....	..... do .....	..... do	3.45	2.03	0.61	1.11
378	♀	El Paso County, Colo ..	— —, 1873	C. E. Aiken.....	3.44	2.15	0.64	1.11

FAM. SAXICOLIDAE: STONE CHATS.

SIALIA MEXICANA, Sw.

Western Bluebird.

- Sialia mexicana*, SWAINS., Fn. Bor.-Am., ii, 1831, 202.—BD., Ives' Col. Exped., 1857-58, pt. iv, 5.—*Id.*, Birds N. A., 1858, 223.—HEERM., P. R. R. Rep., x, pt. iv, 1859, 43.—KENNERLY, P. R. R. Rep., Whipp. Route, x, 1859, 24.—BD., U. S. & Mex. Bound. Surv., ii, pt. ii, 1859, Birds, 9.—*Id.*, Proc. Acad. Nat. Sci. Phila., 1859, 190 (Fort Tejon, Cal.).—HENRY, Proc. Acad. Nat. Sci. Phila., 1859, 106 (New Mexico).—COOP. & SUCKL., P. R. R. Rep., 12, pt. ii, 1860, 173.—BD., Rev. Am. Birds, i, 1862, 63.—COUES, Proc. Acad. Nat. Sci. Phila., 1866, 66 (Fort Whipple).—*Id.*, Proc. Acad. Nat. Sci. Phila., 1868, 82.—COOPER, Am. Nat., iii, 1869, 32 (Montana).—*Id.*, Birds Cal., 1870, 28.—*Id.*, Proc. Cal. Acad., 1870, 75 (Colorado River).—ALLEN, Bul. Mus. Comp. Zoöl., iii, 1872, 174 (foot-hills west of Denver, Colo.).—COUES, Key N. A. Birds, 1872, 76.—YARROW & HENSHAW, Rep. Orn. Specs., 1872, Wheeler's Exped., 1874, 7.—HENSHAW, Rep. Orn. Specs., 1873, Wheeler's Exped., 1874, 98.—BD., BREW., & RIDG., N. A. Birds, i, 1874, 65, pl. v, f. 2.—COUES, U. S. Geol. Surv. Terr., 1874, 14.
- Sialia occidentalis*, TOWNS.—WOODH., Sitgreave's Exp. Zuñi & Col. Riv., 1854, 68.—NEWB., P. R. R. Rep., vi, 1857, 80.

This species possesses a wide range, being found from the Rocky Mountains to the Pacific, and having been detected at various points from Washington Territory to Mexico, yet it is by no means a common inhabitant throughout this extensive area. In Utah, it was not found by our parties at all, nor do I know of its occurrence in that Territory. In Colorado, it seems to be rather uncommon in the eastern portion of the Territory. It was not found in June near Fort Garland in 1873, nor at Santa Fé, N. Mex., in June of 1874, where, however, the succeeding species was abundant.

About July 23, Inscription, Rock, N. Mex., appeared to be a favorite locality for the species, and large numbers of both old and young were congregated together in the piñon and cedar trees. Their habits at this season do not differ notably from the other species. From here southward, they were frequently seen, commonly among the pines. At Camp Apache, in August, I found them in large flocks in the pine woods, and accompanied by flocks of Warblers, Nuthatches, and Titmice, to which they seemed to act as leaders, the whole flock following their flight from tree to tree. It apparently win-

ters in vicinity of Camp Apache, being found here in quite large flocks in November.

No.	Sex.	Locality.	Date.	Collector.	Wing.	Tail.	Bill.	Tarsus.
464	♀ jun.	Inscription Rock, N. Mex.	July 23, 1873	H. W. Henshaw.....	4.30	2.71	0.40	0.83
465	♂	..... do .....	..... do .....	..... do	4.07	2.70	0.45	0.79
527	♂	Camp Apache, Ariz....	Aug. 26, 1873	..... do	4.10	2.85	0.48	0.68
679	♂ ad.	..... do	Sept. 1, 1873	..... do	4.30	2.95	0.42	0.83
975	♂ ad.	Gila River, Southwest- ern New Mexico.	Oct. 28, 1873	..... do	4.45	2.98	0.47	0.80
962	♂ ad.	..... do .....	..... do .....	..... do	4.43	2.98	0.50	0.85
754	♂ ad.	Mount Graham, Ariz..	Sept. 19, 1874	..... do	4.37	2.95	0.53	0.80
781	♂ ad.	..... do	Sept. 21, 1874	..... do	4.41	2.92	0.50	0.79
867	♂	..... do	Sept. 27, 1874	..... do	4.37	2.85	0.43	0.78
966	.....	Black River, Ariz....	Oct. 7, 1874	..... do	4.45	3.10	0.47	0.78
1048	♂	Camp Apache, Ariz....	Oct. 22, 1874	..... do	4.57	3.15	0.47	0.77
1063	♂ ad.	..... do	Oct. 24, 1874	..... do	4.37	2.88	0.47	0.77
1064	♀ ad.	..... do	Oct. 24, 1874	..... do	4.05	2.70	0.40	0.73
1095	♂ ad.	..... do	Oct. 25, 1874	..... do	4.25	2.82	0.47	0.88
					4.48	2.95	0.43	0.77
1088	♂ ad.	..... do	Oct. 29, 1874	..... do	4.35	2.80	0.45	0.87

SIALIA ARCTICA, Sw.

Rocky Mountain Bluebird.

Erythaca (*Sialia*) *arctica*, SWAINS., Fn. Bor.-Am., ii, 1831, 209, pl. xxxix.

Sialia macroptera, BD., Stans. Rep. Exp. Great Salt Lake, 1852, 314.

Sialia arctica, WOODH., Sitgreave's Exp. Zuñi & Col. Riv., 1854, 68.—BD., P. R. R. Rep., Beckwith's Route, x, 1857, 13, pl. xxxv.—*Id.*, Ives' Col. Exped., 1857-58, pt. iv, 5.—*Id.*, Birds N. A., 1858, 224.—*Id.*, U. S. & Mex. Bound. Surv., ii, pt. ii, 1859, Birds, 9.—KENNERLY, P. R. R. Rep., Whipp. Route, x, 1859, 24.—HEERM., P. R. R. Rep., x, pt. iv, 1859, 44.—HAYD., Trans. Am. Phil. Soc., 12, 1862, 159.—BD., Rev. Am. Birds, i, 1864, 64.—COUES, Proc. Acad. Nat. Sci. Phila., 1866, 66.—COOPER, Am. Nat., iii, 1869, 32.—*Id.*, Birds Cal., 1870, 29.—*Id.*, Proc. Cal. Acad., 1870, 75.—STEV., U. S. Geol. Surv. Terr., 1870, 463.—YARROW, Rep. Orn. Specs., 1871, Wheeler's Exped., 1874, 34.—YARROW & HENSHAW, Rep. Orn. Specs., 1872, Wheeler's Exped., 1874, 7.—AIKEN, Proc. Bost. Soc. Nat. Hist., xv, 1872, 194, 671.—MERRIAM, U. S. Geol. Surv. Terr., 1872, 671.—ALLEN, Bul. Mus. Comp. Zool., iii, 1872, 174 (mountains of Colorado, from plains to timber-line; Ogden, Utah).—COUES, Key N. A. Birds, 1872, 76.—HENSHAW, An. Lyc. Nat. Hist. N. Y., xi, 1874.—*Id.*, An. List Birds Utah, 1872, Wheeler's Exped., 1874, 40.—*Id.*, Rep. Orn. Specs., 1873, Wheeler's Exped., 1874, 72, 98.—ALLEN, Proc. Bost.

Soc. Nat. Hist., June, 1874, 19.—BD., BREW., & RIDG., N. A. Birds, i, 1874, 67, pl. v, f. 2.—COUES, U. S. Geol. Surv. Terr., 1874, 14.

A common inhabitant of the mountainous regions of the central district, and very numerous in Utah, Colorado, and in Northern New Mexico and Arizona. It seems to be of a less confiding disposition than the previous species; and I have usually found it during the breeding season in the wild, elevated districts, from 7,000 feet upward, where it frequents the more open spaces, where aspen groves alternate with the remains of pine woods, the broken stubs of which, charred by the fires which have swept through again and again, are seen on every side. In the cavities of these stubs, and the deserted woodpeckers' holes in the aspens, they breed during the early summer months. In the neighborhood of Santa Fé, they breed commonly, and here were noticed in the vicinity of houses, seeming in fact to be as familiar and as much at home as does our own bluebird in the East. Two broods are reared in a season. They do not apparently get much farther south in summer than Santa Fé, but in the late fall and winter are spread over the greater portion of both New Mexico and Arizona. In Utah, they were first noticed as migrating south in small flocks in early August. From this time until November 15, they were usually seen in small detached companies, pursuing their way southward.

No.	Sex.	Locality.	Date.	Collector.	Wing.	Tail.	Bill.	Tarsus.
150	♂ ad.	Gunnison, Utah	Sept. 8, 1872	H. W. Henshaw .....	.....	.....	.....	.....
151	♀ ad.	..... do .....	..... do .....	..... do .....	.....	.....	.....	.....
265	♂ ad.	Iron City, Utah	Oct. 8, 1872	..... do .....	.....	.....	.....	.....
387	♀	Beaver, Utah	Nov. 10, 1872	Dr. H. C. Yarrow and H. W. Henshaw.	.....	.....	.....	.....
143	♀ ad.	Fort Garland, Colo....	May 26, 1873	H. W. Henshaw	4.30	2.87	0.83	0.81
169	♂ ad.	..... do	May 28, 1873	..... do	4.50	2.88	0.57	0.84
280	♀ ad.	..... do	June 6, 1873	..... do	4.36	2.76	0.55	0.80
326	♂ ad.	Rio Grande, Colo....	June 12, 1873	..... do	4.50	2.92	0.56	0.80
330	♂ ad.	..... do .....	..... do .....	..... do	4.65	3.02	0.57	0.86
356	♂ ad.	..... do	June 15, 1873	..... do	4.63	2.90	0.57	0.82
47	♂ ad.	South Park, Colo	June 25, 1873	..... do	4.35	2.91	0.61	0.85
998	♂ ad.	Salt Lake, N. Mex....	Nov. 19, 1873	..... do	4.58	3.03	0.50	0.85
1006	♂ ad.	..... do .....	..... do .....	..... do	4.75	2.27	0.50	0.93
10	♂ ad.	Santa Fé, N. Mex	June 17, 1874	Dr. J. T. Rothrock....	4.43	2.93	0.55	0.81
14	♂ ad.	..... do	June 18, 1874	H. W. Henshaw	4.48	2.98	0.45	0.81
18	♂ ad.	..... do	June 19, 1874	Dr. J. T. Rothrock....	4.45	2.75	0.55	0.88
21	♀ ad.	..... do	June 20, 1874	..... do	4.42	2.88	0.55	0.85

FAM. SYLVIIDAE: SYLVIAS.

REGULUS CALENDULA (L.).

Ruby-crowned Kinglet.

Motacilla calendula, LINN., Syst. Nat., i, 1766, 337.

Regulus calendula, WOODH., Sitgreave's Exp. Zuñi & Col. Riv., 1854, 67.—BD., U. S. & Mex. Bound. Surv., ii, pt. ii, 1854, Birds, 9.—*Id.*, Ives' Col. Exped., 1857-58, pt. iv, 5.—*Id.*, Birds N. A., 1858, 226.—KENNERLY, P. R. R. Rep., Whipp. Route, x, 1859, 24.—HEERM., P. R. R. Rep., x. pt. iv, 1859, 43.—*Id.*, Proc. Acad. Nat. Sci. Phila., 1859, 190 (Fort Tejon, Cal.).—HENRY, Proc. Acad. Nat. Sci. Phila., 1859, 106.—COOP. & SUCKL., P. R. R. Rep., xii, pt. ii, 1860, 174.—HAYD., Trans. Am. Phil. Soc., xii, 1862, 159.—BD., Rev. Am. Birds, i, 1864, 66.—COUES, Proc. Acad. Nat. Sci. Phila., 1866, 66 (Fort Whipple).—COOPER, Am. Nat., iii, 1869, 32.—*Id.*, Birds Cal., 1870, 33.—*Id.*, Proc. Cal. Acad., 1870, 75.—STEV., U. S. Geol. Surv. Terr., 1870, 463.—AIKEN, Proc. Bost. Soc. Nat. Hist., xv, 1872, 195.—SNOW, Birds Kan., 1872, 7.—COUES, Key N. A. Birds, 1872, 78.—MERRIAM, U. S. Geol. Surv. Terr., 1872, 671.—ALLEN, Bul. Mus. Comp. Zoöl., iii, 1872, 974 (Colorado; Utah).—HENSHAW, Rep. Orn. Specs., 1873, Wheeler's Exped., 1874, 57, 72, 98.—*Id.*, An. Lyc. Nat. Hist. N. Y., xi, 1874.—*Id.*, An. List Birds Utah, 1872, Wheeler's Exped., 1874, 40.—YARROW & HENSHAW, Rep. Orn. Specs., 1872, Wheeler's Exped., 1874, 7.—BD., BREW., & RIDG., N. A. Birds, i, 1874, 75, pl. v, f. 9.—COUES, U. S. Geol. Surv. Terr., 1874, 15.

The Ruby-crowned Kinglet, so well known during the migratory seasons throughout the Eastern States, occurs in even greater numbers in spring and fall throughout the Middle Region of North America. In the fall, they are especially numerous, and are, indeed, almost omnipresent; having been met with by our parties from the limits of the pine region on the mountain tops to the lowest valleys, where they frequent the deciduous trees and shrubs along the streams. At this season, they are extremely sociable; and, though occasionally one may be seen alone, they are more often met with in parties of five or six, often several being found in the same tree, or accompanying the Titmice, Warblers, Bluebirds, and other insectivorous birds, that at this season band together in large flocks, and pursue their way through the woods, all on terms of the utmost friendliness with each other. Rarely, indeed, are these companies found unaccompanied by one or more of the Kinglets, and among them they are prominent for the nimbleness of their movements and the untiring industry they show in their pursuit of the small insects, now glean-

ing them from among the small branches and interstices of bark, and now darting forth in chase of them as they fly past.

The species breeds in the heavy pine and spruce forests on the mountains of Colorado, and also in Arizona, both in the White Mountains and as far south as Mount Graham, in both which localities I saw the old birds leading about their young; still in the nesting plumage as late as August 1. In the mountains near Fort Garland, Col., it was a common species in June; the pine woods at an elevation of 10,000 feet often echoing with the music of its sweet, beautifully modulated song, which is also wonderful for its power and the purity of its tones.

That its nesting habits should so long remain unknown is by no means surprising, since, were it not for the song, its presence in these forests would hardly be detected, frequenting, as is its habit at this season, the tops of the tall coniferous trees. June 11, while collecting on a mountain near the Rio Grande, I discovered a nearly finished nest, built on a low branch of a pine, which I have little doubt belonged to this bird. The male was singing directly overhead; but, although I watched for some time in hopes of being able to see the female in the act of building, I was disappointed. The nest was a somewhat bulky structure, very large for the size of the bird, externally composed of strips of bark, and lined thickly with feathers of the Grouse (*Canace obscura*).

No.	Sex.	Locality.	Date.	Collector.	Wing.	Tail.	Bill.	Tarsus.
304	♀ ad.	North Creek, Utah....	Sept. 26, 1872	H. W. Henshaw and Dr. H. C. Yarrow.	-----	-----	-----	-----
215	♂ ad.	Near Ft. Garland, Colo	May 30, 1873	H. W. Henshaw.....	2.42	1.60	0.37	0.65
265	♂ ad.	..... do	June 5, 1873	..... do	2.43	1.97	0.34	0.72
258	♂ jun.	Mount Graham, Ariz..	Aug. 1, 1874	..... do	2.36	1.90	0.44	0.68
116	Jun.	Sangre de Cristo, Colo.	Aug. 9, 1874	C. E. Aiken.....	2.33	1.85	0.37	0.74
254	♂ ad.	Terra Amarilla, N. Mex	Sept. 15, 1874	..... do	2.40	2.03	0.37	0.73
287	♂ ad.	Pagosa, Colo	Sept. 19, 1874	..... do	2.36	1.98	0.36	0.76
821	♂	Mount Graham, Ariz ..	Sept. 23, 1874	H. W. Henshaw.....	2.36	1.90	0.38	0.69
853	♀	..... do	Sept. 24, 1874	..... do	2.20	1.77	0.38	0.70
852	♀	..... do .....	..... do .....	..... do	2.27	1.88	0.38	0.70
811	♂	..... do	Sept. 25, 1874	..... do	2.50	1.95	0.40	0.75
1094	♂	Camp Apache, Ariz....	Oct. 30, 1874	..... do	2.32	1.92	0.38	0.74

POLIOPTILA CÆRULEA (L.)

Blue-gray Gnatcatcher.

Motacilla cærulea, LINN., Syst. Nat., i, 1766, 337.

Culicivora cærulea, WOODH., Sitgreave's Exp. Zuñi & Col. Riv., 1854, 67.

Polioptila cærulea, BD., Ives' Col. Exped., 1857-58, pt. iv, 6.—*Id.*, Birds N. A., 1858, 380.—COUES, Proc. Acad. Nat. Sci. Phila., 1866, 66 (Fort Whipple).—BD., U. S. & Mex. Bound. Surv., ii, pt. ii, 1859, Birds, 13.—HEERM., P. R. R. Rep., x, pt. iv, 1859, 39.—XANTUS, Proc. Acad. Nat. Sci. Phila., 1859, 191 (Fort Tejon, Cal.).—HENRY, Proc. Acad. Nat. Sci. Phila., 1859, 107 (New Mexico).—HAYD., Trans. Philo. Soc. Phila., xii, 1862, 164.—BD., Rev. Am. Birds, i, 1864, 74.—COOPER, Birds Cal., 1870, 35.—*Id.*, Proc. Cal. Acad., 1870, 75.—ALLEN, Bul. Mus. Comp. Zool., iii, 1872, 174 (Eastern Kansas).—SNOW, Birds Kan., 1872, 9.—COUES, U. S. Geol. Surv. Terr., Birds Northwest, 1874, 17.—*Id.*, Key N. A. Birds, 1872, 78.—HENSHAW, Rep. Orn. Specs., 1873, Wheeler's Exped., 1874, 99.

This little bird appears to be sparingly, though quite generally, distributed in New Mexico and Arizona, where I have seen it in several localities, though I have never detected the closely allied forms *P. melanura* and *plumbea*, which are both said to occur in Arizona. The Blue-gray Gnatcatcher is of a very lively disposition, and keeps so constantly in motion that to observe its habits is a matter of no little difficulty, as it moves rapidly from tree to tree, scanning the foliage and twigs as it passes along with quick, nervous turnings of its head and rapid glancings of its eyes. They are also expert fly-catchers, and their flying sallies are frequent and usually successful. They are most often found in the oaks that are scattered over the hill sides, or in the scrub of the foot hills, and are not found in the mountains.

No.	Sex.	Locality.	Date.	Collector.	Wing.	Tail.	Bill.	Tarsus.
720	♀	South of Camp Apache, Ariz.	Sept. 8, 1873	H. W. Henshaw	1.91	2.24	0.33	0.65
898	♂	San Pedro, Ariz	Oct. 3, 1873	..... do	2.03	2.35	0.40	0.70
321	♂ jun.	Camp Bowie, Ariz	Aug. 8, 1874	..... do	1.87	2.07	0.40	0.65
50	♂ ad.	Aguazul, N. Mex	July 2, 1874	..... do	1.90	2.10	0.38	0.68
157	♂ ad.	Near Camp Apache, Ariz	July 19, 1874	..... do	2.00	2.25	0.40	0.67
160	♂ ad.	Arizona .....	..... do .....	..... do	2.10	2.20	0.40	0.68

FAM. PARIDAE: TITMICE.

LOPHOPHANES INORNATUS, Gamb.

Gray-tufted Titmouse.

Parus inornatus, GAMB., Proc. Acad. Nat. Sci. Phila., August, 1845, 265 (Upper California).

Tophophanes (sic) *inornatus*, BD., Ives' Col. Exped. 1857-58, pt. iv, 6.

Lophophanes inornatus, WOODH., Sitgreave's Exp. Zuñi & Col. Riv., 1854, 69.—BD., Birds N. A., 1858, 386.—XANTUS, Proc. Acad. Nat. Sci. Phila., 1859, 91 (Fort Tejon, Cal.).—HEERM., P. R. R. Rep., x, pt. iv, 1859, 42.—BD., Rev. Am. Birds, i, 1864, 78.—COUES, Proc. Acad. Nat. Sci. Phila., 1866, 79 (Fort Whipple).—COOPER, Birds Cal., i, 1870, 42.—AIKEN, Proc. Bost. Soc. Nat. Hist., 1872, 195.—COUES, Key N. A. Birds, 1842, 80, f. 22.—BD., BREW., & RIDG., N. A. Birds, pt. i, 1874, 93, pl. vi, f. 4.—YARROW & HENSHAW, Rep. Orn. Specs., 1872, Wheeler's Exped., 1874, 7.—HENSHAW, An. Lyc. Nat. Hist. N. Y., xi, 1874.—*Id.*, An. List Birds Utah, 1872, Wheeler's Exped., 1874, 40.—*Id.*, Rep. Orn. Specs., 1873, Wheeler's Exped., 1874, 99.—COUES, U. S. Geol. Surv. Terr., Birds Northwest, 1874, p. 20.

Lophophanes bicolor, HENRY, Proc. Acad. Nat. Sci. Phila., 1859, 107 (New Mexico).

This Titmouse is resident in Utah, Colorado, Arizona, and New Mexico, and, in the localities it most affects, is a common bird. These, in the more northern portion of its habitat, are the groves of piñon and scrub cedars, and in Southern Arizona the oaks are much frequented; but it never is found, I believe, in the pine woods. Its habits much resemble those of its eastern congener (*L. bicolor*). It spends much of its time on the ground, searching for insects, and quite likely the piñon nuts and acorns may, during the fall and winter, form a part of its food, though I have never seen them pay any attention to these. It has much curiosity, and, though somewhat timid, will occasionally remain within easy distance of an intruding person; keeping a careful watch upon his motions, and uttering its harsh, scolding notes, expressive alike of anger and fear. It has, in the early summer, a short, disconnected song, which, however, is often sweet and pleasing. I have never seen more than three or four together, even in the fall; but, in every company of the other Titmice, Warblers, or Bluebirds, a few of this species is always found.

No.	Sex.	Locality.	Date.	Collector.	Wing.	Tail.	Bill.	Tarsus.
247	♂	Iron City, Utah.....	Oct. 5, 1871	H. W. Henshaw.....	.....	.....	.....	.....
258	♀	..... do	Oct. 6, 1871	..... do .....	.....	.....	.....	.....
261	♀ ad.	..... do	Oct. 8, 1871	..... do .....	.....	.....	.....	.....
262	♂	..... do .....	..... do .....	..... do .....	.....	.....	.....	.....
263	♂ ad.	..... do .....	..... do .....	..... do .....	.....	.....	.....	.....
264	♀	..... do .....	..... do .....	..... do .....	.....	.....	.....	.....
390	♂	Beaver, Utah.....	Nov. 11, 1871	Dr. H. C. Yarrow and H. W. Henshaw.	.....	.....	.....	.....
391	♀	..... do .....	..... do .....	..... do .....	.....	.....	.....	.....
392	♂	..... do .....	..... do .....	..... do .....	.....	.....	.....	.....
393	♂	..... do .....	..... do .....	..... do .....	.....	.....	.....	.....
394	♀	..... do .....	..... do .....	..... do .....	.....	.....	.....	.....
395	♀	..... do .....	..... do .....	..... do .....	.....	.....	.....	.....
396	♀	..... do .....	..... do .....	..... do .....	.....	.....	.....	.....
397	♂	..... do .....	..... do .....	..... do .....	.....	.....	.....	.....
403	♂	Cove Creek, Utah.....	Nov. 13, 1871	..... do .....	.....	.....	.....	.....

LOPHOPHANES WOLLWEBERI, Bp.

Wollweber's Titmouse.

Lophophanes wollweberi, Bp., C. R., xxxi, September, 1850, 478.—BD., Birds N. A., 1858, 386.—*Id.*, U. S. & Mex. Bound. Surv., ii, pt. ii, 1859, Birds, 14, pl. xv, f. 1.—KENNERLY, P. R. R. Rep., Whipp. Route, x, 1859, 27.—HENRY, Proc. Acad. Nat. Sci. Phila., 1859, 107 (New Mexico).—COUES, Proc. Acad. Nat. Sci. Phila., 1866, 79 (Fort Whipple).—BD., Rev. Am. Birds, i, 1864, 79.—COOPER, Birds Cal., i, 1870, 43.—COUES, Key N. A. Birds, 1872, 80, f. 24.—HENSHAW, Rep. Orn. Specs., 1873, Wheeler's Exped., 1874, 99.

In the more southern portions of New Mexico and Arizona, this appears to be a very generally distributed species, and, in certain localities, was frequently met with. Of its breeding habits, nothing is known. In the fall, however, these are very distinct from the preceding species. Instead of being found in small companies or as stragglers on the skirts of the large flocks of other species, it habitually moves about in flocks, composed often of twenty-five, and even more, of its own species; its exclusiveness in this particular being quite noticeable, though once or twice I have seen a few on intimate terms of companionship with the other Chickadees. It pays especial attention to the oaks, in which trees they move about slowly from limb to limb, scrutinizing each crevice and fold of bark which is likely to serve as a hiding place for insects. They are thus very thorough in their

search, but have less of the rapidity of movement and nervous energy which characterize other members of this group. They are less noisy, too; their notes, though Chickadee-like; being weaker and fainter, and not infrequently one may, when watching one or two of these birds, find himself surrounded by a large number, which have silently closed in around while he was wholly unconscious of their presence. They are strictly arboreal, sharing only to a slight degree the terrestrial habits which are common to the other Titmice, especially of this genus.

No.	Sex.	Locality.	Date.	Collector.	Wing.	Tail.	Bill.	Tarsus.
193	♂ jun.	Rock Cañon, Ariz	July 21, 1874	H. W. Henshaw	2.52	2.48	0.35	0.66
196	Jun.	..... do . . . . .	..... do . . . . .	..... do	2.40	2.45	0.33	0.70
419	♂ jun.	Bowie Agency, Ariz. . . .	Aug. 16, 1874	..... do	2.62	2.55	0.35	0.72
420	♀ jun.	..... do . . . . .	..... do . . . . .	..... do	2.45	2.38	0.32	0.68
421	♂ jun.	..... do . . . . .	..... do . . . . .	..... do	2.57	2.47	0.35	0.68
424	♂ jun.	..... do	Aug. 17, 1874	..... do	2.58	2.50	0.35	0.73
425	♀ jun.	..... do . . . . .	..... do . . . . .	..... do	2.54	2.50	0.35	0.68
426	♂ jun.	..... do . . . . .	..... do . . . . .	..... do	2.52	2.58	0.35	0.57
427	.....	..... do . . . . .	..... do . . . . .	..... do	2.60	2.55	0.33	0.67
427A	.....	..... do . . . . .	..... do . . . . .	..... do	2.65	2.55	0.38	0.72
428	♂ jun.	..... do . . . . .	..... do . . . . .	..... do	2.50	2.47	0.33	0.65
429	♀ jun.	..... do . . . . .	..... do . . . . .	..... do	2.55	2.50	0.33	0.67
513	♀ ad.	Near Camp Crittenden, Ariz.	Aug. 27, 1874	..... do	2.45	2.36	0.32	0.64
534	Jun.	..... do	Aug. 29, 1874	..... do	2.45	2.38	0.35	0.66
566	♀ jun.	..... do . . . . .	..... do . . . . .	..... do	2.40	2.40	0.32	0.65
974	♂ ad.	Near Camp Apache, Ariz	Oct. 9, 1874	..... do	2.60	2.50	0.33	0.69

PARUS MONTANUS, Gamb.

Mountain Chickadee.

Parus montanus, GAMB.; Proc. Acad. Nat. Sci. Phila., April, 1843, 259.—WOODH., Sitgreave's Exp. Zuñi & Col. Riv., 1854, 68.—NEWB., P. R. R. Rep., vi, 1857, 79.—BD., Ives' Col. Exped., 1857-58, pt. iv, 6.—*Id.*, Birds N. A., 1858, 394.—XANTUS, Proc. Acad. Nat. Sci. Phila., 1859, 191 (Fort Tejon, Cal.).—HEERM., P. R. R. Rep., x, pt. iv, 1859, 42.—HENRY, Proc. Acad. Nat. Sci. Phila., 1859, 107 (New Mexico).—COOP. & SUCKL., P. R. R. Rep., xii, pt. ii, 1860, 194.—BD., Rev. Am. Birds, i, 1864, 82.—COOPER, Am. Nat., iii, 1869, 75 (Montana).—STEV., U. S. Geol. Surv. Terr., 1870, 464.—COOPER, Birds Cal., 1870, 46.—AIKEN, Proc. Bost. Soc. Nat. Hist., xv, 1872, 195.—MERRIAM, U. S. Geol. Surv. Terr., 1872, 672.—COUES, Key N. A. Birds, 1872, 81.—ALLEN, Bull. Mus. Comp. Zoöl., iii, 1872, 174 (mountains of Colorado).—HENSHAW, An. Lyc. Nat. Hist. N. Y., xi, 1874, p. 2.—*Id.*, An. List Birds Utah, 1872, Wheeler's Exped., 1874, 40.—YARROW &

HENSHAW, Rep. Orn. Specs., 1872, Wheeler's Exped., 1874, 7.—HENSHAW, Rep. Orn. Specs., 1873, Wheeler's Exped., 1874, 72, 99.—COUES, U. S. Geol. Surv. Terr., Birds Northwest, 1874, 22.

Pœcile montanus, COUES, Proc. Acad. Nat. Sci. Phila., 1866, 79.

A common inhabitant of the deep pine woods, where, during the breeding season, it is chiefly confined. A very active and persistent insect hunter, exploring every crack and crevice beneath the rough bark for the hidden larvæ, which are instantly dragged forth, and, after being vigorously hammered on some horizontal limb and reduced to a shapeless mass, are eagerly swallowed. Its habits are essentially like those of its congeners.

No.	Sex.	Locality.	Date.	Collector.	Wing.	Tail.	Bill.	Tarsus.
414	♀	Fillmore, Utah	Nov. 17, 1872	H. W. Henshaw and Dr. H. C. Yarrow.	.....	.....	.....	.....
415	♀	..... do .....	..... do .....	..... do .....	.....	.....	.....	.....
417	♂	..... do .....	..... do .....	..... do .....	.....	.....	.....	.....
A 3	.....	(Alcoholic) .....	.....	..... do .....	.....	.....	.....	.....
A 4	.....	..... do .....	.....	..... do .....	.....	.....	.....	.....
60	♂ jun.	Willow Spring, Ariz...	July 12, 1874	H. W. Henshaw.....	2. 85	2. 53	0. 38	0. 73
106	.....	Sangre de Cristo Pass, Colo.	Aug. 8, 1874	C. E. Aiken	2. 64	2. 61	0. 42	0. 75
112	♂ jun.	..... do	Aug. 9, 1874	..... do	2. 73	2. 62	0. 40	0. 77
113	.....	..... do .....	..... do .....	..... do	2. 77	2. 63	0. 44	0. 73
164	.....	Trinchara Creek, Colo.	Aug. 18, 1874	..... do	2. 85	2. 67	0. 37	0. 63
165	♂	..... do	Aug. 19, 1874	..... do	2. 85	2. 68	0. 38	0. 75
188	.....	Pagosa, Colo	Aug. 31, 1874	..... do	2. 67	2. 65	0. 40	0. 73
792	♂ ad.	Mount Graham, Ariz ..	Sept. 22, 1874	H. W. Henshaw.....	2. 80	2. 59	0. 40	0. 73
793	♀ jun.	..... do .....	..... do .....	..... do	2. 64	2. 64	0. 40	0. 75
809	♂ ad.	..... do	Sept. 23, 1874	..... do	2. 70	2. 55	0. 43	0. 75
845	♂ ad.	..... do	Sept. 24, 1874	..... do	2. 75	2. 63	.....	0. 75
866	♂	..... do	Sept. 25, 1874	..... do	2. 90	2. 67	0. 38	0. 75

PARUS ATRICAPILLUS, L., var. SEPTENTRIONALIS, Harris.

Long-tailed Chickadee.

Parus septentrionalis, HARRIS, Proc. Acad. Nat. Sci. Phila., ii, 1845, 300.—BD., Stans. Rep. Exp. Great Salt Lake, 1852, 316.—*Id.*, Birds N. A., 1858, 389.—HAYD., Trans. Philo. Soc., xii, 1862, 164.—BD., Birds N. A., i, 1864, 79.—STEV., U. S. Geol. Surv. Terr., 1870, 464.—SNOW, Birds Kan., 1872, 9.—AIKEN, Proc. Bost. Soc. Nat. Hist., xv, 1872, 195.

Parus atricapillus?, NEWB., P. R. R. Rep., vi, 1857, 79 (California; Oregon).

Parus septentrionalis var. *albescens*, BD., Birds N. A., 1858, pl. xxxvii.

Parus atricapillus var. *septentrionalis*, COUES, Key N. A. Birds, 1872, 81.—ALLEN, Bul. Mus. Comp. Zoöl., iii, 1872, 174 (Kansas; Colorado; Utah).—YARROW & HENSHAW, Rep. Orn. Specs., 1872, Wheeler's Exped., 1874, 7.—HENSHAW,

An. Lyc. Nat. Hist. N. Y., xi, 1874.—*Id.*, An. List Birds Utah, 1872, Wheeler's Exped., 1874, 41.—*Id.*, Rep. Orn. Specs., 1873, Wheeler's Exped., 1874, 72.—ALLEN, Proc. Bost. Soc. Nat. Hist., June, 1874, 19.—COUES, U. S. Geol. Surv. Terr., Birds Northwest, 1874, 21.

Common in cottonwood groves near Provo River, 1872, in July and November; not seen elsewhere. In Colorado, this appears to be a not very common species; at all events, it is much less abundant than the Mountain Chickadee. Found indifferently in the heavy pine woods and among the cottonwoods of the streams. Could detect no differences in habits and notes from the eastern Chickadee (*atricapillus*), from which it chiefly differs in its longer tail and lighter colors.

No.	Sex.	Locality.	Date.	Collector.	Wing.	Tail.	Bill.	Tarsus.
26	♀ jun.	Provo, Utah.....	July 1, 1872	H. W. Henshaw.....	.....	.....	.....	.....
24	♂ ad.	..... do.....	Aug. 3, 1872	..... do.....	.....	.....	.....	.....
25	♀ ad.	..... do.....	..... do.....	..... do.....	.....	.....	.....	.....
142	♂ jun.	..... do.....	..... do.....	..... do.....	.....	.....	.....	.....
436	♂	..... do.....	Nov. 25, 1872	H. W. Henshaw and Dr. H. C. Yarrow.	.....	.....	.....	.....
149	Jun.	Fort Garland, Colo....	Aug. 12, 1874	C. E. Aiken.....	2.60	2.78	0.36	0.68
356	Ad.	..... do.....	Oct. 10, 1874	..... do.....	2.68	2.85	0.38	0.67
342	Ad.	Pueblo, Colo.....	Oct. 14, 1874	..... do.....	2.66	2.90	0.33	0.62
366	♂ ad.	..... do.....	Oct. 18, 1874	..... do.....	2.80	2.97	0.34	0.71

PSALTRIPARUS MINIMUS (Townsend), var. PLUMBEUS, Bd.

Lead-colored Titmouse.

Psaltria plumbea, BAIRD, Proc. Acad. Nat. Sci. Phila., vii, June, 1854, 118 (Little Colorado).

Psaltriparus plumbeus, BD., Birds N. A., 1858, 398.—KENNERLY, P. R. R. Rep., Whipple's Route, x, 1859, 27, pl. xxxiii, f. 2.—HENRY, Proc. Acad. Nat. Sci. Phila., 1859, 107 (New Mexico).—BD., Rev. Am. Birds, i, 1864, 84.—COUES, Proc. Acad. Nat. Sci. Phila., 1866, 79 (Fort Whipple, Ariz.).—STEV., U. S. Geol. Surv. Terr., 1870, 464 (Green River).—COOPER, Birds Cal., i, 1870, 49.—COUES, Key N. A. Birds, 1872, 23.—AIKEN, Proc. Bost. Soc. Nat. Hist., 1872, 195 (Eastern Colorado).—YARROW & HENSHAW, Rep. Orn. Specs., 1872, Wheeler's Exped., 1874, 7.—BD., BREW., & RIDG., N. A. Birds, i, 1874, 110, pl. vi, f. 6.—COUES, U. S. Geol. Surv. Terr., Birds Northwest, 1874, 23.

Psaltriparus minimus (error), HENSHAW, An. Lyc. Nat. Hist. N. Y., xi, 1874.—*Id.*, An. List Birds Utah, 1872, Wheeler's Exped., 1874, 40.—*Id.*, Rep. Orn. Specs., 1873, Wheeler's Exped., 1874, 99.

Mr. Aiken is, I believe, the only one who has found this species in Eastern Colorado, where he reports it as a winter resident. In Utah,

Arizona, and Western New Mexico, this little Titmouse is abundant and quite generally distributed, though it avoids the heavy pines, among which I have never seen it, seeking especially the hilly regions covered with piñons and cedars, where they may be seen in fall and winter in very large flocks. In such localities, they probably breed, as I found them in the worn dress peculiar to this period. They are also fond of frequenting the heavy brush along the streams and cañon sides. This is one of the most active and industrious of the family; constantly on the move, searching here and there with sharp, prying eyes for the various small insects and their larvæ. It is perfectly fearless, knowing no danger, and its social disposition is shown in its custom of uniting in flocks often numbering fifty or one hundred individuals, which, as they move along intent on their hunting forays, keep up an incessant querulous chirping.

No.	Sex.	Locality.	Date.	Collector.	Wing.	Tail.	Bill.	Tarsus.
238	♂	Iron City, Utah.....	Oct. 5, 1872	H. W. Henshaw.....	.....	.....	.....	.....
239	♂	..... do .....	..... do .....	..... do .....	.....	.....	.....	.....
240	♀	..... do .....	..... do .....	..... do .....	.....	.....	.....	.....
241	♂	..... do .....	..... do .....	..... do .....	.....	.....	.....	.....
242	♂	..... do .....	..... do .....	..... do .....	.....	.....	.....	.....
243	♂	..... do .....	..... do .....	..... do .....	.....	.....	.....	.....
244	♀	..... do .....	..... do .....	..... do .....	.....	.....	.....	.....
245	♂	..... do .....	..... do .....	..... do .....	.....	.....	.....	.....
246	♀	..... do .....	..... do .....	..... do .....	.....	.....	.....	.....
386	♀	Beaver, Utah.....	Nov. 10, 1872	..... do .....	.....	.....	.....	.....
A 5	.....	(Alcoholic).....	.....	H. W. Henshaw and Dr. H. C. Yarrow.	.....	.....	.....	.....
A 6	.....	..... do .....	.....	..... do .....	.....	.....	.....	.....
451	♀	Fort Wingate, N. Mex.	July 16, 1873	H. W. Henshaw.....	1.95	2.46	0.27	0.58
581	♀ jun.	Camp Apache, Ariz....	Aug. 21, 1873	..... do	1.92	1.85	0.31	0.61
608	♂	..... do	Aug. 24, 1873	..... do	1.93	1.93	0.28	0.60
* 27	♂ ad.	Santa Fé, N. Mex	July 20, 1874	..... do	2.00	2.00	0.31	0.63
*280	♀ ad.	..... do .....	..... do .....	..... do	1.95	2.25	0.32	0.65
*319	♀ ad.	Camp Bowie, Ariz	Aug. 8, 1874	..... do	1.84	2.26	0.35	0.58
*320	♂ ad.	..... do .....	..... do .....	..... do	1.85	2.10	0.25	0.67
*354	♂ ad.	..... do	Aug. 11, 1874	..... do	1.88	2.20	0.28	0.62
*355	♂ ad.	..... do .....	..... do .....	..... do	1.95	2.37	0.27	0.60
969	♀ jun.	Camp Apache, Ariz....	Oct. 9, 1874	..... do	2.07	2.27	0.28	0.60
970	♂ ad.	..... do .....	..... do .....	..... do	2.05	2.38	0.30	0.60
971	♀	..... do .....	..... do .....	..... do	2.10	2.55	0.30	0.62
972	♀ ad.	..... do .....	..... do .....	..... do	2.08	2.47	0.28	0.62

* Worn; breeding-dress.

AURIPARUS FLAVICEPS (Sund.).

Yellow-headed Titmouse, Verdin.

- Ægithalus flaviceps*, SUNDEVALL, Ofversigt af Vet. Ak. Förh., vii, v, 1850, 129.
Ægithalus flaviceps, SUND.—HEERM., P. R. R. Rep., x, pt. ii, 1859, 93.
Paroides flaviceps, BD., Ives' Col. Exped., 1857–58, pt. iv, 6.—*Id.*, Birds N. A., 1858, 400.—*Id.*, U. S. & Mex. Bound. Surv., ii, pt. ii, 1859, Birds, 14, pl. xv, f. 2.—*Id.*, Proc. Acad. Nat. Sci. Phila., 1859, 304 (Cape St. Lucas).
Auriparus flaviceps, BD., Rev. Am. Birds, i, 1864, 85.—COUES, Proc. Acad. Nat. Sci. Phila., 1866, 79 (Cooper, Colorado Valley).—*Id.*, Proc. Acad. Nat. Sci. Phila., 1868, 83.—COOPER, Birds Cal., i, 1870, 51.—COUES, Key N. A. Birds, 1872, 82.—HENSHAW, Rep. Orn. Specs., 1873, Wheeler's Exped., 1874, 99.—BD., BREW., & RIDG., N. A. Birds, 1875, i, 112, pl. vii, f. 11.

A single specimen was taken at old Camp Goodwin, Ariz., and occasionally an individual was met with among the mesquite trees along the Gila River. The habits, so far as observed, seemed to resemble those of the Titmice, as does also its great variety of notes.

In 1874, I met with the species but once, at Camp Lowell, Ariz., in September. This seeming rarity of the species in a region well adapted to its habits was probably due to the lateness of the season at which our visits to Southern Arizona have been made; it probably having departed to a more congenial winter habitat farther south.

No.	Sex.	Locality.	Date.	Collector.	Wing.	Tail.	Bill.	Tarsus.
630	♀	Camp Lowell, Ariz....	Sept. 9, 1874	H. W. Henshaw.....	1.95	2.00	0.35	0.58
792	♂	Camp Goodwin, Ariz..	Sept. 17, 1874	..... do	2.07	1.87	0.35	0.57
906	♂	Gila River, Ariz	Oct. 3, 1874	..... do	1.90	1.93	0.33	0.60

FAM. SITTIDÆ: NUTHATCHES.

SITTA CAROLINENSIS, Gm., var. ACULEATA, Cass.

Slender-billed Nuthatch.

- Sitta aculeata*, CASSIN, Proc. Acad. Nat. Sci. Phila., viii, October, 1856, 254.—BD., Birds N. A., 1858, 375, pl. 33, f. 3.—HEERM., P. R. R. Rep., x, pt. ii, 1859, 56.—XANTUS, Proc. Acad. Nat. Sci. Phila., 1859, 191 (Fort Tejon, Cal.).—KENNERLY, P. R. R. Rep., Whipple's Route, 1859, pl. xxxiii, f. 2, 26.—COOP. & SUCKL., P. R. R. Rep., xii, pt. ii, 1860, 193.—BD., Rev. Am. Birds, i, 1864, 86.—COUES, Proc. Acad. Nat. Sci. Phila., 1866, 78 (Fort Whipple, Ariz.).—COOPER, Birds Cal. 1870, 54.—MERRIAM, U. S. Geol. Surv. Terr., 1872, 672.—AIKEN, Proc. Bost. Soc. Nat. Hist., 1872, 195.
Sitta carolinensis, WOODH., Sitgreave's Exp. Zuñi & Col. Riv., 1854, 66.—NEWB., P. R. R. Rep., vi, 1857, 79.

Sitta carolinensis var. *aculeata*, ALLEN, Bull. Mus. Comp. Zool., 1872, 174 (mountains of Colorado).—COUES, Key N. A. Birds, 1872, 83.—YARROW & HENSHAW, Rep. Orn. Specs., 1872, Wheeler's Exped., 1874, 8.—HENSHAW, An. Lyc. Nat. Hist. N. Y., xi, 1874.—*Id.*, An. List Birds Utah, 1872, Wheeler's Exped., 1874, 40.—*Id.*, Rep. Orn. Specs., 1873, Wheeler's Exped., 1874, 73, 100.—BD., BREW., & RIDG., N. A. Birds, i, 1874, 117.—ALLEN, Proc. Bost. Soc. Nat. Hist., June, 1874, 19.—COUES, U. S. Geol. Surv. Terr., Birds Northwest, 1874, 24.

This Nuthatch is an abundant resident throughout the extensive pine woods of the West, following them in their upward range on the mountains to nearly or quite their limit. Like its eastern representative, it is found frequenting many of the deciduous trees, though it evinces a more marked predilection for the pines. Its habits and notes are so similar to those of the eastern bird that a history of the one would answer perfectly well for the other.

No.	Sex.	Locality.	Date.	Collector.	Wing.	Tail.	Bill.	Tarsus.
226	♂ ad.	Fort Garland, Colo....	June 3, 1873	H. W. Henshaw.....	3.45	2.04	0.75	0.65
114	♂ jun.	Willow Spring, Ariz...	July 13, 1874	..... do	3.57	2.04	0.65	0.70
293	♂ ad.	Pagosa, Colo	Sept. 19, 1874	C. E. Aiken	3.58	2.15	0.78	0.68
869	♀	Mount Graham, Ariz ..	Sept. 25, 1874	H. W. Henshaw.....	3.75	2.16	0.80	0.73
870	♂ jun.	..... do .....	..... do .....	..... do	3.59	2.16	0.80	0.72

SITTA CANADENSIS, L.

Red-bellied Nuthatch.

Sitta canadensis, LINN., Syst. Nat., i, 1766, 177.—BD., Ives' Col. Exped., 1857-58, pt. iv, 6.—*Id.*, Birds N. A., 1858, 376.—HENRY, Proc. Acad. Nat. Sci. Phila., 1859, 107 (New Mexico).—COOP. & SUCKL., P. R. R. Rep., xii, pt. ii, 1860, 192.—HAYD., Trans. Philo. Soc. Phila., xii, 1862, 164.—BD., Rev. Am. Birds, i, 1864, 87.—COUES, Proc. Acad. Nat. Sci. Phila., 1866, 79.—COOPER, Birds Cal., i, 1870, 54.—STEV., U. S. Geol. Surv. Terr., 1870, 464.—SNOW, Birds Kan., 1872, 9.—COUES, Key N. A. Birds, 1872, 83, f. 27.—BD., BREW., & RIDG., N. A. Birds, i, 1874, 118, pl. viii, f. 7.—HENSHAW, Rep. Orn. Specs., 1873, Wheeler's Exped., 1874, 73.—COUES, U. S. Geol. Surv. Terr., Birds Northwest, 1874, 25.

The Red-bellied Nuthatch appears to be of rather uncommon occurrence in the far West. It was not detected by our parties in Utah, though found by Mr. Ridgway in the Wahsatch Mountains in June, where he states it was not common. In the pine woods near Fort Garland, Southern Colorado, I found it breeding in June, and, though less abundant than either

the Pigmy or Slender-billed varieties, it was still by no means rare. Its habits, while differing in no notable degree from those of its allies, are possessed of even more of the energy and restless activity which belong to the whole tribe; and at this, the nesting, season, the males especially were busy from morning till night roving about among the pines and aspens, engaged in hunting not only on their own account, but also for their mates engaged in the cares of incubation. In these duties, however, both sexes take part, and the females were occasionally found abroad while their place on the nest was filled by the males. The single nest examined was found in a small pine stub, a few feet from the ground. The hole was excavated in the rotten wood to the depth of five inches, no especial care having been taken to render this smooth and symmetrical, and was thoroughly lined at bottom with fine shreds of pine bark. The eggs, five in number, were far advanced toward hatching; color grayish white, thinly spotted with reddish dots, confluent at the larger end.

No.	Sex.	Locality.	Date.	Collector.	Wing.	Tail.	Bill.	Tarsus.
211	♂ ad.	Near Fort Garland, Colo	May 30, 1873	H. W. Henshaw.....	2.53	1.53	0.54	0.62
226	♀ ad.	..... do	June 3, 1873	..... do	2.48	1.48	0.58	0.58

SITTA PYGMÆA, Vig.

California Nuthatch.

Sitta pygmaea, VIGORS, Zoöl. Beechey's Voy., 1839, 25, pl. iv.—WOODH., Sitgreave's Exp. Zuñi & Col. Riv., 1854, 66.—NEWB., P. R. R. Rep., vi, 1857, 79.—BD., Ives' Col. Exped., 1857-58, pt. iv, 6.—*Id.*, Birds N. A., 1858, 378.—KENNERLY, P. R. R. Rep., Whipple's Route, 1859, 26.—HENRY, Proc. Acad. Nat. Sci. Phila., 1859, 107 (New Mexico).—COOP. & SUCKL., P. R. R. Rep., xii, pt. ii, 1860, 193.—BD., Rev. Am. Birds, i, 1864, 88.—COUES, Proc. Acad. Nat. Sci. Phila., 1866, 78 (Fort Whipple).—COOPER, Am. Nat., iii, 1869, 74 (Montana).—*Id.*, Birds Cal., i, 1870, 55.—COUES, Key N. A. Birds, 1872, 83, f. 27.—AIKEN, Proc. Bost. Soc. Nat. Hist., 1872, 195.—YARROW, Rep. Orn. Specs., 1871, Wheeler's Exped., 1874, 34.—YARROW & HENSHAW, Rep. Orn. Specs., 1872, Wheeler's Exped., 1874, 8.—BD., BREW., & RIDG., N. A. Birds, i, 1874, 120, pl. viii, f. 11, app. 502.—COUES, U. S. Geol. Surv. Terr., Birds Northwest, 1874, 25.

Sitta pusilla var. *pygmaea*, ALLEN, Bull. Mus. Comp. Zoöl., 1872, 174 (mountains of Colorado).—HENSHAW, An. Lye. Nat. Hist. N. Y., xi, 1874.—*Id.*, An. List Birds Utah, 1872, Wheeler's Exped., 1874, 40.—*Id.*, Rep. Orn. Specs., 1873, Wheeler's Exped., 1874, 73, 100.

This diminutive species has been found abundant at all seasons in every section visited by the survey. In summer, it is rather exclusively pinicoline, ranging upward to the variable pine limit. I have found it as numerous at 10,000 feet as at lower altitudes. In 1873, by June 12, in Southern Colorado, I noticed the old birds flying about the high pine stubs, with food in their bills for the young. In the pines of Mount Graham, Arizona, during the first days of August, young and old were common; the former still dependent upon the care of the parent birds. I have, therefore, no doubt that two broods are reared in a season. Their habits are eminently social, even during the breeding season; it not being unusual to find several associated with the Titmice and Warblers, the whole band apparently being on the best of terms with each other. As fall approaches these little bands are augmented continually till their number often reaches the hundreds, and the trees seem fairly alive with the merry party, while the loud, querulous *weet weet* of the Nuthatches, which is constantly repeated as they move along the branches, or fly from tree to tree, is always conspicuous among the softer notes of the Warblers and other species. At this season, it descends from the pine region, and is often seen in the groves of evergreen oaks.

No.	Sex.	Locality.	Date.	Collector.	Wing.	Tail.	Bill.	Tarsus.
....	♂ ad.	Arizona	Nov. 14, 1871	F. Bischoff .....	.....	.....	.....	.....
....	♂ ad.	..... do .....	..... do .....	..... do .....	.....	.....	.....	.....
....	♂ ad.	..... do .....	..... do .....	..... do .....	.....	.....	.....	.....
244	♂ ad.	Mountains near Fort Garland, Colo.	June 4, 1873	H. W. Henshaw	2. 44	1. 58	0. 56	0. 60
283	♀ ad.	..... do	June 6, 1873	..... do	2. 52	1. 57	0. 54	0. 54
486	♀ jun.	Inscription Rock, N. Mex.	July 24, 1873	..... do	2. 55	1. 55	0. 55	0. 57
988	♂	Mountains at the source of Gila River.	Nov. 5, 1873	..... do	2. 62	1. 75	0. 57	0. 63
84	♂ ad.	Willow Spring, Ariz...	July 12, 1874	..... do	2. 62	1. 53	0. 50	0. 58
772	♂	Mount Graham, Ariz..	Sept. 21, 1874	..... do	2. 58	1. 55	0. 53	0. 60
783	♀	..... do .....	..... do	J. M. Rutter	2. 45	1. 55	0. 55	0. 58
794	.....	..... do	Sept. 22, 1874	H. W. Henshaw	2. 50	1. 54	0. 50	0. 58
839	.....	..... do .....	.....	Dr. J. T. Rothrock	2. 47	1. 47	0. 55	0. 58
325	♂ jun.	Huerfano River, N. Mex	Oct. 7, 1874	C. E. Aiken	2. 60	1. 56	0. 54	0. 60
1025	♂	Camp Apache, Ariz....	Nov. —, 1874	H. W. Henshaw	2. 50	1. 45	0. 55	0. 59

FAM. CERTHIIDÆ: CREEPERS.

CERTHIA FAMILIARIS, L., var. AMERICANA, Bon.

Brown Creeper.

- Certhia americana*, BONAP., Comp. List, 1838.—NEWB., P. R. R. Rep., vi, 1857, 79.—BD., Birds N. A., 1858, 372, pl. 83, f. 2.—HEERM., P. R. R. Rep., x, pt. iv, 1859, 40.—KENNERLY, P. R. R. Rep., Whipple's Route, 1859, 26.—HENRY, Proc. Acad. Nat. Sci. Phila., 1859, 107 (New Mexico).—COOP. & SUCKL., P. R. R. Rep., xii, pt. ii, 1860, 192.—BD., Rev. Am. Birds, i, 1864, 89.—COUES, Proc. Acad. Nat. Sci. Phil., 1866, 79.—SNOW, Birds Kan., 1872, 9.
- Certhia familiaris*, L.—WOODHOUSE, Sitgreave's Exp. Zuñi & Col. Riv., 1854, 66.—COUES, Key N. A. Birds, 1872, 84, f. 28.—BD., BREW., & RIDG., N. A. Birds, i, 1874, 125, pl. viii, f. 11.—COUES, U. S. Geol. Surv. Terr., Birds Northwest, 1874, 26.
- Certhia familiaris* var. *americana*, HENSHAW, An. Lyc. Nat. Hist. N. Y., xi, 1874, 3.—*Id.*, An. List Birds Utah, 1872, Wheeler's Exped., 1874, 41.—*Id.*, Rep. Orn. Specs., 1873, Wheeler's Exped., 1874, 73.
- Certhia mexicana*, BD., Birds N. A., 1858, 923, pl. 83, f. 2.—COOPER, Am. Nat., iii, 1869, 74.—*Id.*, Birds Cal., 1870, 58.

This Creeper has a very general distribution, and in the West is found in about the same degree of abundance as in the Eastern States. It was of rather frequent occurrence in the pine regions of Southern Colorado in June, and was evidently breeding. On several occasions, I noticed the species at Mount Graham, Ariz., and, as late as August 3, found the young still in the first plumage, and, though able to feed and care for themselves, still accompanied by their parents. It has here the same thin, wiry, long drawn note which characterizes it elsewhere, and it is this which most often betrays its presence; for so close does it keep to the trunks of the trees, over which it appears to glide, and so perfectly do its colors harmonize with the tints of the rough bark, that, even when made aware of its actual presence, it is often no easy task to discover its exact whereabouts. Though usually unsuspecting, and pursuing its avocation with perfect unconcern in spite of the looker on, its disposition in this respect varies much; both in the East and West, it will occasionally manifest alarm, and, by hiding and dodging behind the limbs, endeavor to escape observation; in this particular resembling many of the woodpeckers.

The Mexican Creeper (var. *mexicana*) has not yet been detected within our borders, though its occurrence in the Southern Rocky Mountains has been thought probable.

No.	Sex.	Locality.	Date.	Collector.	Wing.	Tail.	Bill.	Tarsus.
227	♂ ad.	Near Fort Garland, Colo	June 3, 1873	H. W. Henshaw.....	2.59	2.14	0.69	0.55
670	♂	Camp Apache, Ariz....	Sept. 1, 1873	..... do	2.63	2.80	0.64	0.60
281	Jun.	Mount Graham, Ariz ..	Aug. 3, 1874	..... do	2.48	2.65	0.53	0.57
280	♀ ad.	..... do .....	..... do .....	..... do	2.56	2.32	0.63	0.57

FAM. TROGLODYTIDÆ: WRENS.

CAMPYLORHYNCHUS BRUNNEICAPILLUS, Lafr.

Cactus Wren.

Picolaptes brunneicapillus, LAFRESNAYE, Mag. de Zoöl., 1835, 61, pl. xlvii.

Campylorhynchus brunneicapillus, BD., Birds N. A., 1858, 355.—*Id.*, U. S. & Mex. Bound. Surv., ii, pt. ii, 1859, Birds, 13.—HEERM., P. R. R. Rep., x, pt. ii, 1859, 41.—BD., Rev. Am. Birds, i, 1864, 99.—COUES, Proc. Acad. Nat. Sci. Phila., 1866, 77 (valleys of the Gila and Lower Colorado).—*Id.*, *ib.*, 1868, 83.—COOPER, Birds Cal., i, 1870, 61.—COUES, Key N. A. Birds, 1872, 85.—BD., BREW., & RIDG., N. A. Birds, 1874, i, 132, pl. viii, f. 5.—YARROW, Rep. Orn. Specs., 1871, Wheeler's Exped., 1874, 34.—YARROW & HENSHAW, Rep. Orn. Specs., 1872, Wheeler's Exped., 1874, 9.—HENSHAW, An. Lyc. Nat. Hist. N. Y., xi, 1874, 3.—*Id.*, An. List Birds Utah, 1872, Wheeler's Exped., 1874, 41.—*Id.*, Rep. Orn. Specs., 1873, Wheeler's Exped., 1874, 100.

A single individual of this species was captured a few miles north of Saint George, Utah, in October; two others being seen at the same time. It is believed that this is the most northern locality in which this bird has been taken.

In the region south of the Gila River in Arizona, and also in South-western New Mexico, this wren is very abundant. Its name is suggestive of its habits; for the broad plains, covered with the various species of cacti, constitute its chosen home, and the neighborhood of these plants forms its hunting ground, while among the branches are seen on every side their curious, bulky, pouch shaped nests. They are also fond of the dense shrub-

bery; and, in the fall, the thickets bordering the streams are frequently resorted to by them. Their loud, harsh notes and active, sprightly motions are always sure to attract the attention of even the casual observer. Though somewhat inquisitive, they are less so than most of this family, and, when they find themselves observed, skulk away into the shelter of the brush or behind the rocks. They go in small companies, or what would appear to be families; and, very likely, the relationship is really thus intimate, the broods remaining intact and not scattering, as is usually the case.

No.	Sex.	Locality.	Date.	Collector.	Wing.	Tail.	Bill.	Tarsus.
.....	Ad.	Nevada	Aug. 14, 1871	F. Bischoff .....	.....	.....	.....	.....
369	♀	Saint George, Utah ...	Oct. 27, 1872	Dr. H. C. Yarrow and H. W. Henshaw.	.....	.....	.....	.....
.....		Gila River, Ariz	Sept. 15, 1873	H. W. Henshaw	3. 17	2. 97	0. 90	1. 20
302	♂ ad.	Camp Bowie, Ariz	Aug. 7, 1874	..... do	3. 53	3. 40	0. 95	1. 12
374	♀ ad.	..... do	Aug. 12, 1874	..... do	3. 15	3. 15	0. 92	1. 08
375	♂ ad.	..... do .....	..... do .....	..... do	3. 14	3. 37	0. 85	1. 10
395	♀ jun.	..... do .....	..... do .....	..... do	3. 23	3. 22	0. 74	1. 08
396	♂ ad.	..... do	Aug. 13, 1874	..... do	3. 47	3. 47	0. 94	1. 15
609	♂ jun.	Camp Lowell, Ariz	Sept. 6, 1874	..... do	3. 00	2. 45	0. 73	1. 04
675	♂ ad.	..... do .....	..... do .....	..... do	3. 64	3. 35	0. 90	1. 15
718	♂ jun.	..... do	Sept. 13, 1874	..... do	3. 42	3. 50	0. 80	1. 15
911	♀ jun.	Gila River, Ariz	Oct. 3, 1874	..... do	3. 16	3. 08	0. 81	1. 06
912	♀ jun.	..... do .....	..... do .....	..... do	3. 36	3. 31	0. 80	1. 15

SALPINCTES OBSOLETUS (Say).

Rock Wren.

- Troglodytes obsoletus*, SAY, Long's Exped., ii, 1823, 4 (South Fork of the Platte).—WOODH., Sitgreave's Exp. Zuñi & Col. Riv., 1854, 66.—NEWB., P. R. R. Rep., xi, 1857, 80.—HEERM., P. R. R. Rep., x, pt. iv, 1859, 41.
- Salpinctes obsoletus*, BD., Ives' Col. Exped., 1857-58, pt. iv, 6.—*Id.*, Birds N. A., 1858, 357.—*Id.*, U. S. & Mex. Bound. Surv., ii, pt. ii, 1859, Birds, 13.—*Id.*, Proc. Acad. Nat. Sci. Phila., 1859, 191 (Fort Tejon, Cal.).—HENRY, Proc. Acad. Nat. Sci. Phila., 1859, 107 (New Mexico).—HAYD., Trans. Am. Phil. Soc., xii, 1862, 163.—BD., Rev. Am. Birds, i, 1864, 110.—COUES, Proc. Acad. Nat. Sci. Phila., 1866, 77 (Fort Whipple).—*Id.*, *ib.*, 1868, 83.—COOPER, Am. Nat., iii, 1869, 297 (Upper Missouri); 73 (breeding at Fort Benton).—*Id.*, Proc. Cal. Acad., 1870, 75 (Colorado River).—*Id.*, Birds Cal., 1870, 64.—STEV.,

U. S. Geol. Surv. Terr., 1870, 464.—ALLEN, Bul. Mus. Comp. Zoöl., 1872, 174 (mountains of Colorado; Ogden, Utah).—COUES, Key N. A. Birds, 1872, 85.—HOLD., Proc. Bost. Soc. Nat. Hist., xv, 1872, 195 (Black Hills).—MERRIAM, U. S. Geol. Surv. Terr., 1872, 673.—BD., BREW., & RIDG., N. A. Birds, i, 1874, 135, pl. viii, fig. 3.—HENSHAW, An. Lyc. Nat. Hist. N. Y., xi, 1874, 3.—*Id.*, An. List Birds Utah, 1872, Wheeler's Exped., 1874, 41.—YARROW & HENSHAW, Rep. Orn. Specs., 1872, Wheeler's Exped., 1874, 8.—HENSHAW, Rep. Orn. Specs., 1873, Wheeler's Exped., 1874, 100.—ALLEN, Proc. Bost. Soc. Nat. Hist., June, 1874, 20.—COUES, U. S. Geol. Surv. Terr., Birds Northwest, 1874, 27.

This wren is an abundant inhabitant of the central mountainous region generally, and has been found by our parties to be common in nearly every section visited in Eastern Nevada, Utah (especially the more southern portion), Arizona, and New Mexico. In Colorado, it was found by Mr. Aiken, who procured a number of specimens. It everywhere shows a most marked predilection for rocky localities, and the confused masses of volcanic *débris* in the wildest and most desolate regions appear to be especially congenial to its nature. It occasionally, however, courts rather than shuns the presence of man; and, at Toquerville, Utah, I often heard the sound of its bright, cheery notes coming from the stone walls which inclose the gardens. In the vicinity of Santa Fé, it breeds abundantly, and here, too, frequents the neighborhood of gardens.

The young in nesting plumage were taken at Fort Wingate, N. Mex., July 14. On the 28th, at Zuñi, a nest was found containing four young nearly fledged. The nest proper was merely a pile of grasses, slightly hollowed, and lined with horse hairs and bits of sheep's wool. This was placed in a natural cavity of a clayey bank. It was without doubt a second brood.

A second nest, obtained near Santa Fé, June 17, was placed on the bare ground beneath an overhanging rock. The nest was merely a mass of sticks, the interior nest being composed of strips of bark, and but slightly hollowed. It contained three young and one egg. This was pure white, spotted, chiefly at the large end, with fine reddish-brown markings.

No.	Sex.	Locality.	Date.	Collector.	Wing.	Tail.	Bill.	Tarsus.
141	♀	Gunnison, Utah	Sept. 5, 1872	H. W. Henshaw.....	.....	.....	.....	.....
285	♀	Toquerville, Utah.....	Oct. 13, 1872	..... do .....	.....	.....	.....	.....
288	♂	..... do .....	..... do .....	..... do .....	.....	.....	.....	.....
289	♂	..... do .....	..... do .....	..... do .....	.....	.....	.....	.....
290	♂	..... do .....	..... do .....	..... do .....	.....	.....	.....	.....
291	♀	..... do .....	..... do .....	..... do .....	.....	.....	.....	.....
299	♀	..... do .....	..... do .....	..... do .....	.....	.....	.....	.....
300	♀	..... do .....	..... do .....	..... do .....	.....	.....	.....	.....
305	♀	..... do .....	..... do .....	..... do .....	.....	.....	.....	.....
298	♂	..... do	Oct. 14, 1872	..... do .....	.....	.....	.....	.....
311	♀	..... do	Oct. 16, 1872	Dr. H. C. Yarrow and H. W. Henshaw.	.....	.....	.....	.....
312	♀	..... do .....	..... do .....	..... do .....	.....	.....	.....	.....
318	♀	..... do	Oct. 17, 1872	..... do .....	.....	.....	.....	.....
319	♂	..... do .....	..... do .....	..... do .....	.....	.....	.....	.....
321	♂	..... do .....	..... do .....	..... do .....	.....	.....	.....	.....
A 7	.....	(Cranium, alcoholic)...	—, 1873	..... do .....	.....	.....	.....	.....
A 8	.....	..... do	—, 1873	..... do .....	.....	.....	.....	.....
17	♂ ad.	Santa Fé, N. Mex.	June 17, 1874	H. W. Henshaw	2. 77	2. 23	0. 78	0. 85
124	.....	Sangre de Cristo, Colo.	Aug. 10, 1874	C. E. Aiken	2. 91	2. 42	0. 80	0. 73
367	Jun.	Camp Bowie, Ariz	Aug. 11, 1874	Dr. J. T. Rothrock ...	2. 74	2. 25	0. 68	0. 83
379	♀ jun.	..... do	Aug. 12, 1874	H. W. Henshaw.....	2. 94	2. 38	0. 70	0. 81
252	.....	Tierra Amarilla, N. Mex	Sept. 15, 1874	C. E. Aiken	2. 85	2. 30	0. 72	0. 82
288	♂	Pagosa, Colo	Sept. 19, 1874	..... do	2. 65	2. 20	0. 70	0. 81

CATHERPES MEXICANUS (Swains.), var. CONSPERSUS, Ridg.

White-throated Rock Wren.

Catherpes mexicanus var. *conspersus*, RIDG., Am. Nat., vii, 1872, 2.—BD., BREW., & RIDG., N. A. Birds, i, 1874, 139, pl. viii, f. 4.—YARROW & HENSHAW, Rep. Orn. Specs., 1872, Wheeler's Exped., 1874, 9.—HENSHAW, An. Lyc. Nat. Hist. N. Y., xi, 1874, 3.—*Id.*, An. List Birds Utah, 1872, Wheeler's Exped., 1874, 41.—*Id.*, Rep. Orn. Specs., 1873, Wheeler's Exped., 1874, 101.

Troglodytes mexicanus, CASS., Birds Cal. & Tex., 1854, 173, pl. 30.

Catherpes mexicanus, BD., Birds N. A., 1858, 356.—*Id.*, Rev. Am. Birds, 1864, 111.—XANTUS, Proc. Acad. Nat. Sci. Phila., 1859, 197.—COUES, Proc. Acad. Nat. Sci. Phila., 1866, 77.—COOPER, Birds Cal., i, 1870, 66.—ALLEN, Bull. Mus. Comp. Zool., 1872, 175 (near Colorado City).—COUES, Key N. A. Birds, 1872, 85.—AIKEN, Proc. Bost. Soc. Nat. Hist., 1872, 196 (Middle Colorado).

Much has recently been added to our knowledge of the range of this species. By our parties it has been met with in Utah, Colorado, New Mexico, and Arizona. In Utah, I only detected it in the extreme southern portion of the Territory, and supposed this to be about its northern limit. In Colorado, however, it extends several degrees farther north, and was met

with near Fountain by Mr. Aiken in winter. It would thus appear that wherever found it is resident. Throughout Eastern Arizona and Western New Mexico, I have seen these wrens on many occasions, and in so many and widely separated localities, that it may be said to occur everywhere where the localities are favorable to its habits. These, in general, are quite similar to those of the preceding, and I have, indeed, seen both species together. The present bird is, however, by no means as common as the Rock Wren; nor do they associate together, as is the usual custom of that bird, but, on the contrary, are usually found alone in the solitude of the deep cañons and along the sides of rocky glens. Here they appear perfectly at home, and their motions are graceful and active as they glide among the interstices of the rocks, searching each nook and corner for insects. They are quite shy, much more so than the preceding species, and, unlike it, their curiosity seldom keeps them in the vicinity of man; but, on the contrary, having discovered the presence of an intruder, they manifest their alarm by a few harsh, scolding notes, and then, with singular adroitness, conceal themselves behind the rocks, when it needs a most careful search to again discover them in their hiding places. They are wont to be quite noisy, and their wild, ringing notes are often heard coming from the inaccessible rocky heights when the birds themselves remain invisible.

During the breeding season, its song is loud, clear, and melodious, and, once heard, is never to be mistaken for that of any other bird. It consists of a series of loud, discontinuous whistles, which, beginning at a high note, descend smoothly and gradually through the entire scale.

No.	Sex.	Locality.	Date.	Collector.	Wing.	Tail.	Bill.	Tarsus.
284	♀ ad.	Toquerville, Utah.	Oct. 13, 1872	H. W. Henshaw. ....	.....	.....	.....	.....
304	♀ ad.	..... do	Oct. 15, 1872	..... do ..... ..	.....	.....	.....	.....
330	♂	..... do	Oct. 20, 1872	Dr. H. C. Yarrow and H. W. Henshaw.	.....	.....	.....	.....
669	.....	Camp Apache, Ariz.	Sept. 11, 1873	H. W. Henshaw.	2.40	2.45	0.76	0.73
986	.....	Mountains near Gila River, N. Mex.	Nov. 5, 1873	..... do	2.29	2.32	0.75	0.70
993	.....	..... do ..... ..	..... do ..... ..	..... do	2.25	2.07	0.75	0.72
962	.....	Black River, Ariz.	Oct. 7, 1874	..... do	2.29	.....	0.78	0.69
1961	♂ ?	Camp Apache, Ariz.	Oct. 21, 1874	..... do	2.43	2.27	.....	0.72

THRYOTHORUS BEWICKI (Aud.), var. LEUCOGASTER, Baird.

White-bellied Wren.

PLATE I, FIG. 1.

Thryothorus bewickii var. *leucogaster*, BD., Rev. Am. Birds, i, 1864, 127 (not of Gould).—COUES, Key N. A. Birds, 1872, 86.—BD., BREW., & RIDG., N. A. Birds, i, 1874, 147.—YARROW & HENSHAW, Rep. Orn. Specs., 1872, Wheeler's Exped., 1874, 9.—HENSHAW, An. Lyc. Nat. Hist. N. Y., xi, 1874, 3.—*Id.*, An. List Birds Utah, 1872, Wheeler's Exped., 1874, 41.—*Id.*, Rep. Orn. Specs., 1873, Wheeler's Exped., 1874, 101.—COUES, Birds Northwest, 1874, 31.

Thryothorus bewickii, XANTUS, Proc. Acad. Nat. Sci. Phila., 1859, 191.—COUES, Proc. Acad. Nat. Sci. Phila., 1866, 78 (Fort Whipple, Ariz.).

NOTE.—The *Troglodytes leucogastra* of Gould, supposed by Baird to be this bird, has been shown to be entirely different. But as Gould's bird falls in a different genus, Baird's name *leucogaster*, of 1864, may be accepted for this variety. See Ibis, 1875, p.—

This wren was found to be of rather common occurrence in Southern Arizona, and to be generally, though rather sparingly, distributed throughout Eastern Arizona from Camp Apache southward. It, without doubt, occurs similarly in New Mexico. I know of nothing in its habits which peculiarly distinguishes it from its eastern relative. It seems to prefer the thickets and clumps of bushes on the open hill sides, where it spends much of its time on the ground searching for food among the roots. Besides possessing the usual variety of quaint, sputtering, wren-like notes, it has also a very pretty song, which I have heard only once or twice. This was a short warbling lay, much varied with low sweet trills, and occasionally interspersed with a hoarse scolding note.

No.	Sex.	Locality.	Date.	Collector.	Wing.	Tail.	Bill.	Tarsus.
259	♀ ad.	Iron City, Utah.....	Oct. 6, 1872	H. W. Henshaw.....	.....	.....	.....	.....
328	♂	Toquerville, Utah.....	Oct. 20, 1872	Dr. H. C. Yarrow and H. W. Henshaw.	.....	.....	.....	.....
356	o	Washington, Utah	Oct. 23, 1872	H. W. Henshaw.....	.....	.....	.....	.....
590	♂	Camp Apache, Ariz....	Aug. 21, 1873	..... do	2.25	2.15	.....	0.80
600	♂	..... do	Aug. 23, 1873	..... do	2.25	2.35	0.58	0.73
750	♂	Southern Arizona	Sept. 11, 1873	..... do	2.33	2.40	0.55	0.63
158	♀ jun.	Near Camp Apache, Ariz	July 19, 1874	..... do .....	.....	.....	.....	.....
159	♂ jun.	..... do .....	..... do .....	..... do .....	.....	.....	.....	.....
172	♂ jun.	..... do	July 20, 1874	..... do .....	.....	.....	.....	.....
323	♂ jun.	..... do	Aug. 8, 1874	..... do .....	.....	.....	.....	.....
497	♀ jun.	Camp Crittenden, Ariz.	Aug. 24, 1874	..... do	2.25	2.41	0.53	0.73
1344	Ad.	Southern Arizona	Oct. —, 1874	..... do	2.12	2.44	0.54	0.71
960	♂ jun.	Gila River, Ariz	Oct. 3, 1874	..... do	2.12	2.40	0.55	0.70
975	♂ ad.	Camp Apache, Ariz ...	Oct. 9, 1874	..... do	2.38	2.50	0.55	0.75

TROGLODYTES AËDON, Vieill., var. PARKMANNI, Aud.

Parkmann's Wren.

Troglodytes parkmanni, AUD., Orn. Biog., v, 1839, 310.—BD., Ives' Col. Exped., 1857, pt. iv, 6.—BD., Birds N. A., 1858, 367.—XANTUS, Proc. Acad. Nat. Sci. Phila., 1859, 191 (Fort Tejon, Cal.).—BD., U. S. & Mex. Bound. Surv., ii, pt. ii, 1859, Birds, 13.—COOP. & SUCKL., P. R. R. Rep., xii, pt. ii, 1860, 191.—BD., Rev. Am. Birds, i, 1864, 140.—COUES, Proc. Acad. Nat. Sci. Phila., 1866, 78 (Fort Whipple).—COOPER, Proc. Cal. Acad., 1870, 75.—*Id.*, Birds Cal., 1870, 71.—STEV., U. S. Geol. Surv. Terr., 1870, 464.—AIKEN, Proc. Bost. Soc. Nat. Hist., 1872, 196.—MERRIAM, U. S. Geol. Surv. Terr., 1872, 673.—HAYD., Trans. Am. Phil. Soc., xii, 1862, 164.

Troglodytes aëdon var. *parkmanni*, COUES, Key N. A. Birds, 1872, 87.—BD., BREW., & RIDG., N. A. Birds, i, 1874, 153.—HENSHAW, Rep. Orn. Specs., 1873, Wheeler's Exped., 1874, 57, 74, 101.—YARROW & HENSHAW, Rep. Orn. Specs., 1872, Wheeler's Exped., 1874, 8.—HENSHAW, An. Lyc. Nat. Hist. N. Y., xi, 1874, 3.—*Id.*, An. List Birds Utah, 1872, Wheeler's Exped., 1874, 41.—ALLEN, Proc. Bost. Soc. Nat. Hist., June, 1874, 17, 20.—COUES, Birds Northwest, 1874, 32.

Troglodytes americanus, HEERM., P. R. R. Rep., x, pt. iv, 1859, 41.

Troglodytes aëdon?, HEERM., P. R. R. Rep., x, pt. iv, 1859, 41.—ALLEN, Bul. Mus. Comp. Zoöl., 1872, 174 (Eastern and Middle Kansas; mountains of Colorado).

This, the representative in the West of the well known House Wren, is everywhere the most abundant of its tribe, retaining wherever found all the well known habits and odd mixture of notes of its eastern analogue. In the vicinity of settlements, it shows much familiarity, building freely in the barns and outbuildings. It is, however, by no means confined to populated districts, but inhabits the dense thickets of the streams, and extends upward in the mountains to an altitude of 10,000 feet, inhabiting the pine woods.

In Colorado, I found a pair building May 23. Nearly a month later, a nest was obtained, built in a small stub. The hole was nearly filled up with a mass of twigs, in the center of which was left a deep cavity, lined with sheeps' wool and feathers. It contained but a single egg. This was white, covered with fine reddish-brown spots.

No.	Sex.	Locality.	Date.	Collector.	Wing.	Tail.	Bill.	Tarsus.
103	♀ jun.	Wahsatch Mts., Utah..	Aug. 17, 1872	H. W. Henshaw.....	.....	.....	.....	.....
164	♂ ad.	Otter Creek, Utah	Sept. 14, 1872	..... do .....	.....	.....	.....	.....
82	♂ ad.	Denver, Colo.	May 14, 1873	..... do	2.09	1.97	0.50	0.68
132	♂ ad.	..... do	May 22, 1873	..... do	2.10	2.02	0.54	0.63
68	♂ ad.	South Park, Colo.....	June 27, 1873	Dr. J. T. Rothrock....	2.06	1.90	0.54	0.72
10	Jun.	Pueblo, Colo	July 4, 1874	C. E. Aiken.....	2.03	1.92	0.50	0.72
22	Jun.	..... do	July 25, 1874	..... do	2.00	1.88	0.45	0.70
82	♀ ad.	Willow Spring, Ariz...	July 26, 1874	H. W. Henshaw.....	1.87	1.78	0.48	0.65
129	♂ ad.	Fort Garland, Colo....	Aug. 11, 1874	C. E. Aiken	2.23	2.05	0.48	0.72
286	♂ ad.	Pagosa, Colo	Sept. 19, 1874	..... do	2.08	1.98	0.50	0.67
791	.....	Mount Graham, Ariz..	Sept. 22, 1874	H. W. Henshaw.....	2.05	1.77	0.54	0.68
301	.....	Rio Grande, Colo	Sept. 26, 1874	C. E. Aiken	1.98	1.80	0.47	0.68

CISTOTHORUS STELLARIS (Licht.)

Short-billed Marsh Wren.

Troglodytes stellaris, LICHT.—NAUMANN, Vögel Deutschlands, iii, 1823, 724 (Carolina).

Cistothorus stellaris, BD., Birds N. A., 1858, 365.—HAYD., Trans. Am. Phil. Soc., xii, 1862, 163 (Council Bluffs and Big Sioux River).—BD., Rev. Am. Birds, i, 1864, 146.—SNOW, Birds Kan., 1872, 9.—COUES, Key N. A. Birds, 1872, 88.—BD., BREW., & RIDG., N. A. Birds, i, 1874, 159, pl. ix, f. 7.—YARROW & HENSHAW, Rep. Orn. Specs., 1872, Wheeler's Exped., 1874, 9.—HENSHAW, An. Lyc. Nat. Hist. N. Y., xi, 1874, 3.—*Id.*, An. List Birds Utah, 1872, Wheeler's Exped., 1874, 41.—COUES, Birds Northwest, 1874, 36.

Troglodytes brevirostris, NUTT., Man. i, 1832, 436.

The most western locality hitherto recorded for this species is the Loup Fork of the Platte, where it was taken by Lieutenant Warren's expedition.

While at Provo, Utah, we received undoubted evidence of its existence in the marshes of the river, where it lived in company with the preceding species. Although no individuals were actually captured, the nests and eggs were seen which had been secured in this locality.

CISTOTHORUS PALUSTRIS, Wils., var. PALUDICOLA, Bd.

Western Long-billed Marsh Wren.

Cistothorus palustris var. *paludicola*, BD., Rev. Am. Birds, i, 1864, 148.—BD., BREW., & RIDG., N. A. Birds, i, 1874, 161.—YARROW & HENSHAW, Rep. Orn. Specs., 1872, Wheeler's Exped., 1874, 9.—HENSHAW, An. Lyc. Nat. Hist. N. Y., xi, 1874, 3.—*Id.*, An. List Birds Utah, 1872, Wheeler's Exped., 1874, 41.

- Telmatodytes palustris* var. *paludicola*, HENSHAW, Rep. Orn. Specs., 1873, Wheeler's Exped., 1874, 74, 101.
- Troglodytes palustris*, NEWB., P. R. R. Rep., xi, 1857, 80.—HEERM., P. R. R. Rep., x, pt. iv, 1859, 41.
- Cistothorus palustris*, XANTUS, Proc. Acad. Nat. Sci. Phila., 1859, 191 (Fort Tejon, Cal.).—COOP. & SUCKL., P. R. R. Rep., xii, pt. ii, 1860, 190.—HAYD., Trans. Am. Phil. Soc., xii, 1862, 163.—COUES, Proc. Acad. Nat. Sci. Phila., 1866, 78 (Fort Whipple, Ariz.).—COOPER, Birds Cal., 1870, 75.—ALLEN, Bull. Mus. Comp. Zoöl., 1872, 175 (Ogden, Utah).—SNOW, Birds Kan., 1872, 9.—AIKEN, Proc. Bost. Soc. Nat. Hist., xv, 1872, 196.—MERRIAM, U. S. Geol. Surv. Terr., 1872, 673.
- Cistothorus* (*Telmatodytes*) *palustris*, BD., Birds N. A., 1858, 364.
- Telmatodytes palustris*, COUES, Birds Northwest, 1874, 34.—HENRY, Proc. Acad. Nat. Sci. Phila., 1859, 107 (New Mexico).

In the extensive marshes which border Utah Lake, and which are covered with a dense growth of coarse grasses and reeds, these wrens were exceedingly numerous; and, in breaking a path through the reeds, which often are so dense as to render progress well nigh impossible, hundreds of these little birds were startled up from their retreats, while their harsh notes were heard on all sides in angry expostulation. Almost as numerous as the birds themselves were their nests, which were seen on all sides, suspended on the tall, waving stems. In Colorado, Arizona, and New Mexico, each and every marshy spot suited to its habits is sure to have at least a pair of these birds. They are quite irregular in their time of nesting, but near the middle of June appears to be the usual time; and I found them in Southern Colorado at this date just depositing their first eggs.

No.	Sex.	Locality.	Date.	Collector.	Wing.	Tail.	Bill.	Tarsus.
83	♀ ad.	Provo, Utah.....	July 25, 1872	Dr. H. C. Yarrow and H. W. Henshaw.	.....	.....	.....	.....
84	♂ ad.	..... do	July 30, 1872	..... do .....	.....	.....	.....	.....
208	♂	Rush Lake, Utah	Oct. 2, 1872	H. W. Henshaw .....	.....	.....	.....	.....
209	♀	..... do .....	..... do .....	..... do .....	.....	.....	.....	.....
306	♀	Toquerville, Utah.....	Oct. 15, 1872	..... do .....	.....	.....	.....	.....
167	♀ ad.	Alkali Lakes, Colo	May 28, 1873	..... do	2.08	1.94	0.50	0.66
178	♂ ad.	..... do	May 29, 1873	..... do	2.00	2.00	.....	0.67
241	♂ ad.	..... do	June 4, 1873	..... do	2.04	1.95	0.51	0.66
241A	♀ ad.	Lake Piedra, N. Mex...	Sept. 13, 1874	C. E. Aiken	2.03	1.92	0.50	0.73

FAM. MOTACILLIDAE: WAGTAILS.

ANTHUS LUDOVICIANUS (Gm.).

Titlark.

Alauda ludoviciana, Gm., Syst. Nat., i, 1788, 793.

Anthus ludovicianus, Bd., U. S. & Mex. Bound. Surv., ii, pt. ii, 1854, Birds, 10.—*Id.*, Ives' Col. Exped., 1857-58, pt. iv, 5.—*Id.*, Birds N. A., 1858, 232.—XANTUS, Proc. Acad. Nat. Sci. Phila., 1859, 190 (Fort Tejon, Cal.).—HEERM., P. R. R. Rep., x, pt. iv, 1859, 45.—HENRY, Proc. Acad. Nat. Sci. Phila., 1839, 107 (New Mexico).—COOP. & SUCKL., P. R. R. Rep., xii, pt. ii, 1860, 176.—HAYD., Trans. Am. Phil. Soc., xii, 1862, 159.—Bd., Rev. Am. Birds, i, 1864, 153.—COUES, Proc. Acad. Nat. Sci. Phila., 1866, 67 (Fort Whipple, winter).—*Id.*, Proc. Acad. Nat. Sci. Phila., 1868, 82.—COOPER, Proc. Cal. Acad., 1870, 75.—*Id.*, Birds Cal., i, 1870, 78.—STEV., U. S. Geol. Surv. Terr., 1870, 463.—ALLEN, Bull. Mus. Comp. Zoöl., 1872, 175 (mountains of Colorado; Wahsatch Mountains).—SNOW, Birds Kan., 1872, 7.—COUES, Key N. A. Birds, 1872, 40.—MERRIAM, U. S. Geol. Surv. Terr., 1872, 674 (Snake River).—AIKEN, Proc. Bost. Soc. Nat. Hist., 1872, 196 (breeding in mountains of Colorado).—YARROW & HENSHAW, Rep. Orn. Specs., 1872, Wheeler's Exped., 1874, 10.—HENSHAW, An. Lyc. Nat. Hist. N. Y., xi, 1874, 3.—*Id.*, An. List Birds Utah, 1872, Wheeler's Exped., 1874, 41.—ALLEN, Proc. Bost. Soc. Nat. Hist., June, 1874, 20.—COUES, Birds Northwest, 1874, 40.

The Titlark has been met with by our parties only as a late summer and fall migrant, as which it occurs generally throughout the West. The discovery of the young by Mr. J. A. Allen, in the mountains of Colorado, at an age scarcely able to fly, proves the fact of its breeding in the locality. In its course southward, it reaches Arizona early in October; and, though I have never seen it abundant, or in large flocks, its distribution appears quite general, a few being met with here and there in very much the same situations as the birds affect at this season in the East, especially among the stubble and weeds of the plowed lands.

No.	Sex.	Locality.	Date.	Collector.	Wing.	Tail.	Bill.	Tarsus.
211	♀ jun.	Rush Lake, Utah	Oct. 2, 1872	H. W. Henshaw .....	.....	.....	.....	.....
354	♂	Washington, Utah	Oct. 23, 1872	Dr. H. C. Yarrow and H. W. Henshaw.	.....	.....	.....	.....
A 9	.....	(Alcoholic)	— —, 1872	..... do .....	.....	.....	.....	.....

FAM. SYLVICOLIDAE: WARBLERS.

HELMINTHOPHAGA RUFICAPILLA (Wils.).

Nashville Warbler.

Sylvia ruficapilla, WILS., Am. Orn., iii, 1811, 120, pl. xxvii, fig. 3.

Helminthophaga ruficapilla, BD., Birds N. A., 1858, 256.—XANTUS, Proc. Acad. Nat. Sci. Phila., 1859, 191 (Fort Tejon, Cal.).—BD., Rev. Am. Birds, i, 1864, 175.—COOPER, Birds Cal., i, 1870, 82 (Sierra Nevada, near Lake Tahoe, Gruber, 1873).—SNOW, Birds Kan., 1872, 7.—ALLEN, Bul. Mus. Comp. Zoöl., 1872, 175 (Eastern Kansas, May; Ogden, Utah; Wahsatch Mountains).—COUES, Key N. A. Birds, 1872, 94.—BD., BREW., & RIDG., N. A. Birds, i, 1874, 196, pl. xi, f. 7.—HENSHAW, An. Lyc. Nat. Hist. N. Y., xi., 1874, 3.—*Id.*, An. List Birds Utah, 1872, Wheeler's Exped., 1874, 41.—COUES, Birds Northwest, 1874, 50.

This species, though detected at several points west of the Rocky Mountains, seems to be quite rare. It was never seen by us in Utah, where, however, Mr. Allen considered it quite common in the neighborhood of Ogden in September. In California, it was taken during the summer in numbers in the Sierra Nevada near Lake Tahoe. In Arizona, I do not think it occurs, save as a migrant. About Camp Crittenden, in the extreme southern portion of the Territory, it was quite common during the last few days of August and the first of September. They appeared to keep constantly in the low trees and bushes, and were very active in their pursuit of insects.

Specimens collected from this locality show some slight peculiarities of coloration in the restriction of the yellow of the throat and the more decided ashy tinge of the sides of the head.

No.	Sex.	Locality.	Date.	Collector.	Wing.	Tail.	Bill.	Tarsus.
507	.....	Camp Crittenden, Ariz.	Aug. 27, 1874	H. W. Henshaw.....	2.23	1.82	0.40	0.65
516	Jun.	..... do .....	..... do .....	..... do	2.40	1.92	.....	0.65
526	♀ ad.	..... do	Aug. 29, 1874	..... do	2.47	1.93	0.38	0.68
596	♀ ad.	..... do	Sept. 3, 1874	..... do	2.27	1.88	0.40	0.65

HELMINTHOPHAGA VIRGINIAE, Bd.

Virginia's Warbler.

Helminthophaga virginiae, Bd., Birds N. A., 1860, p. xi, pl. 79, f. 1 (near Taos, N. M.).—*Id.*, Rev. Am. Birds, i, 1864, 177.—COUES, Proc. Acad. Nat. Sci. Phila., 1866, 70 (Fort Whipple, Ariz.).—COOPER, Birds Cal., i, 1870, 85.—COUES, Key N. A. Birds, 1872, 94.—AIKEN, Proc. Bost. Soc. Nat. Hist., 1872, 196.—COUES, Birds Northwest, 1874, 51.—HENSHAW, An. Lyc. Nat. Hist. N. Y., xi, 1874, 3.—*Id.*, An. List Birds Utah, 1872, Wheeler's Exped., 1874, 41.

Mr. Ridgway appears to be the only one who has found this bird at all common. He found it so in the East Humboldt and Wahsatch Mountains, in both localities as a summer resident. In Arizona, I have met with it but once, and if it occurs in summer it must, I think, be quite rare, and only in the northern portion. Two specimens were secured in the White Mountains, August 11. The following interesting account is furnished by Mr. C. E. Aiken:

"*Helminthophaga virginiae*, Bd.—Mountain Warbler.—This warbler is found very commonly in some parts of Colorado, both as a migrant and as a regular summer resident. At Pagosa I saw it several times in September, and once at Fort Garland in August; but it is most common along the eastern base of the Rocky Mountains. It is strictly a bird of the mountains, though rarely found at a greater altitude than 7,500 feet, preferring rather the lowest foot hills; and, although sometimes so abundant in its favorite haunts as to outnumber all other warblers, it is frequently wholly overlooked by naturalists because of its restricted range. During its migrations, this interesting little bird may be found among the cottonwoods and willows bordering the streams, and often also among the pines; but in summer it frequents only the low scrub oak brush on the hill sides. It exhibits at all times a good deal of shyness, hiding instantly on the approach of an intruder, or keeping at a very respectful distance while uttering its sharp alarm note.

"The male is very musical during the nesting season, uttering his sweet little ditty continually, as he skips through the bushes in search of his morning repast; or, having satisfied his appetite, he mounts to the top of some tree in the neighborhood of his nest, and repeats at regular intervals a song of remarkable fullness for a bird of such minute proportions. The Lazuli

Finch frequents the same localities as the Mountain Warbler, and the notes of the two are so much alike that I have frequently found myself at a loss to distinguish between them. No bird with which I am acquainted conceals its nest more effectually than this warbler. This is placed at the base of a tussock of grass, among the oak bushes, being sunk in a hollow scratched in the earth, so that the rim of the nest is on a level with the surface. The overhanging grass of the tussock hides all so completely that the nest is only to be discovered by the most careful and persistent search. About the first of June, five white eggs, delicately speckled with reddish-brown, are laid."

No.	Sex.	Locality.	Date.	Collector.	Wing.	Tail.	Bill.	Tarsus.
553	♀	White Mts., Arizona...	Aug. 11, 1873	H. W. Henshaw.....	2. 03	1. 93	0. 42	0. 67
554	♀	..... do .....	..... do .....	..... do	2. 11	2. 00	0. 40	0. 65
227	♂ ad.	Navajo Creek, Colo....	Sept. 11, 1874	C. E. Aiken	2. 52	2. 12	0. 46	0. 68
228	.....	..... do .....	..... do .....	..... do	2. 35	2. 03	0. 35	0. 68
253	♀ ?	Tierra Amarilla, N. Mex	Sept. 15, 1874	..... do	2. 45	1. 95	0. 43	0. 65

HELMINTHOPHAGA LUCIAE, Cooper.

Lucy's Warbler.

Helminthophaga luciae, COOPER, Proc. Cal. Acad., July, 1861, 120 (Fort Mojave, Ariz.).—BD., Rev. Am. Birds, i, 1864, 178.—COUES, Proc. Acad. Nat. Sci. Phila., 1866, 70 (Fort Whipple, Ariz.).—COOPER, Birds Cal., i, 1870, 84.—COUES, Am. Nat., vi, 1872, 493.—*Id.*, Key N. A. Birds, 1872, 94.—BD., BREW., & RIDG., N. A. Birds, 1875, i, 200, pl. xi, f. 9; app. 504 (Tucson, Ariz., nesting).

I can add nothing to increase our somewhat slender stock of knowledge of the habits of this recently discovered species. Dr. Cooper discovered and found the species quite common at Fort Mojave, Ariz., in the western part of the Territory; and, since then, it has been met with by Dr. Coues at Fort Whipple, and by Captain Bendire near Tucson, where it was nesting. Though fully expecting to meet with the species, I did not detect it, either in New Mexico or in Arizona, till the last season, when I took a single specimen at Camp Lowell, near where it had been noted by Captain Bendire. Dr. Coues, in speaking of the species, has compared its actions and notes to those of the Gnatcatchers, and quite aptly, judging from the one individual seen by me. Indeed, on first hearing its wiry *tsip* as it glanced rapidly through the low

mesquite trees, I scarcely noticed it, passing it by as a veritable Gnat-catcher; but, its different form attracting my notice, I identified it immediately.

No.	Sex.	Locality.	Date.	Collector.	Wing.	Tail.	Bill.	Tarsus.
681	♂ ad.	Camp Lowell, Ariz....	Sept. 11, 1874	H. W. Henshaw.....	2. 17	.....	0. 37	0. 59

HELMINTHOPHAGA CELATA, Say.

Orange-crowned Warbler.

Sylvia celata, SAY, Long's Exped., i, 1823, 169.

Helminthophaga celata, BD., U. S. & Mex. Bound. Surv., ii, pt. ii, 1859, Birds, 10 (Brownsville, Tex.).—*Id.*, Ives' Col. Exped., 1857, pt. iv, 5.—*Id.*, Birds N. A., 1858, 257.—HEERM., P. R. R. Rep., x, pt. iv, 1859, 40.—XANTUS, Proc. Acad. Nat. Sci. Phila., 1859, 191 (Fort Tejon, Cal.).—COOP. & SUCKL., P. R. R. Rep., xii, pt. ii, 1860, 178.—HAYD., Trans. Am. Phil. Soc., xii, 1862, 160.—BD., Rev. Am. Birds, i, 1865, 176.—COUES, Proc. Acad. Nat. Sci. Phila., 1866, 70 (Fort Tejon, Cal.; Fort Mojave, Ariz.).—COOPER, Birds Cal., i, 1870, 83.—*Id.*, Proc. Cal. Acad., 1870, 75.—STEV., U. S. Geol. Surv. Terr., 1870, 463.—COUES, Key N. A. Birds, 1872, 95.—ALLEN, Bul. Mus. Comp. Zoöl., 1872, 175 (Eastern Kansas; Ogden, Utah; Wahsatch Mountains).—SNOW, Birds Kan., 1872, 7.—AIKEN, Proc. Bost. Soc. Nat. Hist., 1872, 196.—BD., BREW., & RIDG., N. A. Birds, i, 1874, 202, pl. xi, f. 4.—HENSHAW, An. Lyc. Nat. Hist. N. Y., xi, 1874, 3.—*Id.*, An. List Birds Utah, 1872, Wheeler's Exped., 1874, 41.—*Id.*, Rep. Orn. Specs., 1873, Wheeler's Exped., 1874, 57, 74, 102.—COUES, Birds Northwest, 1874, 52.

During the migrations, a very generally distributed species, frequenting the tops of the smaller trees and low bushes, whence it may often be seen darting forth in pursuit of some passing insect. In the breeding season, it ascends higher up, and is then found among the shrubbery on the open mountain sides. At this season, I have found it as high up as 11,000 feet. The song is a short simple lay, consisting of a few sweet trills, given with considerable spirit, and ending with a rising inflection.

No.	Sex.	Locality.	Date.	Collector.	Wing.	Tail.	Bill.	Tarsus.
24	♂ ad.	Denver, Colo.....	May 9, 1873	H. W. Henshaw.....	2. 40	2. 09	0. 29	0. 66
291	♂ ad.	Near Fort Garland, Colo	..... do .....	..... do	2. 55	2. 07	0. 45	0. 72
94	♂ ad.	Denver, Colo.....	May 17, 1873	..... do	2. 47	2. 14	0. 40	0. 64
662	♂	Camp Apache, Ariz....	Sept. 1, 1873	..... do	2. 43	2. 06	0. 38	0. 66
256	♀ jun.	Mount Graham, Ariz..	Aug. 1, 1874	..... do	2. 33	2. 02	0. 39	0. 65
229	♀ ad.	Lake Piedra, N. Mex..	Sept. 11, 1874	C. E. Aiken	2. 29	2. 00	0. 38	0. 72
259	♂ ad.	Navajo Creek, Colo...	Sept. 15, 1874	..... do	2. 37	2. 04	0. 39	0. 70
778	♀ ad.	Mount Graham, Ariz..	Sept. 21, 1874	H. W. Henshaw.....	2. 25	2. 06	0. 40	0. 68
1008	♂ ad.	Camp Apache, Ariz...	Oct. 11, 1874	..... do	2. 55	2. 20	0. 40	0. 65

DENDROICA AESTIVA (Gm.).

Yellow Warbler.

Motacilla aestiva, Gm., Syst. Nat., i, 1788, 996.

Sylvicola aestiva, WOODH., Sitgreave's Exp. Zuñi & Col. Riv., 1854, 70.

Dendroica aestiva, BD., U. S. & Mex. Bound. Surv., ii, pt. ii, 1859, Birds, 10.—BD., Birds N. A., 1858, 282.—HEERM., P. R. R. Rep., x, pt. iv, 1859, 40.—XANTUS, Proc. Acad. Nat. Sci. Phila., 1859, 19 (Fort Tejon, Cal.).—COOP. & SUCKL., P. R. R. Rep., xii, pt. ii, 1860, 181.—HAYD., Trans. Am. Phil. Soc., xii, 1862, 161.—BD., Rev. Am. Birds, i, 1865, 195.—COUES, Proc. Acad. Nat. Sci. Phila., 1866, 69 (Fort Whipple, Ariz.).—COUES, Proc. Acad. Nat. Sci. Phila., 1868, 83.—COUES, Key N. A. Birds, 1872, 97, and of late writers.—ALLEN, Bul. Mus. Comp. Zoöl., 1872, 175 (Kansas; Colorado; Utah).—SNOW, Birds Kan., 1872, 7.—MERRIAM, U. S. Geol. Surv. Terr., 1872, 675 (Ogden, Utah).—BD., BREW., & RIDG., N. A. Birds, i, 1874, 223, pl. xiv, f. 1.—YARROW, Rep. Orn. Specs., 1871, Wheeler's Exped., 1874, 34.—YARROW & HENSHAW, Rep. Orn. Specs., 1872, Wheeler's Exped., 1874, 10.—HENSHAW, Rep. Orn. Specs., 1873, Wheeler's Exped., 1874, 58, 74, 102.—*Id.*, An. Lyc. Nat. Hist. N. Y., xi, 1874, 4.—*Id.*, An. List Birds Utah, 1872, Wheeler's Exped., 1874, 41.—ALLEN, Proc. Bost. Soc. Nat. Hist., June, 1874, 15, 17, 22.—COUES, Birds Northwest, 1874, 54.

The Yellow Warbler was seen frequently in Utah, especially in the vicinity of towns. In Colorado, New Mexico, and Arizona, it is a common bird; the deciduous trees of the streams on the plains being its ordinary resort.

In Southern Colorado, several nests were obtained, and showed a similarity in structure to the usual style. One made of sheeps' wool and hempen material, lined with fine grasses and feathers, has more the appearance of a flycatcher's nest. Except that it is thicker and more carefully made, it might be mistaken for that of *Empidonax pusillus*. The ground color of the eggs taken in the West is pure white, and lacks the greenish tinge which is charactersitic of all eastern specimens I have seen.

No.	Sex.	Locality.	Date.	Collector.	Wing.	Tail.	Bill.	Tarsus.
55	♀ ad. ♀ jun.	Nevada Provo, Utah.....	Aug. 9, 1871 July 25, 1872	F. Bischoff..... H. W. Henshaw and Dr. H. C. Yarrow.	.....	.....	.....	.....
121	♀ ad.	..... do .....	..... do .....	..... do .....	.....	.....	.....	.....
144	♀ jun.	..... do	July 30, 1872	..... do .....	.....	.....	.....	.....
145	♀ ad.	..... do .....	..... do .....	..... do .....	.....	.....	.....	.....
A 10	.....	(Alcoholic).....	....., 1872	..... do .....	.....	.....	.....	.....
A 11	.....	..... do .....	....., 1872	..... do .....	.....	.....	.....	.....
9	♀ ad.	Fort Garland, Colo....	May 15, 1873	H. W. Henshaw.....	2.37	1.95	0.40	0.70

DENDROICA CORONATA (L.).

Yellow-rump Warbler.

Motacilla coronata, LINN., Syst. Nat., i, 1766, 333.

Sylvicola coronata, WOODH., Sitgreave's Exp. Zuñi & Col. Riv., 1854, 71.

Dendroica coronata, BD., Birds N. A., 1858, 272.—HENRY, Proc. Acad. Nat. Sci. Phila., 1859, 106 (New Mexico).—COOP. & SUCKL., P. R. R. Rep., xii, pt. ii, 1860, 180.—HAYD., Trans. Am. Phil. Soc., xii, 1862, 160.—BD., Rev. Am. Birds, i, 1865, 187.—COOPER, Birds Cal., 1870, 89.—COUES, Key N. A. Birds, 1872, 99, f. 41.—ALLEN, Bul. Mus. Comp. Zoöl., 1872, 175 (Eastern Kansas).—SNOW, Birds Kan., 1872, 7.—AIKEN, Proc. Bost. Soc. Nat. Hist., 1872, 196.—BD., BREW., & RIDG., N. A. Birds, i, 1874, 227, pl. xii, f. 9.—HENSHAW, Rep. Orn. Specs., 1873, Wheeler's Exped., 1874, 58.—COUES, Birds Northwest, 1874, 57.

In the Middle Province, this species occurs only as a migrant, and it would appear to be rather uncommon. Early in May, a few were noticed near Denver, Colo., mingled with the flocks of the Audubon's Warbler, whose habits at this season at least appear to be the counterpart of its own. They move easily and quickly through the small trees and bushes, pursuing all the while an onward course, now and then descending to the ground, or poising themselves for an instant on fluttering wings to pick off an insect from the under surface of a leaf or crevice in the bark. Many of the males were in song, and often lingered for an instant to give voice to a low, sweet warble. Several times, I heard males of the two species singing in the same tree, and was thus enabled to note the very great similarity of the two songs. I never met with the species in this region during the fall.

No.	Sex.	Locality.	Date.	Collector.	Wing.	Tail.	Bill.	Tarsus.
11	♀ ad.	Denver, Colo.	May 7, 1873	H. W. Henshaw.	2.80	2.33	0.40	0.72
23	♂ ad.	..... do	May 9, 1873	..... do	2.90	2.35	0.39	0.73
123	♀ ad.	..... do	May 17, 1873	..... do	2.90	2.33	0.40	0.73

DENDROICA AUDUBONI, (Towns.).

Audubon's Warbler.

Sylvia auduboni, TOWNS., Jour. Acad. Nat. Sci. Phila., vii, ii, 1837, 190.

Sylvicola audubonii, WOODH., Sitgreave's Exp. Zuñi & Col. Riv., 1854, 71.

Dendroica audubonii BD., U. S. & Mex. Bound. Surv., ii, pt. ii, 1854, Birds, 10.—*Id.*, Birds N. A., 1858, 273.—XANTUS, Proc. Acad. Nat. Sci. Phila., 1859, 191 (Fort Tejon, Cal.).—KENNERLY, P. R. R. Rep., Whipple's Route, x, 1859, 24.—HEERM., P. R. R. Rep., x, pt. iv, 1859, 39.—COOP. & SUCKL., P. R. R. Rep., xii, pt. ii, 1860, 181.—HAYD., Trans. Am. Phil. Soc., xii, 1862, 160.—BD., Rev. Am. Birds, i, 1865, 188.—COUES, Proc. Acad. Nat. Sci. Phila., 1866, 69 (Fort Tejon, Cal.).—*Id.*, *ib.*, 1868, 83.—COOPER, Am. Nat., iii, 1869, 33.—*Id.*, Proc. Cal. Acad., 1870, 75.—*Id.*, Birds Cal., 1870, 88.—STEV., U. S. Geol. Surv. Terr., 1870, 463.—COUES, Key N. A. Birds, 1872, 100.—ALLEN, Bull. Mus. Comp. Zool., 1872, 175 (Colorado; Utah).—MERRIAM, U. S. Geol. Surv. Terr., 1872, 675.—BD., BREW., & RIDG., N. A. Birds, i, 1874, 229, pl. xiii, f. 1.—YARROW & HENSHAW, Rep. Orn. Specs., 1872, Wheeler's Exped., 1874, 10.—HENSHAW, An. Lyc. Nat. Hist. N. Y., xi, 1874, 4.—*Id.*, An. List Birds Utah, 1872, Wheeler's Exped., 1874, 41.—*Id.*, Rep. Orn. Specs., 1873, Wheeler's Exped., 1874, 58, 75, 102.—COUES, Birds Northwest, 1874, 58.

Dendroica audubonis (*sic*), BD., Ives' Col. Exped., 1857, pt. iv, 5.

During the spring and fall migrations, this warbler is found in the Middle Region diffused over the country everywhere, from the pine region on the mountains to the lowest valleys. Its habits and motions are identical with those of the common Yellow-rump. Mr. Aiken has found it in Middle Colorado as early as April 16, but it probably does not become common till some time later. I saw it in small numbers about Denver May 7, and numerous on the 10th, and apparently still moving northward. On visiting the mountains of Southern Colorado, I found this species was a moderately common one in the pine region from about 9,000 feet upward. By the 1st of June all were paired; and on the 3d I saw a female just beginning a nest in the top of a small spruce, some thirty feet from the ground. This was finished June 8, but no eggs had been laid, and I was forced to content myself with the nest alone. Outwardly it was composed of strips of bark firmly and neatly woven, and lined with fine grasses. It has an external diameter of four inches and is one inch deep.

Mr. Aiken speaks of this bird as follows: "Common as a summer resident of Colorado, and during the migrations particularly abundant, spreading over the whole country from the stunted pines at timber line to the decidu-

ous trees and bushes bordering the streams of the plains. Though generally silent during the migrations, the males, when settled for the summer, are quite musical. In the latter season, we find them restricted to the mountains, usually at an altitude of from 8,000 to 10,000 feet, where, in the wilderness of pines and low aspens, they raise their young."

In Arizona, the species is probably resident, breeding at least as far south as Mount Graham. The young, just beginning to assume the plumage of the adult, were found here August 1; and farther north, in the White Mountains, young just from the nest were taken July 12. In both localities, they were quite as common as in Southern Colorado.

No.	Sex.	Locality.	Date.	Collector.	Wing.	Tail.	Bill.	Tarsus.
97	♂ ad.	Provo, Utah.....	July 26, 1872	H. W. Henshaw and Dr. H. C. Yarrow.	.....	.....	.....	.....
152	♂	Gunnison, Utah.....	Sept. 8, 1872	H. W. Henshaw.....	.....	.....	.....	.....
177	♂ ad.	Panquitch, Utah.....	Sept. 17, 1872	..... do .....	.....	.....	.....	.....
216	♂	Mormon Spring, Utah.	Oct. 3, 1872	..... do .....	.....	.....	.....	.....
217	♂	..... do .....	..... do .....	..... do .....	.....	.....	.....	.....
251	♂	Iron City, Utah.....	Oct. 6, 1872	..... do .....	.....	.....	.....	.....
310	♂	Toquerville, Utah.....	Oct. 16, 1872	H. W. Henshaw and Dr. H. C. Yarrow.	.....	.....	.....	.....
9	♂ ad.	Denver, Colo.	May 7, 1873	H. W. Henshaw.....	3.17	2.50	0.43	0.76
10	♂ ad.	..... do .....	..... do .....	..... do	3.08	2.50	0.47	0.75
22	♂ ad.	..... do	May 9, 1873	..... do	3.14	2.54	0.45	0.75
37	♂ ad.	..... do	May 10, 1873	..... do	3.00	2.42	0.43	0.72
36	♂ ad.	..... do	May 11, 1873	..... do	3.03	2.45	0.42	0.72
38	♂ ad.	..... do .....	..... do .....	..... do	3.07	2.47	0.45	0.70
39	♀ ad.	..... do .....	..... do .....	..... do	2.90	2.38	0.40	0.74
68	♂ ad.	..... do	May 13, 1873	..... do	3.16	2.61	0.45	0.74
120	♀ ad.	..... do	May 17, 1873	..... do	3.11	2.51	0.45	0.71
290	♂ ad.	Near Fort Garland, Colo	June 6, 1873	..... do	3.28	2.54	0.43	0.74
357	♂ ad.	..... do	June 7, 1873	..... do	3.11	2.40	0.41	0.70
664	♂ ad.	Camp Apache, Ariz....	Sept. 1, 1873	..... do	3.22	2.58	0.40	0.74
972	♀ jun.	Gila River, N. Mex....	Oct. 11, 1873	..... do	2.82	2.33	0.40	0.72
972A	♀	..... do .....	..... do .....	..... do	3.04	2.40	0.40	0.70
104	♀ jun.	Willow Spring, Ariz....	July 12, 1874	Dr. J. T. Rothrock....	.....	.....	.....	.....
259	♂ jun.	Mount Graham, Ariz..	Aug. 1, 1874	H. W. Henshaw.....	.....	.....	.....	.....
291	♀	Pagosa, Colo	Sept. 19, 1874	C. E. Aiken.....	.....	.....	.....	.....
298	♂	..... do	Sept. 21, 1874	..... do .....	.....	.....	.....	.....
770	♀	Mount Graham, Ariz..	..... do	H. W. Henshaw.....	.....	.....	.....	.....
859	♀	..... do	Sept. 25, 1874	..... do .....	.....	.....	.....	.....
860	♀	..... do .....	..... do .....	..... do .....	.....	.....	.....	.....
343	♀	Pueblo, Colo.....	Oct. 14, 1874	C. E. Aiken.....	.....	.....	.....	.....

DENDROICA MACULOSA (Gm.).

Black-and-yellow Warbler.

Motacilla maculosa, Gm., Syst. Nat., i, 1788, 984.

Dendroica maculosa, Bd., Birds N. A., 1858, 284.—HAYD., Trans. Am. Phil. Soc., xii, 1862, 161.—Bd., Rev. Am. Birds, i, 1865, 206.—COUES, Key N. A. Birds, 1872, 102, f. 44.—SNOW, Am. Nat., Dec., 1874, 757.—Bd., BREW., & RIDG., N. A. Birds, i, 1874, 232, pl. xiv, f. 2.—HENSHAW, Rep. Orn. Specs., 1873, Wheeler's Exped., 1874, 58.—COUES, Birds Northwest, 1874, 62.

The occurrence of this species west of the plains seems to be accidental, since I do not find it recorded from any point west of Kansas, to the fauna of which State it has recently been added by Mr. Frank H. Snow. I took a fine male in adult plumage near Denver, May 17, 1873. This was migrating in company with a flock of Audubon's Warblers; no others were seen.

No.	Sex.	Locality.	Date.	Collector.	Wing.	Tail.	Bill.	Tarsus.
93	♂ ad.	Denver, Colo.	May 17, 1873	H. W. Henshaw	2.40	2.15	0.45	0.66

DENDROICA CAERULEA (Wils.).

Cærulean Warbler.

Sylvia cærulea, WILS., Am. Orn., ii, 1810, 141, pl. xvii, f. 5.

Sylvia bifasciata, SAY, Long's Exp. Rocky Mountains, 1823, 170.

Sylvicola cærulea, WOODH., Sitgreave's Exp. Zuñi & Col. Riv., 1854, 70 (Texas, common; Indian Territory, breeding).

Dendroica cærulea, Bd., Birds N. A., 1858, 280.—*Id.*, Rev. Am. Birds, i, 1865, 191.—COUES, Key N. A. Birds, 1872, 99.—ALLEN, Bul. Mus. Comp. Zoöl., 1872, 175 (Eastern Kansas).—SNOW, Birds Kan., 1872, 7.—Bd., BREW., & RIDG., N. A. Birds, i, 1874, 236, pl. xiii, f. 10.—HENSHAW, Rep. Orn. Specs., 1873, Wheeler's Exped., 1874, 58.—COUES, Birds Northwest, 1874, 56.

A small warbler seen May 17 was unquestionably of this species. Its small size and bright blue color made it conspicuous among a flock of Audubon's Warblers as they passed rapidly from tree to tree, but, my attention being diverted for a moment, I lost sight of it, nor was it again seen. Not hitherto detected west of the plains. "Apparently common at Leavenworth, Kansas" (Allen).

DENDROICA GRACIAE, Coues.

Gracie's Warbler.

Dendroica graciae, COUES, MSS.—BD., Rev. Am. Birds, i, 1865, 210.—COUES, Proc. Acad. Nat. Sci. Phila., 1866, 67 (Fort Whipple, Ariz.).—COUES, Key N. A. Birds, 1872, 103.—BD., BREW., & RIDG., N. A. Birds, i, 1874, 243, pl. xiv, f. 10.

It is remarkable that, with the exception of a single specimen taken at Inscription Rock, N. Mex., during the two seasons spent in Arizona and New Mexico, this species should have been detected in but one locality, viz, in the White Mountains, near Camp Apache, Ariz. Both seasons it was found in the pine woods of the mountains, and apparently was one of the commonest warblers that spend the summer here. I have little doubt but that, as suggested by Dr. Coues, its range in summer embraces the high pine tracts throughout Arizona and New Mexico. By July 10, the young, just from the nest, were seen, and the old birds, in worn plumage, were busied constantly in providing for the wants of their progeny. The coniferous trees seemed to be alone frequented by them, and, in the tops of these, they kept running swiftly over the smaller branches at the extremities of the limbs, pursuing their prey on the wing. By the middle of August, they had united in flocks, and, with other small insectivorous birds, appeared to be lingering in the region preparatory to the southward migration. Their preference for the pines was apparent, though occasionally found among the oaks. Iris black; bill and feet brown; soles light yellow.

No.	Sex.	Locality.	Date.	Collector.	Wing.	Tail.	Bill.	Tarsus.
485	♀ ad.	Inscription Rock, N. Mex.	July 24, 1873	H. W. Henshaw.....	2.53	2.10	0.45	0.68
534	♂ ad.	White Mountains, Ariz.	Aug. 8, 1873	..... do	2.63	2.26	0.40	0.72
535	♀ jun.	..... do	Aug. 9, 1873	..... do	2.50	2.27	0.40	0.60
567	♀ jun.	..... do	Aug. 11, 1873	..... do	2.55	2.16	0.38	0.60
520	♂ ad.	Camp Apache, Ariz....	Aug. 21, 1873	..... do	2.67	2.24	0.42	0.63
691	♂ jun.	..... do	Sept. 3, 1873	..... do	2.63	2.30	0.40	0.64
747	♀ ad.	South of Camp Apache, Ariz.	..... do .....	..... do	2.60	2.15	0.39	0.60
61	♂ jun.*	Near Camp Apache, Ariz	July 11, 1874	..... do	2.53	2.00	0.32	0.60
81	♀ ad.†	..... do	July 12, 1874	..... do	2.42	2.14	0.38	0.70
101	♂ ad.†	..... do .....	..... do .....	..... do	2.75	2.27	0.41	0.66
129	♂ ad.†	..... do	July 13, 1874	..... do	2.50	1.75	0.42	0.63
130	♀ ad.†	..... do .....	..... do .....	..... do	2.36	.....	0.40	0.63
131	♂ ad.†	..... do .....	..... do .....	..... do	2.60	2.22	0.43	0.61
156	♂ jun.	..... do .....	..... do .....	..... do	2.64	2.32	0.40	0.65

* Nesting-plumage.

† Worn breeding-plumage.

DENDROICA STRIATA (Forst.)

Black-poll Warbler.

Muscicapa striata, FORSTER, Phil. Trans., lxii, 1772, 383, 428.

Sylvicola striata, WOODH., Sitgreave's Exp. Zuñi & Col. Riv., 1854, 70.

Dendroica striata, BAIRD, Birds N. A., 1858, 280.—HENRY, Proc. Acad. Nat. Sci. Phila., 1859, 106 (New Mexico).—HAYD., Trans. Am. Phil. Soc., xii, 1862, 161.—BD., Rev. Am. Birds, i, 1865, 192.—SNOW, Am. Nat., Dec., 1874, 757.—COUES, Key N. A. Birds, 1872, 100, f. 42; pl. 2, f. 15, 16.—BD., BREW., & RIDG., N. A. Birds, i, 1874, 248, pl. xiii, f. 9.—HENSHAW, Rep. Orn. Specs., 1873, Wheeler's Exped., 1874, 59.—COUES, Birds Northwest, 1874, 60.

In its journey northward in spring to its summer home the greater number of Black-poll Warblers choose an eastern route, and throughout the Eastern Province it is one of the most abundant of the transitory visitants, passing through in an almost continuous stream from the 20th of May till the 1st of June. It has recently been ascertained to occur in Kansas by Mr. F. H. Snow, as quoted above. Near Denver, in 1873, it made its appearance a few days earlier than it is wont to do in New England, and by May 17 both sexes were abundant, and passing rapidly onward. This is, I believe, the most western locality at which the species has been recorded.

No.	Sex.	Locality.	Date.	Collector.	Wing.	Tail.	Bill.	Tarsus.
120	♀ ad.	Denver, Colo	May 17, 1873	H. W. Henshaw	2.83	2.22	0.42	0.73

DENDROICA NIGRESCENS (Towns.).

Black-throated Gray Warbler.

Sylvia nigrescens, TOWNS., Jour. Acad. Nat. Sci. Phila., vii, ii, 1837, 191 (Columbia River).

Dendroica nigrescens, BD., Ives' Col. Exped., 1857, pt. iv, 5.—*Id.*, Birds N. A., 1858, 270.—HEERM., P. R. R. Rep., x, pt. iv, 1859, 40.—XANTUS, Proc. Acad. Nat. Sci. Phila., 1859, 191 (Fort Tejon, Cal.).—HENRY, Proc. Acad. Nat. Sci. Phila., 1859, 106 (New Mexico).—COUES, Proc. Acad. Nat. Sci. Phila., 1866, 69 (Fort Whipple)—COOP. & SUCKL., P. R. R. Rep., xii, pt. ii, 1860, 179.—BD., Rev. Am. Birds, i, 1865, 186.—COOPER, Birds Cal., 1870, 90.—

COUES, Key N. A. Birds, 1872, 98.—AIKEN, Proc. Bost. Soc. Nat. Hist., 1872, 197.—BD., BREW., & RIDG., N. A. Birds, i, 1874, 258, pl. xii, f. 8.—HENSHAW, An. Lyc. Nat. Hist. N. Y., xi, 1874, 4.—*Id.*, An. List Birds Utah, 1872, Wheeler's Exped., 1874, 42.—*Id.*, Rep. Orn. Specs., 1873, Wheeler's Exped., 1874, 75, 103.—COUES, Birds Northwest, 1874, 55.

At Fort Garland, Col., a warbler was seen June 25 in a grove of pine trees on the sides of a narrow cañon, which I am quite confident was of this species. It had a short, feeble, but rather pleasing, song, which it constantly emitted at short intervals as it flew from tree to tree. Owing to its shyness, I did not succeed in capturing it.

The dry foot hills in the vicinity of Santa Fé, N. M., covered with a growth of piñons and cedars, were frequented by these birds in June. I saw no females; but the males were in very much worn plumage, and had all the appearance of breeding. The nests, however, I did not succeed in finding. In the fall migrations, their numbers increase, and they are then found quite abundantly in Arizona, frequenting usually the pines, more rarely the oaks and other deciduous trees. The following remarks Mr. Aiken furnishes from notes in Colorado:

"Rather a rare migrant in Colorado; a few probably remaining to breed. I have never seen it anywhere but on the *mesas* and foot hills that are covered with the low scraggy piñon pine. In the spring time, it first makes its appearance about the first of May; two or three males usually being together then, and the females coming several days later. The male, as he searches for insects on leaf and limb, repeats at intervals a singular, but withal a very pretty, song, with something of the metallic ring in it that is heard in the song of the White-throated Wren. Shy and retiring in its habits, and frequenting piñon groves so dense that one can scarcely see a dozen yards ahead, this ornate little sylph is very easily overlooked, and it often requires considerable perseverance to secure a specimen, even after it has been discovered. I have followed one through the thicket for half an hour, while, like an *ignis fatuus*, it led me on, fluttering occasionally into sight for an instant, and a moment later uttering its song perhaps twenty rods away."

No.	Sex.	Locality.	Date.	Collector.	Wing.	Tail.	Bill.	Tarsus.
529	♂ ad.	Camp Apache, Ariz ...	Aug. 12, 1873	H. W. Henshaw	2.50	2.17	0.38	0.67
566	♂ jun.	White Mountains, Ariz.	do	do	2.45	2.25	0.40	0.64
578	♂ ad.	Camp Apache, Ariz.....	Aug. 21, 1873	do	2.50	2.17	0.40	0.69
601	♀ jun.	do	Aug. 23, 1873	do	2.27	2.06	0.40	0.65
701	♂ ad.	do	Sept. 5, 1873	do	2.35	2.17	0.38	0.69
1	♂ ad.	Santa Fé, N. Mex	Aug. 16, 1874	do	2.50	2.20	0.40	0.60
418	♀ jun.	Bowie Agency, Ariz....	do	do	2.40	2.10	0.30	0.69
431	Jun.	do	Aug. 17, 1874	do	2.40	2.25	0.38	0.65
496	♂ ad.	Camp Crittenden, Ariz.	Aug. 25, 1874	do	2.54	2.20	0.40	0.72
505	♂ jun.	do	Aug. 26, 1874	do	2.45	2.12	0.37	0.67
550	♀ ad.	do	do	do	2.60	2.20	0.40	0.66

DENDROICA TOWNSENDI (Nutt.).

Townsend's Warbler.

Sylvia townsendi, TOWNS., Jour. Acad. Nat. Sci. Phila., vii, ii, 1837, 191.

Dendroica townsendii, BD., Birds N. A., 1858, 269.—COOP. & SUCKL., P. R. R. Rep., xii, pt. ii, 1860, 179.—BD., Rev. Am. Birds, i, 1865, 185.—COOPER, Birds Cal., i, 1870, 91.—COUES, Key N. A. Birds, 1872, 98.—BD., BREW., & RIDG., N. A. Birds, i, 1874, 265, pl. xii, f. 7.

At Mount Graham, Ariz., in September, this warbler was found in considerable numbers, though the few taken were procured with no little difficulty, for they almost invariably were seen in the tops of the tallest trees, where a glimpse might now and then be had of them as they dashed out after flying insects, or flew from tree to tree in their always onward migratory course. The tracts of pine woods they shunned entirely, but affected the firs and spruces, and their flights from point to point were regulated and made longer or shorter by the presence or absence of these trees. Their movements were exceedingly rapid; a moment spent in passing in and out the interlacing branches, a few hurried sweeps at their extremities, and they were off to the next adjoining tree to repeat the process again and again till lost sight of in the dense woods. Their only note was the common *tsip*. I obtained no evidence of their breeding in Arizona, though from their habits there seems to exist no reason why these mountain forests should not furnish a congenial summer home. Mr. Aiken obtained two specimens in Colorado, thus including that Territory in the range of the species.

No.	Sex.	Locality.	Date.	Collector.	Wing.	Tail.	Bill.	Tarsus.
184	Jun.	Conejos, Colo.	Aug. 26, 1874	C. E. Aiken	2.58	2.12	0.40	0.68
223	♂ jun.	Mouth of Navajo Creek, Colo.	Sept. 11, 1874	.....do	2.52	2.12	0.38	0.67
834	.....	Mount Graham, Ariz ..	Sept. 24, 1874	H. W. Henshaw.....	2.55	2.30	0.40	0.72
837	♀ jun.	.....do .....	.....do .....	.....do	2.60	2.15	0.40	0.73
886	♀ ad.	.....do	Sept. 25, 1874	.....do	2.47	2.08	0.37	0.72
787	♀	.....do	Sept. 28, 1874	.....do	2.63	2.08	0.39	0.69
802	♀ ad.	.....do	Sept. 29, 1874	.....do	2.63	2.15	0.39	0.70

DENDROICA OCCIDENTALIS (TOWNS.).

Western Warbler.

Sylvia occidentalis, TOWNS., Jour. Acad. Nat. Sci. Phila., vii, ii, 1837, 190 (Columbia River).

Dendroica occidentalis, BD., Birds N. A., 1858, 268.—COOP. & SUCKL., P. R. R. Rep., xii, pt. ii, 1860, 178.—BD., Rev. Am. Birds, i, 1865, 183.—COUES, Proc. Acad. Nat. Sci. Phila., 1866, 69 (Fort Whipple).—COOPER, Birds Cal., i, 1872, 92.—COUES, Key N. A. Birds, 1872, 97.—BD., BREW., & RIDG., N. A. Birds, i, 1874, 266, pl. xii, f. 5.

The Western Warbler was met with at the same time and place, and under precisely the same conditions, as the last species, and at this season the habits of the two are so alike that at the distance at which they were usually seen it was impossible to distinguish them with anything like certainty. Indeed, the two species associated together, and were found in the same trees.

No.	Sex.	Locality.	Date.	Collector.	Wing.	Tail.	Bill.	Tarsus.
541	♀ jun.	Near Camp Crittenden, Ariz.	Aug. 30, 1874	H. W. Henshaw	2.46	2.10	0.38	0.65
36	♀ jun.	.....do	Sept. —, 1874	.....do	2.65	2.07	0.35	0.72
779	♀ ad.	Mount Graham, Ariz..	Sept. 21, 1874	.....do	2.40	2.10	0.38	0.67
785	♀ jun.	.....do .....	.....do .....	.....do	2.45	2.17	0.39	0.66
786	♂ ad.	.....do	Sept. 22, 1874	.....do	2.75	2.27	0.45	0.75
838	♀ jun.	.....do .....	.....do .....	.....do	2.50	2.10	0.41	0.70

PEUCEDRAMUS, Coues, nov. gen.

TYPE.—*Sylvia olivacea*, Giraud.

“General aspect of *Dendroica*. Tongue much as in that genus, but larger, with revolute edges, cleft tip, and lacinate for some distance from the end; wings elongated, half as long again as the tail (in *Dendroica* but little longer than the tail), reach-

ing, when folded, nearly to the end of the tail; tail emarginate; tarsus no longer than the middle toe and claw. Hallux little if any longer than its claw; bill little shorter than tarsus (averaging little over half the tarsus in *Dendroica*), attenuate, notably depressed, yet very little widened at base; culmen rather concave than convex in most of its length, the under outline almost perfectly straight from extreme base to tip; nasal fossæ very large, with a highly developed nasal scale; rictal vibrissæ few and short; plumage without streaks.

"The form of the bill is quite peculiar, lacking entirely the parine aspect of that of *Dendroica*; it somewhat resembles that of *Seiurus*. The relationships of *P. olivacea* appear to be with the Jamaican *Sylvicola coa* of Gosse. In habits, it somewhat resembles the *Certhiidae*".—(COUES, MSS).

While in the field, my attention being attracted to certain peculiarities of this bird, both structural and as shown in its habits, as compared with the genus *Dendroica*, which seemed to amount to generic distinctions, I called the attention of my friend Dr. Elliott Coues to these, and, as a result of his examination of the specimens, he has erected the genus as above given.

PEUCEDRAMUS OLIVACEUS (Giraud).

Olive-headed Warbler.

Sylvia olivacea, GIRAUD, Birds Texas, 1841, 14, pl. vii, f. 2.—SCLAT., Proc. Zoöl. Soc., 1855, 66.

Sylvicola olivacea, CASSIN, Ill. Birds Texas, 1855, 283, pl. xlviii.

Dendroica olivacea, SCLAT., Proc. Zoöl. Soc., 1852, 298 (Oaxaca; cold region).—*Id.*, Proc. Zoöl. Soc., 1859, 363 (Jalapa).—*Id.*, Cat., 1861, 31, No. 190.—BD., Rev. Am. Birds, i, 1865, 205.—BD., BREW., & RIDG., N. A. Birds, i, 1874, 258.—HENSHAW, Am. Sportsman, v, Feb. 20, 1875, 328 (introduced into United States fauna).

Rhimamphus olivaceus, SCLAT., Proc. Zoöl. Soc., 1856, 291 (Cordova).

Sylvia tæniata, DUBUS., Bul. Acad. Brux., xiv, 1847, 104.—*Id.*, Rev. Zoöl., 1848, 245.

Sylvicola tæniata, BON., Consp., 1850, 309.

HAB.—Both coasts of Mexico south into Guatemala, Arizona.

This species was given by Mr. Giraud as a bird of Texas; but the quotation has been disregarded by authors under the assumption that the locality of his specimens was, through mistake, erroneously given. It would appear, however, that its occurrence in Texas is rendered by no means improbable, since the capture of several specimens by our party during the past season in the mountains of Southern Arizona. During a three days' visit to Mount Graham, August 1 to 4, the species was not detected; though this can hardly be considered as negating the probability of its occurrence here as a summer resident, since in so short a period the time was far too limited to examine, even cursorily, a region abounding at this season in

bird life, including many species of peculiar interest, especially when the rough nature of the country and the density of the pine woods is considered.

Returning here September 19, many of the species found in August in abundance had migrated south, and were either entirely wanting or represented by individuals from farther north, while the woods, the silence of which was often unbroken for long intervals by the note of a single bird, would now and then, as if by magic, be filled with hundreds of feathered migrants, who in noisy companies were proceeding on their way south. The day after establishing our camp here, Mr. Rutter, of the party, brought in a fine specimen of this warbler, which he stated he had shot from among a flock of Aububon's Warblers and Snowbirds, which he had started from the ground while walking in the pine woods. With the rest, it had apparently been feeding upon the ground, and had flown up to a low branch of a pine, where it sat and began to give forth a very beautiful song, which he described as consisting of detached, melodious, whistling notes. During the next few days, I confined my collecting trips to the spruce woods, and though I watched eagerly for this to me strange warbler, I did not see it till the last day of my stay in the locality, when I heard a few strange Vireo-like notes coming from some thick pines, and, hurrying to the spot, soon had the satisfaction of seeing one of these warblers on the low limbs of a huge pine, where it was moving quickly over the large branches, its manner and whole appearance reminding me instantly of the Pine Creeper (*Dendroica pinus*). A few moments later, a second specimen was shot from the top of a tall pine, where it was actively creeping about. As all the warblers present here at this time were migrants, we may reasonably infer that, with the others, this species was *en route* from some locality to the north, and perhaps it may be found to be a rare inhabitant of the high pine region throughout Arizona and New Mexico.

No.	Sex.	Locality.	Date.	Collector.	Wing.	Tail.	Bill.	Tarsus.
745	♂ ad.	Mount Graham, Ariz..	Sept. 19, 1874	J. M. Rutter	3.00	2.30	0.52	0.72
856	♂	..... do	Sept. 25, 1874	H. W. Henshaw.....	3.00	2.37	0.48	0.70
884	♂ ad.	..... do .....	..... do .....	..... do	3.00	2.28	0.44	0.73

SEIURUS NOVEBORACENSIS (Gm.).

Small-billed Water Thrush.

Motacilla noveboracensis, GM., Syst. Nat., i, 1788, 958.

Seiurus noveboracensis, BD., Birds N. A., 1858, 261.—HAYD., Trans. Am. Phil. Soc., 12, 1862, 160.—COOPER, Am. Nat., iii, 1862, 32.—BD., Rev. Am. Birds, i, 1865, 215.—COUES, Key N. A. Birds, 1872, 106, pl. 2, f. 9, 10, 11.—SNOW, Birds Kan., 1872, 7.—BD., BREW., RIDG., N. A. Birds, i, 1874, 283, pl. xiv, f. 12.—HENSHAW, Rep. Orn. Specs., 1873, Wheeler's Exped., 1874, 59.—COUES, Birds Northwest, 1874, 71.

Seiurus? noveboracensis, ALLEN, Proc. Bost. Soc. Nat. Hist., June, 1874, 22.

The Water Thrush appears to be of rare occurrence in the Middle Province, though it doubtless passes through in its migrations, and occurs at many points where it has not been reported from the lack of observers and the short time its passage occupies. At Denver, I secured a single individual May 12, and in a few days small numbers were observed, usually singly, by the side of pools and streams. Near Camp Crittenden, the latter part of August, one was found on a small water course; this being the only occasion I have detected it in Arizona, nor am I aware that it is elsewhere recorded from this Territory.

No.	Sex.	Locality.	Date.	Collector.	Wing.	Tail.	Bill.	Tarsus.
53	♀ ad.	Denver, Colo.	May 12, 1873	H. W. Henshaw	3.04	2.25	0.55	0.81

GEOTHYLPIS TRICHAS (L.).

Maryland Yellowthroat.

Turdus trichas, LINN., Syst. Nat. 1766, 295.

Geothlypis trichas, BD., U. S. & Mex. Bound. Surv., ii, pt. ii, 1859, Birds, 10.—*Id.*, Birds N. A., 1858, 241.—XANTUS, Proc. Acad. Nat. Sci. Phila., 1859, 191 (Fort Tejon, Cal.).—HENRY, Proc. Acad. Nat. Sci. Phila., 1859, 106 (New Mexico).—COOP. & SUCKL., P. R. R. Rep., xii, pt. ii, 1860, 177.—HAYD., Trans. Am. Phil. Soc., xii, 1862, 160.—BD., Rev. Am. Birds, i, 1865, 220.—COUES, Proc. Acad. Nat. Sci. Phila., 1866, 69 (Fort Whipple, Ariz.).—COOPER, Birds Cal., 1870, 95.—STEV., U. S. Geol. Surv. Terr., 1870, 463.—COUES, Key N. A. Birds, 1872, 107, f. 47.—ALLEN, Bull. Mus. Comp. Zoöl., 1872, 175 (Eastern Kansas; Ogden, Utah).—SNOW, Birds Kan., 1872, 7.—AIKEN, Proc. Bost. Soc. Nat. Hist., 1872, 197 (Black Hills).—MERRIAM, U. S. Geol. Surv. Terr., 1872, 674 (Ogden; Madison River, Fort Ellis, Mont.).—BD.,

BREW., & RIDG., N. A. Birds, i, 1874, 297, pl. xv, f. 4.—YARROW & HENSHAW, Rep. Orn. Specs., 1872, Wheeler's Exped., 1874, 10.—HENSHAW, An. Lyc. Nat. Hist. N. Y., xi, 1874, 4.—*Id.*, An. List Birds Utah, 1872, Wheeler's Exped., 1874, 42.—*Id.*, Rep. Orn. Specs., 1873, Wheeler's Exped., 1874, 59, 103.—ALLEN, Proc. Bost. Soc. Nat. Hist., June, 1874, 15, 22.—COUES, Birds Northwest, 1874, 74.

Trichas marylandicus, WOODH., Sitgreave's Exp. Zuñi & Col. Riv., 1854, 71.

Trichas delafeldii, HEERM., P. R. R. Rep., x, pt. iv, 1859, 40.

This species has been found by our parties in various parts of Utah and Colorado, although it appears to be not so common as at the East. The thickets by the water courses and the damp meadowy grounds of the lowlands are its places of resort. In Arizona, it appears to be rare; and I have met with it but twice, at Camp Apache, and again at Camp Grant. It is a summer resident.

No.	Sex.	Locality.	Date.	Collector.	Wing.	Tail.	Bill.	Tarsus.
12	♀ ad.	Denver, Colo.	May 7, 1873	H. W. Henshaw	2. 12	2. 13	0. 45	0. 71

GEOTHLYPIS MACGILLIVRAYI, Baird.

MacGillivray's Warbler.

Sylvia macgillivrayi, AUD., Orn. Biog., v, 1839, 75, pl. cccxcix.

Geothlypis macgillivrayi, BD., U. S. & Mex. Bound. Surv., ii, pt. ii, 1859, Birds, 10.—*Id.*, Birds N. A., 1858, 244, pl. 99, f. 4.—XANTUS, Proc. Acad. Nat. Sci. Phila., 1859, 191 (Fort Tejon, Cal.).—HENRY, Proc. Acad. Nat. Sci. Phila., 1859, 106 (New Mexico).—COOP. & SUCKL., P. R. R. Rep., xii, pt. ii, 1860, 177.—BD., Rev. Am. Birds, i, 1865, 227.—COUES, Proc. Acad. Nat. Sci. Phila., 1866, 70 (Fort Whipple, Ariz.).—COOPER, Am. Nat., iii, 1869, 32.—*Id.*, Proc. Cal. Acad., 1870, 75 (Colorado River).—*Id.*, Birds Cal., i, 1870, 96.—COUES, Key N. A. Birds, 1872, 107.—ALLEN, Bul. Mus. Comp. Zool., 1872, 175 (Eastern Kansas; Colorado).—AIKEN, Proc. Bost. Soc. Nat. Hist., 1872, 197.—RIDG., Am. Jour., Dec., 1872, 459.—YARROW & HENSHAW, Rep. Orn. Specs., 1872, Wheeler's Exped., 1874, 10.—HENSHAW, An. Lyc. Nat. Hist. N. Y., xi, 1874, 4.—*Id.*, An. List Birds Utah, 1872, Wheeler's Exped., 1874, 42.—*Id.*, Rep. Orn. Specs., 1873, Wheeler's Exped., 1874, 59, 75, 103.—BD., BREW., & RIDG., N. A. Birds, i, 1874, 303, pl. xv, f. 4, 5.—ALLEN, Proc. Bost. Soc. Nat. Hist., June, 1874, 22.—COUES, Birds Northwest, 1874, 75.

Trichas tolmiei, HEERM., P. R. R. Rep., x, pt. iv, 1859, 40.

The MacGillivray's Warbler is one of the most characteristic of the family throughout the Middle Region, and has been detected by the

various parties of the Expedition at many different points in Utah, Colorado, New Mexico, and Arizona. Any patch of shrubbery or tangled growth of bushes is sure to be selected as the summer abode of one or more pairs of these birds. From such localities in the low valleys, they follow the streams upward as they flow from the mountains; and, up to an altitude of about 9,000 feet, the species is common. Its song, though short, is sweet and pleasing, and in early summer is repeated at very brief intervals, as the birds pause now and then in their industrious search under fallen logs and among the dead leaves for insects. During the migration, a general diffusion of their numbers takes place, and, below the height above mentioned, they may be met with almost anywhere except on perfectly open ground.

No.	Sex.	Locality.	Date.	Collector.	Wing.	Tail.	Bill.	Tarsus.
80	♂ ad.	Denver, Colo.	May 14, 1873	H. W. Henshaw.....	2.47	2.34	0.47	0.77
117	♂ ad.	..... do	May 17, 1873	..... do	2.43	2.30	0.46	0.82
122	♂ ad.	..... do	May 18, 1873	..... do	2.48	2.38	0.45	0.82
130	♀ ad.	Fort Garland, Colo....	May 25, 1873	..... do	2.38	2.47	0.45	0.80
160	♂ ad.	..... do	May 28, 1873	..... do	2.57	2.45	0.42	0.81
555	♀	White Mountains, Ariz	Aug. 11, 1873	..... do	2.25	2.37	0.43	0.78
556	♂ jun.	..... do .....	..... do .....	..... do	2.20	2.36	0.42	0.98
661	♀	Camp Apache, Ariz....	Sept. 1, 1873	..... do	2.18	2.30	0.44	0.76
663	♀	..... do .....	..... do .....	..... do	2.29	3.30	0.45	0.80
123	♂ jun.	Camp Bowie, Ariz.	Oct. 7, 1873	Dr. C. G. Newberry ..	2.28	2.14	0.42	0.75

ICTERIA VIRENS (L.), var. LONGICAUDA, Lawr.

Long-tailed Chat.

Icteria longicauda, LAW., An. Lyc. Nat. Hist. N. Y., vi, April, 1853, 4.—BD., U. S. & Mex. Bound. Surv., ii, pt. ii, 1854, Birds, 10.—NEWB., P. R. R. Rep., vi, 1857, 81, pl. xxxiv.—BD., Birds N. A., 1858, 249, pl. 34, f. 2.—HEERM., P. R. R. Rep., x, pt. iv, 1859, 55.—XANTUS, Proc. Acad. Nat. Sci. Phila., 1859, 191 (Fort Tejon, Cal.).—HENRY, Proc. Acad. Nat. Sci. Phila., 1859, 106 (New Mexico).—HAYD., Trans. Am. Phil. Soc., xii, 1862, 160.—BD., Rev. Am. Birds, i, 1865, 230.—COUES, Proc. Acad. Nat. Sci. Phila., 1866, 71 (Fort Whipple, Ariz.).—*Id.*, Proc. Acad. Nat. Sci. Phila., 1868, 83.—COOPER, Proc. Acad. Nat. Sci. Phila., 1870, 75.—*Id.*, Birds Cal., 1870, 98.—AIKEN, Proc. Bost. Soc. Nat. Hist., 1872, 197 (Colorado).—MERRIAM, U. S. Geol. Surv. Terr., 1872, 674.

Icteria virens var. *longicauda*, COUES, Key N. A. Birds, 1872, 108.—BD., BREW., & RIDG., N. A. Birds, i, 1874, 309.—YARROW & HENSHAW, Rep. Orn. Specs., 1872, Wheeler's Exped., 1874, 10.—HENSHAW, An. Lyc. Nat. Hist. N. Y., xi, 1874, 4.—*Id.*, An. List Birds Utah, 1872, Wheeler's Exped., 1874, 42.—*Id.*, Rep. Orn. Specs., 1873, Wheeler's Exped., 1874, 103.—COUES, U. S. Geol. Surv. Terr., 1874, 77.—ALLEN, Bull. Mus. Comp. Zool., 1872, 175 (Eastern Middle Kansas; Colorado; Utah).—COUES, Birds Northwest, 1874, 77.

In Utah, this species is quite a common one; being found especially numerous in the thickets about Provo. In Southern Colorado, I saw but few, and these only in the lower regions, and I have never seen it at a higher elevation than 8,000 feet. In both Arizona and New Mexico, the species has been met with at many and widely distant localities, so that its distribution appears to be general. Little can be said of its habits in the West which is not characteristic of the bird in the East; and there appears also to be a perfect correspondence in its manner of nesting.

No.	Sex.	Locality.	Date.	Collector.	Wing.	Tail.	Bill.	Tarsus.
20	♀ ad.	Provo, Utah.....	July 27, 1872	H. W. Henshaw and Dr. H. C. Yarrow.	.....	.....	.....	.....
146	♀ jun.	..... do .....	..... do .....	..... do .....	.....	.....	.....	.....
523	♂ jun.	Camp Apache, Ariz....	Aug. 5, 1873	H. W. Henshaw.....	2.93	3.38	0.55	0.97
49	♂ ad.	Bowie Agency, Ariz...	July 2, 1874	..... do	3.05	3.30	0.60	1.00
131	♂ ad.	Camp Apache, Ariz...	July 14, 1874	..... do	3.28	3.62	0.55	1.03
9	♂ ad.	Pueblo, Colo	July 24, 1874	C. E. Aiken.....	3.14	3.38	0.58	0.98
43	♂ ad.	..... do	July 27, 1874	..... do	3.20	3.47	0.50	1.05
44	♀ ad.	..... do .....	..... do .....	..... do	3.23	3.53	0.58	1.02
213	♂ ad.	Camp Grant, Ariz....	July 28, 1874	H. W. Henshaw.....	3.00	3.30	0.60	0.97
214	♀ jun.	..... do .....	..... do .....	..... do .....	.....	.....	.....	.....
566	♂ jun.	Camp Crittenden, Ariz.	Sept. 1, 1874	..... do .....	.....	.....	.....	.....

MYIODIOCTES PUSILLUS (Wils.).

Green Black-capped Flycatcher.

Muscicapa pusilla, WILS., Am. Orn., iii, 1811, 103, pl. xxvi, f. 4.

Sylvania wilsonii, WOODH., Sitgreave's Exp. Zuñi & Col. Riv., 1854, 69.

Myiodioctes pusillus, BD., U. S. & Mex. Bound. Surv. Terr., ii, pt. ii, 1859, Birds, 10.—BD., Birds N. A., 1858, 293.—XANTUS, Proc. Acad. Nat. Sci. Phila., 1859, 191 (Fort Tejon, Cal.).—HEERM., P. R. R. Rep., x, pt. iv, 1859, 39.—COOP. & SUCKL., P. R. R. Rep., xii, pt. ii, 1860, 182.—BD., Rev. Am. Birds, i, 1865, 241.—COUES, Proc. Acad. Nat. Sci. Phila., 1866, 71 (Fort Whipple, Ariz.).—*Id.*, Proc. Acad. Nat. Sci. Phila., 1868, 83.—COOPER, Proc. Cal. Acad., 1870,

75.—*Id.*, Birds Cal., 1870, 101.—STEV., U. S. Geol. Surv. Terr., 1870, 464.—COUES, Key N. A. Birds, 1872, 109, f. 50.—SNOW, Birds Kan., 1872, 8.—AIKEN, Proc. Bost. Soc. Nat. Hist., 1872, 197.—BD., BREW., & RIDG., N. A. Birds, i, 1874, 317, pl. xvi, f. 34.—YARROW & HENSHAW, Rep. Orn. Specs., 1872, Wheeler's Exped., 1874, 11.—HENSHAW, An. Lyc. Nat. Hist. N. Y., xi, 1874, 4.—*Id.*, An. List Birds Utah, 1872, Wheeler's Exped., 1874, 42.—*Id.*, Rep. Orn. Specs., 1873, Wheeler's Exped., 1874, 59, 75, 103.—COUES, Birds Northwest, 1874, 79.

Wilsonia pusilla, ALLEN, Bul. Mus. Comp. Zool., 1872, 175.

Stated by Mr. Allen to be a common inhabitant of the Colorado Mountains, breeding from about 8,000 feet up to about timber line. Said also by Dr. Coues to be a common summer resident in the mountainous districts of Arizona from May till September. The species has never been met with by our parties other than as a spring or fall migrant, as which it is exceedingly abundant, and seemingly pursues its way north or south without reference to locality, being found from the mountain tops to the lowest valleys. That some remain in Arizona to breed, retiring for this purpose to the summits of the high mountain ranges, seems quite probable; for I have met with individuals early in August which could hardly at this date have made their way from very far north, while, by the middle of this month, the species abounds everywhere, being much more widely diffused and in greater numbers than it ever is in the East.

No.	Sex.	Locality.	Date.	Collector.	Wing.	Tail.	Bill.	Tarsus.
81	♀ ad.	Denver, Colo.	May 14, 1873	H. W. Henshaw	2. 21	2. 14	0. 40	0. 70
161	♀ ad.	Fort Garland, Colo....	May 28, 1873	..... do	2. 17	2. 18	0. 40	0. 65
162	♂ ad.	..... do .....	..... do .....	..... do	2. 12	2. 19	0. 35	0. 68
163	♂ ad.	..... do .....	..... do .....	..... do	2. 25	2. 07	0. 38	0. 68
44	♂ ad.	South Park, Colo	June 24, 1873	Dr. J. T. Rothrock....	2. 23	2. 17	0. 39	0. 73
671	♂ jun.	Camp Apache, Ariz....	Sept. 1, 1873	H. W. Henshaw.....	2. 20	2. 15	0. 38	0. 73
693	♀ jun.	..... do	Sept. 3, 1873	..... do	2. 16	2. 16	0. 40	0. 65
757	♀ jun.	Thirty miles south of Camp Apache, Ariz.	..... do	M. N. Maguet.....	2. 13	2. 05	0. 37	0. 67
115	♂ ad.	Camp Bowie, Ariz	Oct. 6, 1873	Dr. C. G. Newberry ..	2. 17	2. 15	0. 35	0. 66
519	♂	Camp Crittenden, Ariz.	Aug. 28, 1874	H. W. Henshaw.....	.....	.....	.....	.....
533	♀	..... do	Aug. 30, 1874	J. M. Rutter .....	.....	.....	.....	.....
569	.....	..... do	Sept. 1, 1874	H. W. Henshaw.....	.....	.....	.....	.....

SETOPHAGA RUTICILLA (L.).

Redstart.

Motacilla ruticilla, LINN., Syst. Nat., 10th ed., 1758, 186 (CATESBY, Car., tab. 67).
Setophaga ruticilla, WOODH., Sitgreave's Exp. Zuñi & Col. Riv., 1854, 75.—BAIRD, Birds N. A., 1858, 297.—HAYD., Trans. Am. Phil. Soc., ii, 1862, 161.—BD., Rev. Am. Birds, i, 1865, 256.—COOPER, Am. Nat., Aug., 1869, 33 (Fort Union, N. M.; breeding; obtained 8 nests).—STEV., U. S. Geol. Surv. Terr., 1870, 463.—COUES, Key N. A. Birds, 1872, 110.—ALLEN, Bull. Mus. Comp. Zoöl., 1872, 175 (Eastern Kansas; Colorado; Utah).—SNOW, Birds Kan., 1872, 8.—BD., BREW., & RIDG., N. A. Birds, i, 1874, 322, pl. xvi, f. 5.—YARROW & HENSHAW, Rep. Orn. Specs., 1872, Wheeler's Exped., 1874, 11.—HENSHAW, An. Lyc. Nat. Hist. N. Y., xi, 1874, 4.—*Id.*, An. List Birds Utah, 1872, Wheeler's Exped., 1874, 42.—*Id.*, Rep. Orn. Specs., 1873, Wheeler's Exped., 1874, 75.—ALLEN, Proc. Bost. Soc. Nat. Hist., June, 1874, 15, 23.—COUES, Birds Northwest, 1874, 81.

In Utah, the Redstart appears to be of rather frequent occurrence in the wooded section of the lowlands, especially in the alder thickets, along many of the streams. I did not see it at Denver nor in the vicinity of Fort Garland; though on the Huerfano River, eighty miles northeast of that post, it occurred in numbers May 23, and doubtless remains there throughout the summer. Farther south, it has been found in New Mexico, at Fort Union, as above cited. It has not been detected in Arizona.

No.	Sex.	Locality.	Date.	Collector.	Wing.	Tail.	Bill.	Tarsus.
122	♂ ad.	Provo, Utah.....	July 29, 1872	H. W. Henshaw and Dr. H. C. Yarrow.	.....	.....	.....	.....

SETOPHAGA PICTA, Swains.

Painted Flycatcher.

Setophaga picta, SWAINS., Zoöl. Ill., 2d ser., i, 1829, pl. iii.—KAUP, Proc. Zoöl. Soc., 1851, 50.—BD., U. S. & Mex. Bound. Surv., ii, pt. ii, 1859, Birds, 11.—SCLAT., Proc. Zoöl. Soc., 1856, 66.—*Id.*, *ib.*, 1858, 299 (Oaxaca).—*Id.*, Cat., 1861, 36, No. 221 (Guatemala).—BD., Birds N. A., 1858, 298, pl. lxxvii, f. 2.—SCLAT. & SALVIN, Ibis, 1859, 12 (Guatemala).—BD., Rev. Am. Birds, i, 1865, 256.—RIDG., Am. Nat., vi, 1872, 436.—COUES, Key N. A. Birds, 1872, 110.—*Id.*, Am. Nat., vii, 1873, 325 (Tucson, Ariz.; Bendire).—HENSHAW, Rep. Orn. Specs., 1873, Wheeler's Exped., 1874, 104.—BD., BREW., & RIDG., N. A. Birds, 1874, iii, app. 507.

Muscicapa leucomus, GIRAUD, Birds Texas, 1841, pl. vi, f. 1.—SCLAT., Proc. Zoöl. Soc., 1855, 66.

HAB.—All Mexico ; Guatemala ; Arizona.

This beautiful flycatcher has as yet been observed in our territory only in the southeastern portion of Arizona, where it is diffused over a considerable extent of country as a summer resident. It appears not to inhabit the high mountains nor the extreme lowlands, but to occupy an intermediate position, and to find the rocky hills covered with a sparse growth of oak most congenial to its habits. Of its breeding habits, nothing is known ; though that it rears its young in such localities as above mentioned there can be no doubt, since I have taken the young birds in the first plumage, and still under charge of the parents, at Rock Cañon, July 21, and again of the same age at Camp Crittenden, August 29. During the latter part of August, they appear to become more numerous ; this being due to their more general distribution at the close of the nesting season. By the latter part of September, very few remain ; and probably the species winters far to the southward. Their motions are an almost exact reflection of those of the common Redstart, which they so much resemble in form.

With half shut wings and outspread tail, they pass rapidly along the limbs of trees, now and then making a sudden dart for a passing fly, which secured they again alight and resume their search. They are constantly in motion, and rarely remain in the same tree many moments. It not infrequently may be seen clinging to the trunk of a tree while it seizes a grub or minute insect which its sharp eyes have detected hidden in the bark.

Bill and feet black.

The adult plumage of the sexes differs little, though the coloration in the female is quite perceptibly duller throughout. The black is less lustrous ; the wings are blackish brown instead of pure black ; the white on the wing confined to the coverts, and only just visible on the edges of the secondaries.

Young male, first plumage : upper parts dull black, only slightly lustrous ; white nearly as in the adult, viz, a spot on the lower eye lid, a patch on the wing, including the greater and middle coverts, the outer edge of first primary only, the outer edges of the secondaries, the inside of wings,

axillars, crissum, tibiæ, outer tail feathers except at base, and a diminishing space on the second and third, white.

No.	Sex.	Locality.	Date.	Collector.	Wing.	Tail.	Bill.	Tarsus.
651	♂ jun.	Camp Apache, Ariz ...	Aug. 29, 1873	Lieut. W. C. Manning	2. 70	2. 55	0. 36	0. 60
732	♂ ad.	Thirty miles south of Camp Apache, Ariz.	Sept. 10, 1873	H. W. Henshaw.....	2. 82	2. 66	0. 40	0. 64
740	♂ ad.	.....do .....	.....do .....	.....do	2. 73	2. 64	0. 38	0. 61
741	.....	.....do	Sept. 11, 1873	.....do	2. 70	2. 70	0. 37	0. 60
166	♀ ad.	Rock Cañon, Ariz.....	July 20, 1874	.....do	2. 72	2. 58	0. 41	0. 66
192	♀ jun.	.....do	July 21, 1874	.....do	2. 78	2. 78	0. 40	0. 65
527	♂ jun.	Near Camp Crittenden, Ariz.	Aug. 29, 1874	.....do	2. 76	2. 62	0. 40	0. 66
540	♀ ad.	.....do	Aug. 30, 1874	.....do	2. 70	2. 40	0. 38	0. 65
887	♀ ad.	Mount Graham, Ariz..	Sept. 25, 1874	.....do	2. 75	2. 73	0. 40	0. 63

CARDELLINA RUBRIFRONS (Giraud).

Red-faced Warbler.

Muscicapa rubrifrons, GIRAUD, Birds Texas, 1841, pl. vii, f. 1 (Northeast Mexico?).

Cardellina rubrifrons, SCLAT., Proc. Zool. Soc., 1855, 66.—*Id.*, *ib.*, 1858, 299 (Oaxaca).—

Id., *ib.*, 1859, 374 (Oaxaca).—*Id.*, Cat., 1861, 37, No. 229.—*BD.*, Rev. Am. Birds, i, 1865, 264.

Cardellina amicta, ("DUBUS., MSS.")—*BON.* Consp., 1850, 312.

Parus erythropis, LICHT., MSS. (Mus. Berlin).

HAB.—Mexico; Guatemala; Arizona.

SP. CHAR.—Male: above, grayish ash; a nuchal patch, rump, and under parts white; the latter, especially, tinged with rosy; a broad hood of black over top of head, passing down over the ears, and leaving the forehead, lores, eyelids, and sides of neck bright red; inside of wings white, which also tips the middle coverts, thus forming a band; sides of body ashy. Female somewhat duller. In fall, the white nuchal patch is obscured by an ashy suffusion, and in some specimens is scarcely visible. Iris black; bill black; lower mandible lighter; legs dark-brown.

Specimens from Mexico and farther south appear to be perceptibly brighter.

Young birds in the first plumage have the ash above perceptibly tinged with reddish; the red on the head in patches, and not well defined. In one specimen (No. 103), the greater wing coverts are tipped with white, thus forming a second wing band.

This is another of the species which was attributed to Texas by Giraud as above cited. Its occurrence in Arizona is certainly not surprising, since it is known to be a common inhabitant of the mountains of Mexico. It without doubt follows the trend of the mountain ranges northward, and

may, I think, be expected to occur in greater or less abundance throughout the higher mountainous districts of Southern Arizona, extending up at least as far as into the White Mountains. I met with the species at two points, near Camp Apache, and again on Mount Graham, a point some two hundred miles to the south. At the former place, several specimens were captured, including the young in nesting plumage, thus indicating that they breed in the vicinity. My note book contains the following :

July 1.—While collecting in the early evening in the pine woods, a few angry chirps coming from the thick foliage of a spruce attracted my attention, and in a moment a robin flew out in hot haste closely followed by a small bird, which after a short chase returned, and with a few satisfied chirps called together several young, whose presence I for the first time was thus made aware of. The old bird immediately began to search for food, moving like a Chickadee over the limbs, and flying out now and then for a short distance to snap up an insect, which was instantly given to one or the other of the several young that, with beseeching notes and cries, followed the old one about as it moved from one part of the tree to another. Soon perceiving that the birds were entire strangers to me, I shot first the old bird, which proved to be a male, and then two of the young, when the female appeared on the scene, and led away the two remaining members of the brood in safety. The following day a careful search revealed but two more individuals, both adult.

Just a month later, on visiting Mount Graham, I not only saw the species again, but it proved to be a common bird of this locality, flocks of ten or fifteen not being unusual among the pines and spruces; it frequented these trees almost exclusively, only rarely being seen on the bushes that fringed the streams. Its habits are a rather strange compound, now resembling those of Warblers, again recalling the Redstarts, but more often perhaps bringing to mind the less graceful motions of the familiar Titmice. Their favorite hunting places appeared to be the extremities of the limbs of the spruces, over the branches of which they passed with quick motion, and a peculiar and constant sidewise jerk of the tail.

When thus engaged, especially when high overhead, they might easily be passed by, as a busy group of Titmice intent only on satisfying their

hunger. They appear to obtain most of their food from the branches, seizing the insects when at rest; but they are abundantly able to take their prey on the wing, and accomplish this much after the style of the Redstarts. Their disposition seems to prompt them to sociability with other species, and occasionally I found them accompanying the Audubon's Warblers, and imitating them in their short flights from tree to tree, occasionally paying flying visits to the fallen logs and even to the ground. Save in being rather louder and harsher, their chirps resemble the notes of the Yellow-rump Warblers.

No.	Sex.	Locality.	Date.	Collector.	Wing.	Tail.	Bill.	Tarsus.
102	♂ ad.	Mts. near Apache, Ariz	July 12, 1874	H. W. Henshaw	2.59	2.45	0.38	0.70
103	♂ jun.	.....do .....	.....do .....	.....do	2.66	2.41	0.36	0.64
104	♂ jun.	.....do .....	.....do .....	.....do	2.55	2.40	0.30	0.65
124	♀ ad.	.....do	July 13, 1874	.....do	2.53	2.42	0.34	0.65
125	♂ jun.	.....do .....	.....do .....	.....do	2.58	2.45	0.36	0.65
269	♂	.....do	Aug. 2, 1874	.....do	2.72	2.72	0.37	0.65
211	♀ jun.	Mount Graham, Ariz	Aug. 3, 1874	.....do	2.58	2.58	0.36	0.68
248	♂ jun.	.....do .....	.....do .....	.....do	2.73	2.52	0.36	0.65
249	♀	.....do .....	.....do .....	.....do	2.57	2.45	0.35	0.70
250	♀	.....do .....	.....do .....	.....do	2.55	2.32	0.38	0.67
268	.....	.....do .....	.....do .....	.....do	2.55	2.33	0.37	0.70
270	♂	.....do .....	.....do .....	.....do	2.64	2.53	0.35	0.65
272	♀	.....do .....	.....do .....	.....do	2.63	2.52	0.35	0.65
282	♂	.....do .....	.....do .....	.....do	2.55	2.47	0.37	0.68
283	.....	.....do .....	.....do .....	.....do	2.63	2.50	0.35	0.68
284	♂	.....do .....	.....do .....	.....do	2.66	2.53	0.34	0.66

FAM. HIRUNDINIDAE: SWALLOWS.

PROGNE SUBIS, (L.).

Purple Martin.

Hirundo subis, LINN., Syst. Nat., 10th ed., 1758, 192 (*Hirundo caerulea canadensis*, EDWARDS Av., tab. 120, Hudson's Bay).

Progne subis, BD., Rev. Am. Birds, i, 1865, 274.—COUES, Proc. Acad. Nat. Sci. Phila., 1866, 72 (Fort Whipple, Ariz.).—STEV., U. S. Geol. Surv. Terr., 1870, 463.—BD., BREW., & RIDG., N. A. Birds, i, 1874, 329, pl. xvi, f. 10.—YARROW & HENSHAW, Rep. Orn. Specs., 1872, Wheeler's Exped., 1874, 12.—HENSHAW, An. Lyc. Nat. Hist. N. Y., xi, 1874, 4.—*Id.*, An. List Birds Utah, 1872, Wheeler's Exped., 1874, 42.—*Id.*, Rep. Orn. Specs., 1873, Wheeler's Exped., 1874, 104.—ALLEN, Proc. Bost. Soc. Nat. Hist., June, 1874, 24.

Progne purpurea, WOODH., Sitgreave's Exp. Zuñi & Col. Riv., 1854, 65.—NEWB., P. R. R. Rep., vi, 1857, 79.—BD., Birds N. A., 1858, 314.—*Id.*, Proc. Acad. Nat. Sci. Phila., 1859, 303 (Cape Saint Lucas).—XANTUS, Proc. Acad. Nat. Sci. Phila., 1859, 191 (Fort Tejon, Cal.).—HEERM., P. R. R. Rep., x, pt. ii, 1859, 35.—BD., U. S. & Mex. Bound. Surv., ii, pt. iv, 1859, Birds, 11.—HENRY, Proc. Acad. Nat. Sci. Phila., 1859, 106 (New Mexico).—COOP. & SUCKL., P. R. R. Rep., xii, pt. ii, 1860, 186.—HAYD., Trans. Am. Phil. Soc. xii, 1862, 162.—COOPER, Birds Cal., 1870, 113.—COUES, Key N. A. Birds, 1872, 114.—SNOW, Birds Kan., 1872, 8.—COUES, Birds Northwest, 1874, 91.

Progne chalybea?, NEWB., P. R. R. Rep., vi, 1857, 79.

This species is universally distributed throughout all the United States, and in the West its abundance appears to be fully as great as in the East. It occurs throughout Utah, being found in the vicinity of the towns, and breeding plentifully in boxes placed for its convenience, as at Salt Lake City, or retiring in large colonies to the solitudes of the mountains, where, in the old pine and aspen woods, it finds abundant accommodation for rearing its young in the abandoned Woodpecker's holes. Wherever found, it is never content to remain isolated in pairs, but associates together in colonies of greater or less number. Farther south, in New Mexico and Arizona, they are of no less common occurrence, but seemingly are more confined to the mountains, though this perhaps is due to the lack of timber in the lowlands, and a consequent want of the necessary facilities for rearing the young, rather to any natural preference for high regions. About the middle of August, while in extreme Southeastern Arizona, I noticed each evening immense numbers of these birds and the Cliff Swallows flying swiftly overhead, their course leading them directly south. They only paused now and then to catch an insect, immediately resuming their onward flight. All the actions of these birds seem to indicate that the migration at this early date had fairly begun, yet I have found in quite a number of instances the parents feeding the just fledged young as late as August 22.

No.	Sex.	Locality.	Date.	Collector.	Wing.	Tail.	Bill.	Tarsus.
524	♂ ad.	Camp Apache, Ariz....	Aug. 5, 1873	H. W. Henshaw	5.91	3.35	0.50	0.57
595	♂ jun.	..... do	Aug. 22, 1873	..... do	4.55	2.27	0.41	0.60
77	♂ ad.	Willow Spring, Ariz...	July 12, 1874	..... do	6.22	3.70	0.48	0.61
78	♂ ad.	..... do .....	..... do .....	..... do	6.00	3.50	0.48	0.60

PETROCHELIDON LUNIFRONS (Say).

Cliff-Swallow.

Hirundo lunifrons, SAY, Long's Exp., ii, 1823, 47 (Rocky Mountains).—WOODH., Sitgreave's Exp. Zuñi & Col. Riv., 1854, 64.—BD., Birds N. A., 1858, 309.—HEERM., P. R. R. Rep., x, pt. iv, 1859, 36.—XANTUS, Proc. Acad. Nat. Sci. Phila., 1859, 191 (Fort Tejon, Cal.).—HENRY, Proc. Acad. Nat. Sci. Phila., 1859, 106 (New Mexico).—COOP. & SUCKL., P. R. R. Rep., xii, pt. ii, 1860, 184.—COOPER, Am. Nat., iii, 1869, 33.—*Id.*, Birds Cal., 1870, 104.—STEV., U. S. Geol. Surv. Terr., 1870, 463.—ALLEN, Bull. Mus. Comp. Zool., 1872, 176 (Eastern Kansas; Utah; Colorado).—SNOW, Birds Kan., 1872, 8.—BD., Rev. Am. Birds, i, 1865, 288.—COUES, Proc. Acad. Nat. Sci. Phila., 1866, 72.—*Id.*, Key N. A. Birds, 1872, 114.—HOLD., Proc. Bost. Soc. Nat. Hist., xv, 1872, 197.—MERRIAM, U. S. Geol. Surv. Terr., 1872, 676.—BD., BREW., & RIDG., N. A. Birds, i, 1874, 335, pl. xvi, f. 13.—YARROW & HENSHAW, Rep. Orn. Specs., 1872, Wheeler's Exped., 1874, 11.—HENSHAW, An. Lyc. Nat. Hist. N. Y., xi, 1874, 4.—*Id.*, An. List Birds Utah, 1872, Wheeler's Exped., 1874, 42.—*Id.*, Rep. Orn. Specs., 1873, Wheeler's Exped., 1874, 60, 75, 104.—ALLEN, Proc. Bost. Soc. Nat. Hist., June, 1874, 15, 17, 23.—COUES, Birds Northwest, 1874, 88.

Observed in Snake Valley, Nevada, and in many localities in Middle and Southern Utah, living in colonies, and building their nests at times in inaccessible spots in lofty cliffs, and again in places but a few feet above the plain.

A wide-spread species, both in Arizona and New Mexico, as their mud nests, attached to the cliffs everywhere, attest.

Seen near Fort Garland, Colo., in large numbers, building under the eaves of the post quarters. I noticed here a very curious departure from the usual method of constructing the nest. Under the projecting eaves of one of the store houses, a large colony had established themselves; there being in the neighborhood of fifty nests, most of which were built in the usual fashion. But a few pairs, taking advantage of circumstances, had established themselves in certain small passages, which opened directly under the eaves, and had served as ventilators. The mouth of each one of these had been built up with mud, a small hole being left as an entrance. Some twelve inches beyond was the nest proper, consisting of a small pile of straws and feathers, on which the eggs were deposited. The wisdom of the birds in thus availing themselves of these holes was very clearly demonstrated, since nearly the entire labor of nest making was obviated and a much safer domicile secured.

No.	Sex.	Locality.	Date.	Collector.	Wing.	Tail.	Bill.	Tarsus.
422	♀ ad.	Fort Garland, Colo.....	June 27, 1873	H. W. Henshaw.....	4.28	2.13	0.30	0.45

HIRUNDO HORREORUM, Barton.

Barn Swallow.

Hirundo horreorum, BARTON, Fragments Nat. Hist. Penna., 1799, 17.—BD., U. S. & Mex. Bound. Surv., ii, pt. ii, 1859, Birds, 11.—NEWB., P. R. R. Rep., vi, 1857, 78.—BD., Birds N. A., 1858, 308.—HENRY, Proc. Acad. Nat. Sci. Phila., 1859, 106 (New Mexico).—COOP. & SUCKL., P. R. R. Rep., xii, pt. ii, 1860, 184.—HAYD., Trans. Am. Phil. Soc., xii, 1862, 161.—BD., Rev. Am. Birds, i, 1865, 294.—COUES, Proc. Acad. Nat. Sci. Phila., 1866, 72 (Fort Mojave; Cooper).—COOPER, Am. Nat., iii, 1869, 33 (Montana).—*Id.*, Birds Cal., i, 1870, 103.—COUES, Key N. A. Birds, 1872, 113, f. 54.—ALLEN, Bul. Mus. Comp. Zool., 1872, 176 (Eastern Kansas to Ogden, Utah)—SNOW, Birds Kan., 1872, 8.—MERRIAM, U. S. Geol. Surv. Terr., 1872, 676.—BD., BREW., & RIDG., N. A. Birds, i, 1874, 339, pl. xvi, f. 9.—YARROW & HENSHAW, Rep. Orn. Specs., 1872, Wheeler's Exped., 1874, 11.—HENSHAW, An. Lyc. Nat. Hist. N. Y., xi, 1874, 4.—*Id.*, An. List Birds Utah, 1872, Wheeler's Exped., 1874, 42.—*Id.*, Rep. Orn. Specs., 1873, Wheeler's Exped., 1874, 60, 76, 104.—ALLEN, Proc. Bost. Soc. Nat. Hist., June, 1874, 17, 23.—COUES, Birds Northwest, 1874, 85.

Hirundo rufa, WOODH., Sitgreave's Exp. Zuñi & Col. Riv., 1854, 64.—NEWB., P. R. R. Rep., vi, 1857, 78.—HEERM., P. R. R. Rep., x, pt. ii, 1859, 36.

The Barn Swallow has a very general distribution throughout the Middle Region, but it appears to be nowhere very common. Specimens were secured both in Nevada and Utah at various points, most often in the close vicinity of settlements, where, secure in the protection of man, it builds its nest under the roofs and in the outbuildings. Individuals of the species were quite numerous at Fort Garland, Colo., and at Santa Fé, N. Mex., and also on the road between here and Fort Wingate, where they were seen by Dr. Newberry. This is the most southern point at which we have seen it. It has been detected in Arizona only at Fort Mojave by Dr. Cooper, as above quoted

No.	Sex.	Locality.	Date.	Collector.	Wing.	Tail.	Bill.	Tarsus.
50	♂ ad.	Provo, Utah.....	July 29, 1872	H. W. Henshaw.....	.....	.....	.....	.....
168	o	Fairfield, Utah.....	Aug. 3, 1872	Dr. H. C. Yarrow.....	.....	.....	.....	.....
66	.....	South Park, Colo.....	June 26, 1873	Dr. J. T. Rothrock.....	4.73	4.07	0.28	0.42
161	♂ jun.	Twin Lakes, Colo.....	Aug. —, 1873	.....do.....	4.37	3.10	0.32	0.43

TACHYCINETA BICOLOR (Vieill.).

White-bellied Swallow.

Hirundo bicolor, VIEILL., Ois. Am. Sept., i, 1807, 61, pl. xxxi.—WOODH., Sitgreave's Exp. Zuñi & Col. Riv., 1854, 65.—BD., U. S. & Mex. Bound. Surv., ii, pt. ii, 1854, Birds, 11.—NEWB., P. R. R. Rep., vi, 1857, 78.—BD., Birds N. A., 1858, 310.—XANTUS, Proc. Acad. Nat. Sci. Phila., 1859, 191 (Fort Tejon, Cal.).—HEERM., P. R. R. Rep., x, pt. iv, 1859, 36.—HENRY, Proc. Acad. Nat. Sci. Phila., 1859, 106 (New Mexico).—COOP. & SUCKL., P. R. R. Rep., xii, pt. ii, 1860, 185.—BD., Rev. Am. Birds, i, 1865, 297.—COOPER, Birds Cal., i, 1870, 106.—ALLEN, Bul. Mus. Comp. Zool., 1872, 176.—SNOW, Birds Kan., 1872, 8.

Tachycineta bicolor, COUES, Key N: A. Birds, 1872, 113.—YARROW & HENSHAW, Rep. Orn. Specs., 1872, Wheeler's Exped., 1874, 11.—HENSHAW, An. Lyc. Nat. Hist. N. Y., xi, 1874, 4.—*Id.*, An. List Birds Utah, 1872, Wheeler's Exped., 1874, 42.—HENSHAW, Rep. Orn. Specs., 1873, Wheeler's Exped., 1874, 76.—ALLEN, Proc. Bost. Soc. Nat. Hist., June, 1874, 29.—COUES, Birds North-west, 1874, 86.

Found at Fairfield, Utah, early in August, and at Provo in same month. Rather common.

In Southern Colorado, the species was not uncommon, though perhaps the rarest of the swallows. Here, instead of being found near the habitations of man, it appeared to seek the solitude of the wild districts, and, in company with the succeeding species, to find a home in the hollows of the trees and deserted Woodpecker's holes. Its presence was not detected at a higher elevation than 8,000 feet. Captain Bendire informs me that this species occurs about Tucson as a summer visitor, and breeds.

No.	Sex.	Locality.	Date.	Collector.	Wing.	Tail.	Bill.	Tarsus.
83	♀ ad.	South Park, Colo:.....	July 1, 1873	Dr. J. T. Rothrock.....	4.55	2.50	0.25	0.47

TACHYCINETA THALASSINA (Sw.).

Violet-green Swallow.

Hirundo thalassina, SWAINS., Phil. Mag., i, 1827, 365 (Mexico).—WOODH., Sitgreave's Exp. Zuñi & Col. Riv., 1854, 64.—BD., U. S. & Mex. Bound. Surv., ii, pt. ii, 1859, Birds, 11.—NEWB., P. R. R. Rep., vi, 1857, 78.—BD., Ives' Col. Exped., 1857-58, pt. iv, 5.—*Id.*, Birds N. A., 1858, 311.—HEERM., P. R. R. Rep., x, pt. ii, 1859, 36.—BD., Proc. Acad. Nat. Sci. Phila., 1859, 303 (Cape Saint

Lucas).—XANTUS, Proc. Acad. Nat. Sci. Phila., 1859, 191 (Fort Tejon, Cal.).—HENRY, Proc. Acad. Nat. Sci. Phila., 1859, 106 (New Mexico).—COOP. & SUCKL., P. R. R. Rep., xii, pt. ii, 1860, 183.—BD., Rev. Am. Birds, i, 1865, 299.—COOPER, Proc. Cal. Acad., 1870, 75.—*Id.*, Birds Cal., ii, 1871, 107.—ALLEN, Bull. Mus. Comp. Zoöl., 1872, 176.

Tachycineta thalassina, COUES, Proc. Acad. Nat. Sci. Phila., 1866, 72.—*Id.*, Key N. A. Birds, 1872, 113.—MERRIAM, U. S. Geol. Surv. Terr., 1872, 677 (Ogden Cañon, Utah).—BD., BREW., & RIDG., N. A. Birds, i, 1874, 347, pl. xvi, f. 11.—HENSHAW, Rep. C. m. Specs., 1873, Wheeler's Exped., 1874, 60, 76, 104.—*Id.*, An. Lyc. Nat. Hist. N. Y., xi, 1874, 4.—*Id.*, An. List. Birds Utah, 1872, Wheeler's Exped., 1874, 42.—COUES, Birds Northwest, 1874, 86.—ALLEN, Proc. Bost. Soc. Nat. Hist., June, 1874, 23.

This species was first seen in the vicinity of Denver on the 12th of May.

In Southern Colorado, a few pairs were seen during the breeding-season in the same localities as the White-bellied Swallow. This species, however, attains a much higher altitude, and at 10,000 feet I found it very common and in large colonies. June 7, they had not begun to build, though evidently about to do so in the high pine stubs.

In Utah, New Mexico, and Arizona, this swallow inhabits the higher regions, being met with in abundance everywhere in suitable localities. It prefers the open spaces in the pine woods or along its edges, and occasionally makes its homes in the oak groves, building its nest most usually in the holes abandoned by Woodpeckers.

No.	Sex.	Locality.	Date.	Collector.	Wing.	Tail.	Bill.	Tarsus.
254	♂ ad.	Mountains near Fort Garland, Colo.	June 5, 1873	H. W. Henshaw.....	4.60	1.98	0.23	0.41
255	♂ ad.	.....do.....	.....do.....	.....do.....	4.55	2.06	0.22	0.42
256	♂ ad.	.....do.....	.....do.....	.....do.....	4.51	2.07	0.23	0.40
257	♂ ad.	.....do.....	.....do.....	.....do.....	4.45	2.05	0.25	0.40
258	♂ ad.	.....do.....	.....do.....	.....do.....	4.70	2.15	0.21	0.37
259	♀ ad.	.....do.....	.....do.....	.....do.....	4.45	1.95	0.22	0.42
260	♀ ad.	.....do.....	.....do.....	.....do.....	4.20	2.00	0.20	0.44
279	♀ ad.	.....do.....	June 6, 1873	.....do.....	4.22	1.90	0.20	0.43
458	♂ ad.	Neutria, N. Mex.....	July 19, 1873	.....do.....	4.50	2.07	0.25	0.40
34	♂ ad.	Pueblo, Colo.....	July 26, 1874	C. E. Aiken.....	4.55	2.11	0.22	0.38
35	♂ ad.	.....do.....	July 27, 1874	.....do.....	4.45	2.12	0.23	0.33
36	♂ ad.	.....do.....	.....do.....	.....do.....	4.72	2.10	0.25	0.40
117	♂ jun.	Sangre de Cristo Pass, Colo.	Aug. 9, 1874	.....do.....	.....	.....	.....	.....

STELGIDOPTERYX SERRIPENNIS (Aud.).

Rough-winged Swallow.

Hirundo serripennis, AUD., Orn. Biog., iv, 1838, 593.

Cotyle serripennis, BD., U. S. & Mex. Bound. Surv., ii, pt. ii, 1859, Birds, 11.—NEWB., P. R. R. Rep., vi, 1857, 79.—BD., Birds N. A., 1858, 313.—HEERM., P. R. R. Rep., x, pt. iv, 1859, 36.—KENNERLY, P. R. R. Rep., Whipple's Route, x, 1859, 24.—COOP. & SUCKL., P. R. R. Rep., xii, pt. ii, 1860, 186.—COOPER, Proc. Cal. Acad., 1870, 75.—*Id.*, Birds Cal., 1870, 110.—ALLEN, Bull. Mus. Comp. Zoöl., 1872, 176 (Eastern Kansas).—SNOW, Birds Kan., 1872, 8.

Stelgidopteryx serripennis, BD., Rev. Am. Birds, i, 1865, 314.—COUES, Proc. Acad. Nat. Sci. Phila., 1866, 73 (Fort Whipple, Ariz.).—*Id.*, Key N. A. Birds, 1872, 114.—BD., BREW., & RIDG., N. A. Birds, i, 1874, 350, pl. xvi, f. 12.—YARROW & HENSHAW, Rep. Orn. Specs., 1872, Wheeler's Exped., 1874, 11.—HENSHAW, An. Lyc. Nat. Hist. N. Y., xi, 1874, 4.—*Id.*, An. List Birds Utah, 1872, Wheeler's Exped., 1874, 42.—*Id.*, Rep. Orn. Specs., 1873, Wheeler's Exped., 1874, 60, 77, 105.—COUES, U. S. Geol. Surv. Terr., 1874, 90.

Exceedingly abundant on the Provo River, Utah, where they roost in large numbers upon the dead bushes along the banks. So numerous are they and so closely do they sit huddled together that six individuals were secured at a single shot. They were observed on the wing in pursuit of insects, far into the evening, even when so dark that they could with difficulty be distinguished. Also noticed in Western Utah and Eastern Nevada.

First seen about Denver the 6th of May, and common about the 12th. In Southern Colorado, the species was represented by numerous individuals, which usually confined their flight to the near vicinity of streams. I noticed them several times in suspicious proximity to some dead stubs; and, though I never saw one entering the cavities, many of which had been appropriated by the Violet-green Swallows, I think it quite probable that they had recourse to this means of nidification in the absence of banks suitable for their excavations. Many seen near Zuñi, N. Mex.; and its range probably includes both this Territory and Arizona. At Fort Whipple, Ariz., it was found breeding by Dr. Coues, who observed its arrival late in April.

No.	Sex.	Locality.	Date.	Collector.	Wing.	Tail.	Bill.	Tarsus.
90	♂ ad.	Provo, Utah.....	July 26, 1872	H. W. Henshaw and Dr. H. C. Yarrow.	.....	.....	.....	.....
89	♂ ad.	.....do.....	.....do.....	.....do.....	.....	.....	.....	.....
95	♂ ad.	.....do.....	.....do.....	.....do.....	.....	.....	.....	.....
91	♀ jun.	.....do.....	.....do.....	.....do.....	.....	.....	.....	.....
167	o	Fairfield, Utah.....	Aug. 3, 1872	Dr. H. C. Yarrow.....	.....	.....	.....	.....
A 14	.....	(Alcoholic).....	——, 1873	H. W. Henshaw and Dr. H. C. Yarrow.	.....	.....	.....	.....
60	♀ ad.	Pueblo, Colo.....	July 29, 1874	C. E. Aiken.....	.....	.....	.....	.....

COTYLE RIPARIA (L.).

Bank Swallow.

Hirundo riparia, LINN., Syst. Nat., i, 1766, 344.

Cotyle riparia, WOODH., Sitgreave's Exp. Zuñi & Col. Riv., 1854, 65.—NEWB., P. R. R. Rpt., vi, 1857, 78.—BD., Birds N. A., 1858, 313.—HEERM., P. R. R. Rep., x, pt. iv, 1859, 36.—HENRY, Proc. Acad. Nat. Sci. Phila., 1859, 106 (New Mexico).—HAYD., Trans. Am. Phil. Soc., xii, 1862, 162.—BD., Rev. Am. Birds, i, 1865, 319.—COUES, Proc. Acad. Nat. Sci. Phila., 1866, 72 (rare; Fort Whipple, Ariz.).—COOPER, Birds Cal., i, 1870, 110.—COUES, Key N. A. Birds, 1872, 114.—ALLEN, Bul. Mus. Comp. Zool., 1872, 176 (Eastern Kansas).—SNOW, Birds Kan., 1872, 8.—AIKEN, Proc. Bost. Soc. Nat. Hist., 1872, 198.—MERRIAM, U. S. Geol. Surv. Terr., 1872, 677 (Salt Lake).—YARROW & HENSHAW, Rep. Orn. Specs., 1872, Wheeler's Exped., 1874, 11.—HENSHAW, An. Lyc. Nat. Hist. N. Y., xi, 1874, 4.—*Id.*, An. List Birds Utah, 1872, Wheeler's Exped., 1874, 42.—ALLEN, Proc. Bost. Soc. Nat. Hist., June, 1874, 17, 24.—COUES, Birds Northwest, 1874, 89.

This species appears to be far more distinctively eastern in its distribution than the preceding, though several citations, as above given, show its occurrence in the Far West, even in California. In nearly every case, however, their numbers when compared with the Rough-winged are small. On the Provo River, Utah, it was observed by Dr. Yarrow and myself to be quite common and intimately associated with the Rough-winged Swallows, both species breeding in the same banks together. Indeed, the flight and general appearance of the two are so much alike that when both species were found skimming the surface of the river together it needed the most careful scrutiny to distinguish them.

No.	Sex.	Locality.	Date.	Collector.	Wing.	Tail.	Bill.	Tarsus.
96	Provo, Utah.....	July 23, 1871	H. W. Henshaw and Dr. H. C. Yarrow.	.....	.....	.....	.....

FAM. VIREONIDAE: VIREOS.

VIREO GILVUS (Vieill.), var. SWAINSONI, Bd.

Western Warbling Vireo.

Vireo swainsonii, BD., Birds N. A., 1858, 336 (in text; Pacific coast).—COUES, Ibis, 1865, 164 (Arizona).—*Id.*, Proc. Acad. Nat. Sci. Phila., 1866, 73 (Arizona).

Vireosylva swainsonii, BD., Rev. Am. Birds, i, 1866, 343.—STEV., U. S. Geol. Surv. Terr., 1870, 464 (Wyoming).—AIKEN, Proc. Bost. Soc. Nat. Hist., 1872, 193 (Colorado).

Vireosylva gilva var. *swainsoni*, COOPER, Birds Cal., i, 1870, 116.

Vireo gilvus var. *swainsoni*, COUES, Key N. A. Birds, 1872, 121, f. 64.—BD., BREW., & RIDG., N. A. Birds, i, 1874, 371.—YARROW & HENSHAW, Rep. Orn. Specs., 1872, Wheeler's Exped., 1874, 12.—HENSHAW, Rep. Orn. Specs., 1873, Wheeler's Exped., 1874, 77, 105.—*Id.*, An. Lyc. Nat. Hist. N. Y., xi, 1874, 4.—*Id.*, An. List Birds Utah, 1872, Wheeler's Exped., 1874, 43.—COUES, Birds Northwest, 1874, 98.

Vireo gilvus, COOP. & SUCKL., Nat. Hist. Wash. Terr., 1859, 188.—XANTUS, Proc. Acad. Nat. Sci. Phila., 1859, 191 (Fort Tejon, Cal.).—HEERM., P. R. R. Rep., x, pt. iv, 1859, 55.—HENRY, Proc. Acad. Nat. Sci. Phila., 1859, 106 (New Mexico).—COOPER, Am. Nat., iii, 1869, 35.—ALLEN, Bull. Mus. Comp. Zool., iii, 1872, 156, 176 (Kansas; Colorado; Utah), (includes both varieties).

This vireo is the most abundant and widely distributed of its tribe throughout the Middle Region, and has been met with in every section through which the expedition has passed. In Utah, it is abundant; and here it often finds its home in the gardens and streets of the towns, thus exhibiting the same traits of confiding familiarity which attach to it in the East. It is, however, equally numerous in the wild uncultivated districts where man has not yet penetrated. It frequents, for the most part, the deciduous trees, especially the cottonwoods, and ranges from the valleys high up into the mountains, and the species is almost as strongly represented numerically at 10,000 feet as at a lower altitude. Its habits are everywhere the same, and the sweet, half meditative notes of its beautiful song

have the same power to charm the ear in the solitude of its wild home as when heard under the more familiar conditions of civilization.

No.	Sex.	Locality.	Date.	Collector.	Wing.	Tail.	Bill.	Tarsus.
64	♂ jun.	Wahsatch Mts., Utah..	Aug. 11, 1872	H. W. Henshaw.....	.....	.....	.....	.....
B	.....	Meadow Creek, Utah..	Sept. 15, 1872	Dr. H. C. Yarrow.....	.....	.....	.....	.....
231	♀ ad.	Near Ft. Garland, Colo	May 3, 1873	H. W. Henshaw.....	2. 76	2. 16	0. 42	0. 70
138	♂ ad.	..... do	May 26, 1873	..... do	2. 83	2. 27	0. 43	0. 68
175	♂ ad.	..... do	May 29, 1873	..... do	2. 73	2. 27	0. 45	0. 66
195	♀ ad.	..... do .....	..... do .....	..... do	2. 60	2. 20	0. 43	0. 66
196	♂ ad.	..... do	May 30, 1873	..... do	2. 80	2. 25	0. 43	0. 69
232	♂ ad.	..... do	June 5, 1873	..... do	2. 85	2. 30	0. 40	0. 70
278	♀ ad.	..... do	June 6, 1873	..... do	2. 75	2. 17	0. 42	0. 70
380	♂ ad.	..... do	June 19, 1873	..... do	2. 84	2. 19	0. 42	0. 69
389	♂ ad.	..... do	June 21, 1873	..... do	2. 83	2. 27	0. 43	0. 68
557	♂ ad.	White Mts., Ariz.....	Aug. 11, 1873	..... do	2. 67	2. 15	0. 43	0. 65
558	♀	..... do .....	..... do .....	..... do	2. 50	1. 95	0. 45	0. 66
72	♀ ad.	Willow Spring, Ariz....	July 12, 1874	H. W. Henshaw.....	.....	.....	.....	.....
74	♂ ad.	..... do .....	..... do .....	..... do .....	.....	.....	.....	.....
53	♀ ad.	Pueblo, Colo	July 28, 1874	C. E. Aiken.....	2. 80	2. 13	0. 45	0. 69
274	Jun.	Mount Graham, Ariz..	Aug. 3, 1874	..... do .....	.....	.....	.....	.....
329	♀	Camp Bowie, Ariz	Aug. 31, 1874	Dr. J. T. Rothrock....	.....	.....	.....	.....
158	♂ jun.	Indian Creek, Colo....	Aug. 14, 1874	..... do	2. 92	2. 30	0. 42	0. 65
518	♀ ad.	Near Camp Crittenden, Ariz.	Aug. 28, 1874	H. W. Henshaw.....	.....	.....	.....	.....
549	♂	..... do	Aug. 31, 1874	..... do .....	.....	.....	.....	.....
569	.....	..... do	Sept. 1, 1874	..... do .....	.....	.....	.....	.....
692	♂	Camp Lowell, Ariz.....	Sept. 11, 1874	..... do .....	.....	.....	.....	.....

VIREO SOLITARIUS (Wils.).

Solitary Vireo.

Muscicapa solitaria, WILS., Am. Orn., ii, 1810, 143, pl. xvii, f. 6.

Vireo solitarius, BD., Birds N. A., 1858, 340.—HEERM., P. R. R. Rep., x, pt. ii, 1859, 55.—COOP. & SUCKL., P. R. R. Rep., xii, pt. ii, 1860, 189.—HAYD., Trans. Am. Phil. Soc., xii, 1862, 163.—COOPER, Proc. Cal. Acad., 1870, 175.—COUES, Key N. A. Birds, 1872, 66, 121.—SNOW, Birds Kan., 1872, 8.—COUES, Birds Northwest, 1874, 99.

Vireosylvia solitaria, COOPER, Birds Cal., 1870, 117.

Ianivireo solitarius, BD., BREW., & RIDG., Birds N. A., i, 1874, 373.

The Solitary Vireo appears to occur in the Southern Rocky Mountains only as a migrant, and to be wholly replaced there in summer by the nearly allied variety, the plumbeous *Vireo* (var. *plumbeus*). In its course southward

from its northern breeding ground, it appears to follow the mountain ranges, and to confine itself to the pine region. During the latter part of September, I found the species occurring quite numerously at Mount Graham, where it was seen only among the lofty pines, usually accompanying other birds, as the Audubon's Warbler and Nuthatches. It could scarcely be said to be in song yet; as it moved about from branch to branch, it occasionally paused to give utterance to a few strains, which, though broken and detached, were sufficient to bring to mind the beautiful melody to be heard from this bird in the vernal season—in variety and richness of notes not surpassed by the song of any of the family.

No.	Sex.	Locality.	Date.	Collector.	Wing.	Tail.	Bill.	Tarsus.
790	.....	Mount Graham, Ariz ..	Sept. 20, 1874	H. W. Henshaw.....	2. 83	2. 25	0. 43	0. 73
803	♂	..... do	Sept. 23, 1874	..... do	2. 95	2. 20	0. 40	0. 78
815	♂	..... do .....	..... do .....	..... do	2. 80	2. 17	0. 50	0. 75
817	♂	..... do .....	..... do .....	..... do	2. 70	2. 20	0. 52	0. 72
857	♂ ad.	..... do	Sept. 24, 1874	..... do	2. 85	2. 32	0. 44	0. 73
888	.....	..... do	Sept. 25, 1874	..... do	2. 95	2. 33	0. 43	0. 73
889	♀	..... do .....	..... do .....	..... do	2. 90	2. 27	0. 43	0. 73

VIREO SOLITARIUS (Wils.), var. (?) CASSINI, Bd.

Cassin's Vireo.

Vireo cassinii, XANTUS, Proc. Acad. Nat. Sci. Phila., 1858, 117.—BD., Birds N. A., 1858, 340, pl. 78, f. 1 (var. ?).—XANTUS, Proc. Acad. Nat. Sci. Phila., 1859, 191 (Fort Tejon, Cal.).

Lanivireo solitarius var. *cassini*, BD., BREW., & RIDG., N. A. Birds, i, 1874, 377.

Vireo solitarius var. *cassinii*, HENSHAW, Rep. Orn. Specs., 1873, Wheeler's Exped., 1874, 105.

Since the discovery of this bird at Fort Tejon, Cal., it has been met with by but few observers, and nothing whatever appears to be known of its summer home or of its habits; at least nothing to show that these are in any way peculiar or distinctive from the Solitary Vireo, which it so closely resembles in appearance. Mr. Ridgway secured two specimens in the West Humboldt Mountains in September. Seemingly, it occurs in Arizona only as a migrant, though possibly it may winter in the southern portion. In 1873, it was observed by both Dr. C. G. Newberry and myself; the earliest date

being September 12. It was not uncommon along the Gila River, where it usually kept in the tall cottonwoods. In 1874, it was again met with by Dr. Rothrock and myself at Mount Graham, and under precisely the same circumstances as the preceding species. They were, however, here quite rare as compared with *solitarius*; but, near Camp Crittenden, the last few days of August, quite a number were seen among the deciduous trees. Their seeming preference for the deciduous over the coniferous timber is the only point wherein their habits seem to differ from those of the Solitary Vireo.

No.	Sex.	Locality.	Date.	Collector.	Wing.	Tail.	Bill.	Tarsus.
92	♀	South of Camp Apache, Ariz.	Sept. 12, 1873	Dr. C. G. Newberry...	2. 78	2. 29	0. 45	0. 75
781	♀	Gila River, Ariz.....	Sept. 16, 1873	H. W. Henshaw.....	2. 82	2. 25	0. 45	0. 69
795 do .....	..... do .....	..... do	2. 85	2. 30	0. 45	0. 73
525	♀	Near Camp Crittenden, Ariz.	Aug. 29, 1874	Dr. J. T. Rothrock....	2. 75	2. 13	0. 43	0. 74
548 do	Aug. 30, 1874	H. W. Henshaw.....	2. 83	2. 30	0. 43	0. 77
547	♀	..... do	Aug. 31, 1874	..... do	2. 84	2. 35	0. 47	0. 75
858	♀	Mount Gradam, Ariz..	Sept. 25, 1874	..... do	2. 87	2. 31	0. 43	0. 73

VIREO SOLITARIUS (Wils.), var. PLUMBEUS, Coues.

Western Solitary Vireo.

Vireo plumbeus, COUES, Proc. Acad. Nat. Sci. Phila., 1866, 73.—*Id.*, Key N. A. Birds, 1872, 122, f. 6.

Vireosylva plumbea, BD., Rev. Am. Birds, i, 1866, 349.—AIKEN, Proc. Bost. Soc. Nat. Hist., 1872, 198.

Vireo solitarius var. *plumbeus*, ALLEN, Bull. Mus. Comp. Zool., 1872, 176.—COUES, Key N. A. Birds, 1872, 351.—HENSHAW, Rep. Orn. Specs., 1873, Wheeler's Exped., 1874, 77, 105.—YARROW & HENSHAW, Rep. Orn. Specs., 1872, Wheeler's Exped., 1874, 12.—HENSHAW, An. Lyc. Nat. Hist. N. Y., xi, 1874, 5.—*Id.*, An. List Birds Utah, 1872, Wheeler's Exped., 1874, 43.—COUES, Birds Northwest, 1874, 100.

Lanivireo solitarius var. *plumbeus*, BD., BREW., & RIDG., N. A. Birds, i, 1874, 377.

This is a common bird through the Middle Region, entirely replacing there in summer the Solitary Vireo. In choice of habitat, it is somewhat variable, but is more usually met with among the pines; finding its limit at an altitude of about 10,000 feet. In the migratory season, however, it scatters over the country generally, finding in the deciduous trees of the

streams a welcome place of resort as well as an abundance of suitable insect food. In habits generally, and song, it is quite identical with the Solitary Vireo. During the season of 1874, many specimens were secured in Colorado and New Mexico by Mr. C. E. Aiken, and in the different localities it was everywhere numerous.

A nest found by Mr. C. E. Aiken in El Paso County, Colorado, and by him kindly presented to me, exhibits but little difference when compared with nests of the true *solitarius* taken in New England. It is composed of soft, cottony substances, bound externally with strips of bark and other fibrous material, with a lining of fine grasses. The eggs are pure white, spotted chiefly at the larger end with reddish-brown.

A specimen, taken September 3, at Camp Apache, Ariz., is intermediate in coloration between *solitarius* and *plumbeus*, showing very clearly the relationship of the two. A strong greenish tinge pervades the back, and is also very decided on the sides and flanks.

No.	Sex.	Locality.	Date.	Collector.	Wing.	Tail.	Bill.	Tarsus.
95	Jun.	Wahsatch Mts., Utah..	Aug. 16, 1872	H. W. Henshaw.....	.....	.....	.....	.....
461	♂ ad.	Neutria, N. Mex.....	July 19, 1873	..... do	2. 15	2. 54	0. 52	0. 75
462	♂ ad.	..... do .....	..... do .....	..... do	2. 13	2. 48	0. 55	0. 74
694	♂	Camp Apache, Ariz....	Sept. 3, 1873	..... do	2. 17	2. 45	0. 51	0. 74

VIREO BELLI, Aud.

Bell's Vireo.

Vireo belli, AUD., Birds Am., vii, 1844, 333, pl. cccclxxxv (Missouri River).—WOODH., Sitgreave's Exp. Zuñi & Col. Riv., 1854, 76 (Texas; abundant).—BD., Birds N. A., 1858, 337.—*Id.*, U. S. & Mex. Bound. Surv., ii, pt. ii, 1859, Birds, 12 (Western Texas).—*Id.*, Rev. Am. Birds, i, 1866, 358.—ALLEN, Bull. Mus. Comp. Zoöl., 1872, 176 (Eastern and Middle Kansas).—COUES, Key N. A. Birds, 1872, 123.—SNOW, Birds Kan., 1872, 8 (common).—HENSCHAW, Rep. Orn. Specs., 1873, Wheeler's Exped., 1874, 105.—BD., BREW, & RIDG., N. A. Birds, i, 1874, 389 (not of COOPER).—COUES, Birds Northwest, 1874, 101.

This little Vireo appeared to be rather common along the Gila River, inhabiting the dense thickets along the banks. At this season, the middle of September, its quaint song was heard during most of the day, but more

particularly in the hot hours of noonday. In addition to the song, which somewhat resembles the White-eyed Vireo's, it has a harsh scolding note, which it often repeats as it searches among the dense undergrowth for its food. But a single specimen was obtained, as it was rather timid, and on hearing the slightest noise would instantly cease its notes and dive into the brush. The single specimen secured appears on comparison to be quite typical of the species, as shown by a specimen from its more eastern habitat.

No.	Sex.	Locality.	Date.	Collector.	Wing.	Tail.	Bill.	Tarsus.
794	♂ ad.	Gila River, Ariz.	Sept. 16, 1873	H. W. Henshaw.	2. 15	2. 23	0. 43	0. 75

VIREO PUSILLUS, Coues.

Least Vireo.

Vireo pusillus, COUES, Proc. Acad. Nat. Sci. Phila., 1866, 76 (XANTUS, Cape Saint Lucas ; COOPER, Fort Mojave).—BD., Rev. Am. Birds, i, 1866, 360.—COUES, Proc. Acad. Nat. Sci. Phila., 1868, 83.—*Id.*, Key N. A. Birds, 1872, 123.—COOPER, Birds Cal., 1872, 124.—BD., BREW., & RIDG., N. A. Birds, i, 1874, 393, pl. xvii, f. 14, app. 507 (nesting).

It is quite likely that some at least of the Vireos heard along the Gila River, as above mentioned, were really of this species, or variety ; for, on reaching Camp Grant, Ariz., the past season, I found that the thick bushes and undergrowth fringing the streams, as they issue from the mountains, afforded a home for great numbers of Vireos ; and, recognizing their notes and song as well as habits to be identical with those heard and seen the previous season on the Gila, I supposed them all to be the Bell's Vireo. A series of six specimens obtained at this locality prove, however, to be quite typical of the form known as *pusillus*. The difference between this form and *belli* seems, however, not to be of greater value than would entitle the former to rank as a variety. The points of discrepancy are principally those of coloration : *pusillus* being paler throughout ; the upper parts are of a clearer ash, and lack much of the green seen in *belli* ; the white of under parts is purer, and traces only of yellow are observable on the sides, where in *belli* the yellowish wash is very decided. In the points of coloration which distinguish *pusillus*, as well as the longer (?) tail, we see but the usual conditions

which, in so many well known instances, accompany the change of habitat when the species extends from the east to the west. In this instance, the divergent features between the two extremes or typical forms are paralleled in the cases of *Vireo gilvus* var. *swainsoni* and *V. solitarius* var. *plumbeus* as distinguished from the eastern forms.

No.	Sex.	Locality.	Date.	Collector.	Wing.	Tail.	Bill	Tarsus.
220	♂ ad.	Camp Grant, Ariz.....	July 29, 1874	H. W. Henshaw.....	2. 16	2. 07	0. 42	0. 75
222	♂ ad.	..... do .....	..... do .....	..... do	2. 13	2. 10	0. 41	0. 73
223	♂ ad.	..... do .....	..... do .....	..... do	2. 15	2. 15	0. 40	0. 77
224	Jun.	..... do .....	..... do .....	..... do	2. 12	2. 05	0. 37	0. 70
225	.....	..... do .....	..... do .....	..... do	2. 09	2. 12	0. 40	0. 72
232	Jun.	..... do	July 30, 1874	..... do	2. 13	2. 04	0. 40	0. 74

VIREO VICINIOR, Coues.

Arizona Vireo.

Vireo vicinior, COUES, Proc. Acad. Nat. Sci. Phila., 1866; 75 (Fort Whipple, Ariz ; one specimen).—BD., Rev. Am. Birds, 1866, 361.—COOPER, Birds Cal., 1870, 125.—COUES, Key N. A. Birds, 1872, 122.—BD., BREW., & RIDG., N. A. Birds, i, 1874, 393, pl. xvii, f. 7.

This Vireo was discovered by Dr. Coues at Prescott, Ariz., and described in 1866, since which time the type of the species has remained unique till the rediscovery of the species during the past season in New Mexico and Arizona. Judging from the wide separation of the several localities at which the six specimens were taken, it appears to be a widely distributed species, though everywhere rare. It would appear not to be a bird of the mountains, but, in respect to elevation, to occupy a position somewhat intermediate between the higher districts and the low valleys. The rocky hills, covered with a scanty growth of bushes and scrub, are its favorite haunts, and it was in such localities that all our specimens were obtained. They are not especially active in their motions, but glean their insect food from among the branches with the same deliberation of movement and ease that mark the habits of the vireos generally; but in their choice of hunting ground they are rather peculiar. They do not, like the Solitary Vireo and its allies, frequent the tops of the larger trees, nor, like the White-eyed and Bell's Vireo, keep close to the ground, but move about

constantly in the tops of the bushes from six to twelve feet in height. On the Colorado Chiquito River, in New Mexico, July 8, I found a family of these birds, the young, though fledged, being still dependent on the old for food. Upon approaching the bush in which they were lodged, the parents manifested the utmost solicitude, and flew to meet me, uttering a variety of notes, now flying to the edge of the thicket, and remonstrating with me with harsh cries of anger and alarm, now returning to their young, and with earnest warning notes endeavoring to lead them away from a spot which to them seemed fraught with danger. My suspicions that they were not the Plumbeous Vireos had at first been aroused by hearing the song which seemed to me one of the most beautiful I had ever heard from any of the family. It might perhaps be best compared with the finest efforts of the Solitary Vireo, yet to the beauty and variety of notes of that bird it had added all the charm and mellowness of expression which is pre-eminent in the song of the Yellow-throated Vireo. During the few moments I spent in observing their actions, the female led away two of the brood, leaving the male with two of the nestlings, which I secured. Fall specimens differ from the type which is in summer dress only in having the lower dorsal surface, rump, upper tail-coverts, and the outer webs of the inner secondaries, except the exterior pair, washed faintly with green, which is also just perceptible on the sides and flanks. The young in the first plumage do not differ materially from the adult.

No.	Sex.	Locality.	Date.	Collector.	Wing.	Tail.	Bill.	Tarsus.
56	♂ jun.	Colorado Chiquito, N. Mex.	July 8, 1874	H. W. Henshaw	2.51	2.40	0.40	0.75
57	♀ jun.	..... do .....	..... do .....	..... do	2.53	2.40	0.42	0.75
318	♂ ad.*	Camp Bowie, Ariz.	Aug. 8, 1874	..... do	2.45	.....	0.45	0.71
331	♂ jun.	..... do	Aug. 9, 1874	Dr. J. T. Rothrock	2.49	2.55	0.43	0.77
353	.....	..... do	Aug. 11, 1874	..... do	2.55	2.53	0.43	0.75
662	.....	Camp Lowell, Ariz.	Sept. 10, 1874	H. W. Henshaw	2.52	2.64	0.45	0.73

* Worn.

FAM. AMPELIDAE: CHATTERERS.

AMPELIS CEDRORUM (Vieill.).

Cedar Bird.

Bombycilla cedrorum, VIEILL., Ois. Am. Sept., i, 1807, 88, pl. lvii.

Ampelis cedrorum, BD., Birds N. A., 1858, 318.—HEERM., P. R. R. Rep., x, pt. iv, 1859, 56.—BD., U. S. & Mex. Bound. Surv., ii, pt. ii, 1859, 56.—HENRY, Proc. Acad. Nat. Sci. Phila., 1859, 106 (New Mexico).—COOP. & SUCKL., P. R. R. Rep., xii, pt. ii, 1860, 187.—HAYD., Trans. Am. Phil. Soc., xii, 1862, 162.—BD., Rev. Am. Birds, i, 1866, 407.—COOPER, Am. Nat., iii, 1869, 34.—*Id.*, Birds Cal., i, 1870, 129.—HENSHAW, Rep. Orn. Specs., 1873, Wheeler's Exped., 1874, 106.—ALLEN, Bull. Mus. Comp. Zool., 1872, 176 (Eastern Kansas).—COUES, Key N. A. Birds., 1872, 115, pl. 56.—SNOW, Birds Kan., 1872, 8.—AIKEN, Proc. Bost. Soc. Nat. Hist., 1872, 198.—BD., BREW., & RIDG., N. A. Birds, i, 1874, 401, pl. xviii, f. 2.—HENSHAW, An. Lyc. Nat. Hist. N. Y., xi, 1874, 5.—*Id.*, An. List Birds Utah, 1874, Wheeler's Exped., 1874, 43.—COUES, Birds Northwest, 1874, 93.—ALLEN, Proc. Bost. Soc. Nat. Hist., June, 1874, 24.

Bombycilla carolinensis, NEWB., P. R. R. Rep., vi, 1857, 81.

Except in Utah, where the species is not of uncommon occurrence, especially in fall, the Cedar Bird appears not to be an abundant resident of the Middle Region, though it has been reported from various and widely distant points. Mr. Aiken has noticed its occurrence in El Paso County, Colorado, but a few times, in the earlier part of the winter. Its occurrence in Arizona seems to be exceptional, and it has been met with there but once by us. A female, in much worn plumage, was taken, about thirty miles south of Apache, and it is probable that it had nested in the neighborhood.

No.	Sex.	Locality.	Date.	Collector.	Wing.	Tail.	Bill.	Tarsus.
752	♀ ad.	South of Camp Apache, Ariz.	Sept. 11, 1873	H. W. Henshaw.....	3.45	2.32	0.38	0.62

PHAENOPEPLA NITENS (Sw.).

Black Flycatcher.

Ptilionys nitens, SW., Anim. Menag., 1838, 285.—HEERM., P. R. R. Rep., x, pt. iv, 1859, 38.

Phainopepla nitens, BD., Ives' Col. Exped., 1857-58, pt. iv, 5.—XANTUS, Proc. Acad. Nat. Sci. Phila., 1859, 191 (Fort Tejon, Cal.).—BD., U. S. & Mex. Bound. Surv., ii,

pt. ii, 1859, Birds, 11.—KENNERLY, P. R. R. Rep., Whipple's Route, x, 1859, 25.—BD., Proc. Acad. Nat. Sci. Phila., 1859, 303 (Cape Saint Lucas).—HENRY, Proc. Acad. Nat. Sci. Phila., 1859, 106 (New Mexico).
Phænopepla nitens, COUES, Proc. Acad. Nat. Sci. Phila., 1866, 71 (Fort Whipple, Ariz.).—*Id.*, Proc. Acad. Nat. Sci. Phila., 1868, 83.—*Id.*, Key N. A. Birds, 1872, 116.—YARROW, Rep. Orn. Specs., 1871, Wheeler's Exped., 1874, 34.—HENSHAW, Rep. Orn. Specs., 1873, Wheeler's Exped., 1874, 106.—BD., BREW., & RIDG., N. A. Birds, i, 1874, 405, pl. xviii, f. 3, app. 507 (nesting).

Large numbers of this species were found, on several occasions, in the cañon back of Camp Apache, Ariz. As they were noticed nowhere else in this vicinity, I judged that the abundance of mistletoe berries here served as an attraction. These they were greedily feeding upon. In a cañon at the base of Mount Turnbull, I also saw large numbers. Here the berries, which appear to be a favorite diet, were wanting; and they were engaged much of the time in catching flies, which they did by ascending perpendicularly from the bushes, snapping up an insect, and returning, much in the manner of the Bluebirds. At this season they are very restless and shy.

In 1874, they were met with in so many localities as to warrant the belief that they spread over a large area in the southern portions, and are residents. At Camp Bowie, Ariz., large numbers were found gathered together in the cañon, attracted thither by the abundance of the berries of the *Prunus demissa* and *Vitis incisa*. Of these, the birds seemed very fond, and they appeared to constitute their sole food; though the period during which their feast lasts must be necessarily short, as each bush was fairly beset by scores of these birds, who seemed to have entered into a rivalry with the Mockingbirds to see which could bear away most of the ripe juicy fruit.

No.	Sex.	Locality.	Date.	Collector.	Wing.	Tail.	Bill.	Tarsus.
.. ..	Jun.	Nevada	Aug. 6, 1871	F. Bischoff .....	.....	.....	.....	.....
515	♂ jun.	Camp Apache, Ariz.	Aug. 4, 1873	H. W. Henshaw	3. 35	3. 37	0. 45	0. 61
516	♂ jun.	..... do .....	..... do .....	..... do	3. 42	3. 42	0. 45	0. 68
797	♂ ad.	Mount Turnbull, Ariz.	Aug. 17, 1873	..... do	3. 48	3. 58	0. 45	0. 63
800	♂ jun.	..... do	Sept. 19, 1873	..... do	3. 75	4. 12	0. 40	0. 70
376	♂ jun.	Camp Bowie, Ariz.	Aug. 12, 1874	..... do	3. 48	3. 64	0. 50	0. 67
388	♂ jun.	..... do .....	..... do .....	..... do	3. 57	3. 60	0. 48	0. 72
397	♀ jun.	..... do	Aug. 13, 1874	..... do	3. 55	3. 82	0. 50	0. 63
398	♂ jun.	..... do .....	..... do .....	..... do	3. 39	3. 52	0. 48	0. 70
628	♂ ad.	Camp Lowell, Ariz.	Sept. 9, 1874	..... do	3. 55	3. 67	0. 44	0. 73

MYIADESTES TOWNSENDI (Aud.)

Townsend's Solitaire.

- Ptiligonyx townsendii*, AUD., Orn. Biog., v, 1839, 206, pl. ccccxix, f. 2.—WOODH., Sitgreave's Exp. Zuñi & Col. Riv., 1854, 76.—NEWB., P. R. R. Rep., vi, 1857, 82.
- Myiadestes townsendii*, BD., Birds N. A., 1858, 321.—XANTUS, Proc. Acad. Nat. Sci. Phila., 1859, 191 (Fort Whipple, Ariz.).—KENNERLY, P. R. R. Rep., Whipple's Route, x, 1859, 25.—HEERM., P. R. R. Rep., x, pt. iv, 1859, 38.—HENRY, Proc. Acad. Nat. Sci. Phila., 1859, 106 (New Mexico).—STEV., U. S. Geol. Surv. Terr., 1870, 464.—COOP. & SUCKL., P. R. R. Rep., xii, pt. ii, 1860, 187.—HAYD., Trans. Am. Phil. Soc., xii, 1862, 162.—BD., Rev. Am. Birds, i, 1865, 429.—COUES, Proc. Acad. Nat. Sci. Phila., 1866, 72 (Fort Whipple, Ariz.).—COOPER, Am. Nat., iii, 1869, 34.—ALLEN, Bull. Mus. Comp. Zool., 1872, 176 (mountains of Colorado).—COUES, Key N. A. Birds, 1872, 117, f. 57.—AIKEN, Proc. Bost. Soc. Nat. Hist., 1872, 198.—BD., BREW., & RIDG., N. A. Birds, i, 1874, 409, pl. xviii, f. 3, 4.—YARROW & HENSHAW, Rep. Orn. Specs., 1872, Wheeler's Exped., 1874, 12.—HENSHAW, An. Lyc. Nat. Hist. N. Y., xi, 1874, 5.—*Id.*, An. List Birds Utah, 1874, Wheeler's Exped., 1874, 43.—*Id.*, Rep. Orn. Specs., 1873, Wheeler's Exped., 1874, 77, 106.—COUES, Birds Northwest, 1874, 93.

Apparently rather rare, not being seen until October 28, when three were noticed in company near Pine Valley, Utah. Very shy and retiring, frequenting the hill sides covered with small cedars, the berries of which constitute the major part of their food in winter when the ground is covered with snow. In some of its habits and motions, it closely resembles the Bluebirds (*Sialia*). Stationing itself upon the low branches of a tree, it carefully scans the ground, and, perceiving an insect, suddenly darts down and, seizing its prey, bears it at once to the nearest perch.

During a week's stay in June at the base of Baldy Peak, I frequently saw this bird in the pine forests, and as high up on the mountain-sides as 10,000 feet, and its summer-range doubtless extends up to timber line. Its habits, as far as I noticed them, are singularly like those of the Bluebirds. Besides a loud, liquid call note, the male has a beautiful warbling song. This somewhat resembles the finest efforts of the Purple Finch (*Carpodacus purpureus*), but far excels that bird in power, sweetness, and modulation. Though I searched most carefully for the nest of this species, I was not successful further than to satisfy myself that it breeds in the crevices of the rocks. Its preference for such localities during the summer, with the evident solicitude manifested on more than one occasion, left little doubt in my mind upon this point.

They are quite common, in the fall, in Eastern Arizona and Western New Mexico. Having reared their young, these birds appear to forsake the pine woods, which constitute their summer abode, and appear lower down on the hill sides, covered with piñon and cedars. Their food at this season appears to consist almost exclusively of berries, particularly from the piñons and cedars, and the crops of many examined contained little else save a few insects. The habit of catching insects on the wing, after the manner of the Flycatchers, which is attributed to this bird, appears to be not a common one, or, as is likely the case, the bird varies its habits in different localities, as, of hundreds I have seen at different seasons, none were ever thus engaged, nor have I ever seen them searching among the leaves for insects, like the thrushes. In their usual manner of procuring food, as in their habits and motions generally, they have always seemed to me nearly allied to the Bluebirds. Though in summer a bird of retiring and unsocial habits, and never more than a single pair being found in a locality, in the fall they are to a considerable extent gregarious, associating usually in small companies of from five to ten. At the Old Crater, forty miles south of Zuñi, N. Mex., they had congregated in very large numbers about a spring of fresh water, the only supply for many miles around; and hundreds were to be seen sitting on the bare volcanic rocks, apparently too timid to venture down and slake their thirst while we were camped near by. Their song is occasionally heard even in November and December, and is very sweet, but not so full and varied as during the vernal season.

No.	Sex.	Locality.	Date.	Collector.	Wing.	Tail.	Bill.	Tarsus.
370	♀ ad.	Pine Valley, Utah.....	Oct. 28, 1872	Dr. H. C. Yarrow and H. W. Henshaw.	.....	.....	.....	.....
402	♀ jun	Cove Creek, Utah.....	Nov. 13, 1872	..... do .....	.....	.....	.....	.....
277	♂ ad.	Fort Garland, Colo....	June 6, 1873	H. W. Henshaw.....	4.76	4.44	0.56	0.82
286	♂ ad.	Rio Grande, Colo.....	June 7, 1873	..... do	4.64	4.31	0.54	0.75
324	♀ ad.	..... do	June 11, 1873	..... do	4.66	4.17	0.54	0.80
325	♂ ad.	..... do	June 12, 1873	..... do	4.47	4.20	0.54	0.82
453	♂ ad.	Fort Wingate, N. Mex.	July 18, 1873	..... do	4.50	4.21	0.48	0.75
704	♀ ad.	Camp Apache, Ariz....	Sept. 6, 1873	..... do	4.40	3.97	0.47	0.78
959	♂ ad.	Silver City, N. Mex....	Oct. 24, 1873	..... do	4.50	4.10	0.45	0.81
960	♂	..... do .....	..... do .....	..... do	4.57	4.32	0.49	0.80
961	♂	..... do .....	..... do .....	..... do	4.56	4.41	0.45	0.75

FAM. LANIIDAE: SHRIKES.

COLLURIO BOREALIS (Vieill.).

Great Northern Shrike.

- Lanius borealis*, VIEILL., Ois. Am., Sept., i, 1807, 90, pl. i.
Collyrio borealis, BD., Birds N. A., 1858, 324.—COOP. & SUCKL., P. R. R. Rep., xii, pt. ii, 1860, 188.—HAYD., Trans. Am. Phil. Soc., xii, 1862, 162.—COOPER, Am. Nat., iii, 1869, 35.—STEV., U. S. Geol. Surv. Terr., 1870, 464.—SNOW, Birds Kan., 1872, 8.
Collurio borealis, BD., Rev. Am. Birds, i, 1866, 440.—COUES, Proc. Acad. Nat. Sci. Phila., 1866, 73 (Fort Whipple, Ariz.; one specimen).—COOPER, Birds Cal., i, 1870, 137.—COUES, Key N. A. Birds, 1872, 125, f. 73.—AIKEN, Proc. Bost. Soc. Nat. Hist., 1872, 198.—MERRIAM, U. S. Geol. Surv. Terr., 1872, 677.—BD., BREW., & RIDG., N. A. Birds, i, 1874, 415.—YARROW & HENSHAW, Rep. Orn. Specs., 1872, Wheeler's Exped., 1874, 13.—HENSHAW, An. Lyc. Nat. Hist. N. Y., xi, 1874, 5.—*Id.*, An. List Birds Utah, 1872, Wheeler's Exped., 1874, 43.—COUES, Birds Northwest, 1874, 111.

Specimen taken and others observed late in the fall in Southern Utah.

According to Mr. Aiken, this shrike occurs quite regularly in Colorado as a winter visitant, retiring to the far north in early spring to give place to the succeeding species.

COLLURIO LUDOVICIANUS (L.), var. EXCUBITOROIDES, Swains.

White-rumped Shrike.

- Lanius excubitoroides*, SWAINS, Fn. Bor.-Am., ii, 1831, 115 (Saskatchewan).—WOODH., Sitgreave's Exp. Zuñi & Col. Riv., 1854, 77.—HEERM., P. R. R. Rep., x, pt. iv, 1859, 55.
Collyrio excubitoroides, BD., Ives' Col. Exped., 1857-58, pt. iv, 5.—*Id.*, U. S. & Mex. Bound. Surv., ii, pt. ii, 1859, Birds, 11.—KENNERLY, P. R. R. Rep., Whipple's Route, 1859, 25.—XANTUS, Proc. Acad. Nat. Sci. Phila., 1859, 191 (Fort Tejon, Cal.).—BD., Birds N. A., 1858, 527, pl. 75, f. 2.—HAYD., Trans. Am. Phil. Soc., xii, 1862, 162.—COUES, Proc. Acad. Nat. Sci. Phila., 1866, 73 (Fort Whipple, Ariz.; rare).—COOPER, Am. Nat., Aug., 1869, 74 (Fort Union, N. Mex.; breeding).—*Id.*, Proc. Cal. Acad., 1870, 75.—SNOW, Birds Kan., 1872, 8.
Collurio excubitoroides, BD., Rev. Am. Birds, i, 1866, 445.—COOPER, Birds Cal., i, 1871, 138.—AIKEN, Proc. Bost. Soc. Nat. Hist., 1872, 198.—MERRIAM, U. S. Geol. Surv. Terr., 1872, 677 (Salt Lake; Fort Hall, Mont.).

- Collurio ludovicianus* var. *excubitoroides*, COUES, Key N. A. Birds, 1872, 125—BD., BREW., & RIDG., N. A. Birds, i, 1874, 421.—YARROW, Rep. Orn. Specs., 1871, Wheeler's Exped., 1874, 34.—YARROW & HENSHAW, Rep. Orn. Specs., 1872, Wheeler's Exped., 1874, 13.—ALLEN, Proc. Bost. Soc. Nat. Hist., June, 1874, 24.—COUES, Birds Northwest, 1874, 102.—HENSHAW, An. Lyc. Nat. Hist. N. Y., xi, 1874, 5.—*Id.*, An. List Birds Utah, 1872, Wheeler's Exped., 1874, 43.—*Id.*, Rep. Orn. Specs., 1873, Wheeler's Exped., 1874, 60, 78, 107.
- Lanius elegans*, BD., Birds N. A., 1858, 328 (foot-note), pl. 75, f. 1.
- Collyrio elegans*, BD., Birds N. A., 1858, 35.
- Collurio elegans*, BD., Rev. Am. Birds, 1866, 444.—COOPER, Birds Cal., i, 1870, 140.
- Collyrio ludovicianus*, HENRY, Proc. Acad. Nat. Sci. Phila., 1859, 107 (New Mexico).
- Collurio ludovicianus* var. *robustus*, BD., Am. Nat., vii, 1873, 609 (same specimen formerly called *C. elegans*).—BD., BREW., & RIDG., Birds N. A., i, 1874, 420.

This, the Western Shrike, is found over a large area of country from the Mississippi River to the Pacific coast. It appears to reach its maximum of abundance north of about the thirty-sixth parallel, south of which, in New Mexico and Arizona at least, its numbers appear to decrease, and it was met with by our parties in this region only occasionally. Dr. Coues gives it, in his Fort Whipple list, as a probable resident, but rare. In Utah, it is everywhere abundant, and resident, I believe, in the extreme southern portion. Equally numerous in Colorado, it does not there appear ever to winter, as Mr. Aiken informs me, but goes farther south, returning early in spring; its occurrence in El Paso County having been noted by him April 5. I saw it in New Mexico near Albuquerque in December, and think it probably winters at least as far north as this point. Its habits appear everywhere the same, and are essentially like those of its relative of the Gulf States. It preys largely upon insects and grasshoppers, and these, indeed, form by far the major portion of its food, though it occasionally attacks successfully the smaller species of birds and mice.

Near Denver, Colo., numerous individuals of this species were seen during the first days of May, and apparently all were mated, and possibly nesting, though I did not succeed in finding any nests. It has at this season quite a number and variety of notes, some of which are the call notes and common to both sexes. The male also makes an occasional attempt at a song, and the notes, though harsh, are not unpleasing.

No.	Sex.	Locality.	Date.	Collector.	Wing.	Tail.	Bill.	Tarsus.
....	Ad.	Nevada	June 1, 1871	F. Bischoff .....	.....	.....	.....	.....
....	Ad.	.....do	Sept. 19, 1871	.....do .....	.....	.....	.....	.....
115	♀ jun.	Fountain Green, Utah.	Aug. 20, 1872	H. W. Henshaw.....	.....	.....	.....	.....
122	♂ jun.	Fairview, Utah	Aug. 22, 1872	.....do .....	.....	.....	.....	.....
375	♂ ad.	Rush Lake, Utah	Oct. 31, 1872	H. W. Henshaw and Dr. H. C. Yarrow.	.....	.....	.....	.....
410	♂ ad.	Fillmore, Utah.....	Nov. 15, 1872	H. W. Henshaw.....	.....	.....	.....	.....
20	♀ ad.	Southern Colorado	May 7, 1873	H. W. Henshaw.....	3.63	3.90	0.63	1.02
62	♂ ad.	.....do	May 12, 1873	.....do	3.85	4.23	0.56	1.04
116	♂ ad.	Camp Bowie, Ariz.....	Oct. 6, 1873	Dr. C. G. Newberry...	2.55	4.15	0.60	1.02
95	♀ jun.	Pueblo, Colo	Aug. 3, 1874	C. E. Aiken.....	.....	.....	.....	.....
96	♀ jun.	.....do .....	.....do .....	.....do .....	.....	.....	.....	.....
305	.....	Del Norte, Colo .....	.....do .....	.....do .....	.....	.....	.....	.....

FAM. TANAGRIDAE: TANAGERS.

PYRANGA LUDOVICIANA (Wils.).

Louisiana Tanager.

Tanagra ludoviciana, WILS., Am. Orn., iii, 1811, 27, pl. xx, f. 1.

Pyrrangia ludoviciana, BD., Birds N. A., 1858, 303.—HEERM., P. R. R. Rep., x, pt. iv, 1859, 52.—XANTUS, Proc. Acad. Nat. Sci. Phila., 1859, 191 (Fort Tejon, Cal.).—COOP. & SUCKL., P. R. R. Rep., xii, pt. ii, 1860, 182.—HAYD., Trans. Am. Phil. Soc., xii, 1862, 161.—COUES, Proc. Acad. Nat. Sci. Phila., 1866, 71 (Fort Whipple, Ariz.).—*Id.*, *ib.*, 1868, 83.—COOPER, Am. Nat., iii, 1869, 33.—*Id.*, Birds Cal., 1870, 145.—ALLEN, Bul. Mus. Comp. Zoöl., 1872, 175 (mountains of Colorado).—COUES, Key N. A. Birds, 1872, 112.—AIKEN, Proc. Bost. Soc. Nat. Hist., 1872, 198.—MERRIAM, U. S. Geol. Surv. Terr., 1872, 678.—BD., BREW., & RIDG., N. A. Birds, i, 1874, 437, pl. 20, f. 3, 4.—YARROW & HENSHAW, Rep. Orn. Specs., 1872, Wheeler's Exped., 1874, 13.—HENSHAW, An. Lyc. Nat. Hist. N. Y., xi, 1874, 5.—*Id.*, An. List Birds Utah, 1872, Wheeler's Exped., 1874, 43.—*Id.*, Rep. Orn. Specs., 1873, Wheeler's Exped., 1874, 60, 78, 117.—COUES, Birds Northwest, 1874, 83.

In Utah, the Louisiana Tanager was met with but once, at Provo in July. According to other observers, however, it is quite common, and doubtless the reason it was not detected by us more frequently was owing to the fact that our visits to the mountain districts were made too late in the season, and after the bird had passed south. In 1873, in Southern Colorado, the species was found in small numbers among the cottonwoods along the

streams, at an elevation of about 7,500 feet. On reaching the pines, at an elevation of about 9,000 feet, they were found to be present in much greater numbers, and at 10,000 feet were still common.

Their song is a short simple melody, but beautiful from its extreme sweetness of expression. In this, as also in habits, it bears a great resemblance to the Scarlet Tanager. It is busy the whole time gleaning from among the pines and spruces the larger beetles and insects which infest them, and generally keeps well up among the higher branches, whence it makes its presence known by its occasional bursts of melody. Very common at Camp Apache, Ariz., and met with frequently at various points to the southward. Seen at the Gila River October 16; but at this time nearly all had gone farther south. Frequents at this season the deciduous trees.

Iris brown; bill horn-color; feet and legs bluish.

No.	Sex.	Locality.	Date.	Collector.	Wing.	Tail.	Bill.	Tarsus.
126	♂ ad.	Provo, Utah.....	July 29, 1872	H. W. Henshaw and Dr. H. C. Yarrow.	.....	.....	.....	.....
192*	♂ o	Fort Garland, Colo....	May 29, 1873	H. W. Henshaw.....	3.77	3.04	0.61	0.77
193	♀ ad.	..... do .....	..... do .....	..... do	3.66	3.04	0.66	0.78
206	♂ ad.	..... do	May 30, 1873	..... do	3.85	3.05	0.61	0.76
253	♀ ad.	..... do	June 5, 1873	..... do	3.58	2.90	0.63	0.76
281	♂ ad.	..... do	June 6, 1873	..... do	3.82	3.00	0.60	0.74
321	♂ ad.	Rio Grande, Colo.....	June 12, 1873	..... do	3.83	3.08	0.60	0.75
322	♂ ad.	..... do .....	..... do .....	..... do	3.82	2.97	0.81	0.79
460	♀ ad.	Neutria, N. Mex.....	July 19, 1873	..... do	3.93	2.90	0.58	0.73
585	♂ ad.	Camp Apache, Ariz....	Aug. 21, 1873	..... do	3.68	3.07	0.65	0.75
627	♀ jun.	..... do	Aug. 27, 1873	..... do	3.70	3.18	0.63	0.83
709	♂ ad.	..... do	Sept. 7, 1873	..... do	3.75	3.15	0.64	0.74
742	♀ jun.	South of Camp Apache, Ariz.	Sept. 11, 1873	..... do	3.68	2.98	0.63	0.75
745	♀ jun.	..... do .....	..... do .....	..... do	3.55	2.88	0.59	0.74
746	♀ jun.	..... do .....	..... do .....	..... do	3.78	2.90	0.64	0.80
799	♀ ad.	Camp Goodwin, Ariz..	Sept. 17, 1873	..... do	3.62	2.86	0.58	0.79
915	♀ jun.	Gila River, Ariz.....	Oct. 16, 1873	..... do	3.70	2.94	0.65	0.80
99	♀ jun.	Willow Spring, Ariz...	July 12, 1874	..... do .....	.....	.....	.....	.....
334	♂ ad.	Camp Bowie, Ariz.....	Aug. 10, 1874	..... do .....	.....	.....	.....	.....
373	♂ ad.	..... do	Aug. 12, 1874	..... do .....	.....	.....	.....	.....
563	♂ jun.	Camp Crittenden, Ariz.	Sept. 1, 1874	..... do .....	.....	.....	.....	.....
370	♂ ad.	Pueblo, Colo.....	Oct. 14, 1874	C. E. Aiken.....	.....	.....	.....	.....

* Young of year.

PYRANGA HEPATICA, Swains.

Liver-colored Tanager.

Pyrrhuloxia hepatica, SWAINS., Phil. Mag., i, 1827, 124.—KENNERLY, P. R. R. Rep., Whipple's Route, x, 1859, 30.—COUES, Proc. Acad. Nat. Sci. Phila., 1866, 71.—BD., BREW., & RIDG., N. A. Birds, i, 1874, 440, pl. xx, f. 9, 10.—HENSLOW, Rep. Orn. Specs., 1873, Wheeler's Exped., 1874, 108.
Pyrrhuloxia azarae, WOODH., Sitgreave's Exp. Zuñi & Col. Riv., 1854, 82.

In 1873, a single female of this little known species was shot at Camp Apache August 4. In a grove of oaks on the skirts of a pine forest, about twenty miles south of Apache, I saw, in the course of an afternoon, perhaps half a dozen males. They appeared to be feeding upon insects, which they gleaned from among the foliage and smaller branches of the oaks. They were excessively shy, so much so that I found it difficult to get within gunshot of them. The species was introduced into our fauna by Dr. Woodhouse, who took a single female in the San Francisco Mountains, New Mexico. No other specimens have since been obtained till the present time.

In 1874, this tanager was again found when we approached Camp Apache, and was ascertained to be an abundant inhabitant of the pine woods. At this date, July 12, they, without doubt, had nests; but I was unable to find them, though I spent some time in the search, watching the birds as they moved slowly about in the tops of the pines searching for insects. At this season, they capture these generally while at rest, but occasionally sally forth and take them in the mid-air. With the exception of the call notes, used by both sexes, and which resemble the syllables *chuck, chuck*, several times repeated, they were perfectly silent, and neither here nor elsewhere did I ever hear any song. This was the more remarkable, as from this date till the last of August I saw individuals at short intervals all the way from Camp Apache to Camp Crittenden, near the Mexican line. At Rock Cañon, the oak-woods among and on the limits of the pines were frequented by numbers, and, July 21, the young, just from the nest, were taken. The old birds manifested much affection and solicitude for their progeny, flying down on the low branches, and, after venting their anger in harsh notes, returned to the side of their young and led them away to a place of safety.

I found several old nests here which bore in their plan of structure and the site chosen a remarkable resemblance to the nests of the Scarlet Tanager. They were composed mainly of coarse rootlets and the dried stems of plants, lined with finer material of the same nature; the nest, as a whole, being of a slight, unsubstantial character, and placed on the ends of the low horizontal branches of the oaks. I have found nests of the Scarlet Tanager at the East which differed scarcely at all from these, either in the substance of its composition or the position. In the latter part of August, they appeared to forsake the pine woods entirely, and then become more widely diffused; being found to some extent in the deciduous trees along the streams, but by far the larger number inhabit the oak groves, where their habits are much the same as in early summer, except that they are now expert flycatchers. By the end of September, all had apparently passed beyond our limits.

No.	Sex.	Locality.	Date.	Collector.	Wing.	Tail.	Bill.	Tarsus.
511	♀ ad.	Camp Apache, Ariz.	Aug. 4, 1873	H. W. Henshaw	4.05	3.05	0.68	0.83
717	♂ ad.	Twenty miles south of Camp Apache, Ariz.	Sept. 8, 1873	..... do	4.10	3.53	0.67	0.87
718	♂ ad.	..... do .....	..... do .....	..... do	4.11	3.32	0.68	0.85
67	♂ ad.	Willow Spring, Ariz. ...	July 12, 1874	..... do	4.03	3.35	0.65	0.85
68	♀ ad.	..... do .....	..... do .....	..... do	3.84	3.33	0.72	0.87
96	♂ ad.	..... do .....	..... do .....	..... do	4.15	3.45	0.68	0.90
163	♂ ad.	Rock Cañon, Ariz.	July 20, 1874	..... do	4.23	3.47	0.73	0.85
165	♀ ad.	..... do .....	..... do .....	..... do	4.08	3.48	0.73	0.92
164	♀ ad.	..... do .....	..... do .....	..... do	4.07	3.38	0.70	0.90
177	♂ ad.	..... do	July 21, 1874	..... do	3.85	3.23	0.70	0.87
178	♂ ad.	..... do .....	..... do .....	..... do	4.17	3.62	0.72	0.90
180	♀ ad.	..... do .....	..... do .....	..... do	3.87	3.45	0.72	0.92
180A	♂ jun.	..... do .....	..... do .....	..... do	4.07	3.50	0.65	0.85
409	♀ jun.	Bowie Agency, Ariz. ...	Aug. 15, 1874	J. M. Rutter.....	3.77	3.53	0.73	0.92
430	♀ jun.	..... do	Aug. 17, 1874	H. W. Henshaw.....	3.87	3.48	0.73	0.82
501	♂ jun.	Camp Crittenden, Ariz.	Aug. 26, 1874	..... do	4.10	3.60	0.77	0.90
502	♀ jun.	..... do .....	..... do .....	..... do	3.83	3.43	0.68	0.88
503	♂ jun.	..... do .....	..... do .....	..... do	4.13	3.50	0.67	0.94
512	♂ jun.	..... do	Aug. 27, 1874	..... do	4.10	3.62	0.73	0.82

PYRANGA AESTIVA (L.), var. COOPERI, Ridg.

Cooper's Tanager.

PLATES II & III.

Pyrrhula cooperi, RIDG., Proc. Acad. Nat. Sci. Phila., 1869, 130.

Pyrrhula aestiva var. *cooperi*, COUES, Key N. A. Birds, 1872, 111, f. 52^b.—BD., BREW., & RIDG., N. A. Birds, i, 1874, 445, pl. xx, f. 1, 2.—HENSHAW, Rep. Orn. Specs., 1873, Wheeler's Exped., 1874, 60, 108.—COUES, Birds Northwest, 1874, 82.

Pyrrhula aestiva, COOPER, Proc. Cal. Acad., 1861, 122.—COUES, Proc. Acad. Nat. Sci. Phila., 1866, 71 (Fort Mojave, COOPER).

Reaches as far north in summer as Denver, Colo., where I obtained a specimen May 10.

A beautiful adult male of this variety of the Summer Tanager (*P. aestiva*) was taken on the Gila River, Arizona, 1873, September 16, and another heard in same locality; also noted on the San Francisco River October 10. In each instance, they were found in the tall cottonwoods, actively engaged searching for insects.

None of these birds were seen in 1874; yet frequently, south of the Gila River, I heard mention made by the settlers of the abundance of a "Red Bird", which was everywhere stated to inhabit the cottonwoods along the streams. It was doubtless this tanager, which seems to confine its range to the low valleys, and migrates to the south very early; only an occasional straggler occurring by the middle of September. The plates represent male and female specimens taken by the Expedition.

No.	Sex.	Locality.	Date.	Collector.	Wing.	Tail.	Bill.	Tarsus.
54	♂ jun.	Denver, Colo.	May 12, 1873	H. W. Henshaw.....	3.61	3.00	0.80	0.77
792	♂ ad.	Gila River, Ariz.	Sept. 16, 1873	..... do	4.00	3.50	0.83	0.80

FAM. FRINGILLIDAE: FINCHES.

HESPERIPHONA VESPERTINA (Cooper).

Evening Grosbeak.

Fringilla vespertina, COOPER, An. Lyc. Nat. Hist. N. Y., i, ii, 1825, 220 (Sault Sainte Marie).

Hesperiphona vespertina, BD., Birds N. A., 1858, 469.—HENRY, Proc. Acad. Nat. Sci. Phila., 1859, 107 (New Mexico).—COOP. & SUCKL., P. R. R. Rep., xii, pt. ii, 1860, 196.—COUES, Proc. Acad. Nat. Sci. Phila., 1866, 80.—COOPER, Birds Cal., i, 1870, 174.—COUES, Key N. A. Birds, 1872, 127.—AIKEN, Proc. Bost. Soc. Nat. Hist., 1872, 199.—BD., BREW., & RIDG., N. A. Birds, i, 1874, 449, pl. 22, f. 1.—HENSHAW, Rep. Orn. Specs., 1873, Wheeler's Exped., 1874, 108.—COUES, Birds Northwest, 1874, 104.

Hesperiphona vespertina var. *montana*, BD., BREW., & RIDG., N. A. Birds, i, 1874, 449, pl. 22, f. 4 (individual variation).

Doubtless a rare resident in Arizona, where alone the species has been detected by our expedition.

A small flock of immature birds was seen a little south of Camp Apache feeding upon berries.

No.	Sex.	Locality.	Date.	Collector.	Wing.	Tail.	Bill.	Tarsus.
739	♀ jun.	South of Camp Apache, Ariz.	Sept. 11, 1873	H. W. Henshaw.....	4.14	2.64	0.70	0.75

CARPODACUS CASSINI, Bd.

Cassin's Purple Finch.

Carpodacus cassinii, BD., Birds N. A., 1858, 414.—XANTUS, Proc. Acad. Nat. Sci. Phila., 1859, 191 (Fort Whipple, Ariz.).—KENNERLY, P. R. R. Rep., Whipple's Route, 1859, 27, pl. xxvii, f. 1.—COUES, Proc. Acad. Nat. Sci. Phila., 1866, 80 (Fort Whipple, Ariz.).—COOPER, Birds Cal., i, 1870, 155.—COUES, Key N. A. Birds, 1872, 128.—MERRIAM, U. S. Geol. Surv. Terr., 1872, 678 (Yellowstone and Snake River, Wyoming).—BD., BREW., RIDG., N. A. Birds, i, 1874, 460, pl. 21, f. 4-5.—HENSHAW, An. Lyc. Nat. Hist. N. Y., xi, 1874, 5.—*Id.*, An. List Birds Utah, 1872, Wheeler's Exped., 1874, 43.—*Id.*, Rep. Orn. Specs., 1873, Wheeler's Exped., 1874, 78, 109.—COUES, Birds Northwest, 1874, 106.

This Purple Finch appears to be more abundant in Utah and Colorado than in the Territories south. In Southern Colorado it seemed to be not very common, though I saw several pairs about the middle of June in the pine region at an altitude of about 9,000 feet, where they were doubtless breeding. The males were continually singing, and their efforts in this direction were very fine, more so, I think, than the common Purple Finch, to the song of which, however, their strains bear a close resemblance, but are louder. In November, they were present in large flocks at the salt

lake south of Zuñi, N. Mex.; the cedar clad hills of this locality being their attraction, and they very probably spend the winter in this region.

No.	Sex.	Locality.	Date.	Collector.	Wing.	Tail.	Bill.	Tarsus.
999	♂ ad.	Salt lake south of Zuñi, N. Mex.	Nov. 20, 1873	H. W. Henshaw.....	3.56	2.55	0.51	0.74
1000	♂ ad.	..... do .....	..... do .....	..... do	3.55	2.54	0.56	0.74
1001	♂ ad.	..... do .....	..... do .....	..... do	3.83	2.92	0.55	0.75
1002	♂ jun.	..... do .....	..... do .....	..... do	3.68	2.67	0.52	0.70
1003	♀	..... do .....	..... do .....	..... do	3.50	2.72	0.54	0.70
1004	♂ jun.	..... do .....	..... do .....	..... do	3.53	2.65	0.52	0.70
1005	♀	..... do .....	..... do .....	..... do	3.62	2.70	0.52	0.70
1007	♂	..... do .....	..... do .....	..... do	3.52	2.50	0.52	0.73
1008	♀ ad.	..... do .....	..... do .....	..... do	3.43	2.50	0.50	0.73

CARPODACUS FRONTALIS (Say).

House Finch.

Fringilla frontalis, SAY, Long's Exped. to Rocky Mts., ii, 1824, 40.

Carpodacus frontalis, NEWB., P. R. R. Rep., vi, 1857, 38.—BD., Ives' Col. Exped., 1857-58, pt. iv, 6.—*Id.*, Birds N. A., 1858, 415.—*Id.*, Proc. Acad. Nat. Sci. Phila., 1859, 304 (Cape Saint Lucas).—*Id.*, U. S. & Mex. Bound. Surv., ii, pt. ii, 1859, Birds, 14.—KENNERLY, P. R. R. Rep., Whipple's Route, 1859, 28.—XANTUS, Proc. Acad. Nat. Sci. Phila., 1859, 191 (Fort Tejon, Cal.).—HENRY, Proc. Acad. Nat. Sci. Phila., 1859, 107 (New Mexico).—COUES, Proc. Acad. Nat. Sci. Phila., 1866, 80 (Fort Whipple, Ariz.).—*Id.*, *ib.*, 1868, 83.—COOPER, Birds Cal., i, 1870, 156.—COUES, Key N. A. Birds, 1872, 129.—AIKEN, Proc. Bost. Soc. Nat. Hist., 1872, 199.—YARROW & HENSHAW, Rep. Orn. Specs., 1872, Wheeler's Exped., 1874, 13.—HENSHAW, An. Lyc. Nat. Hist. N. Y., xi, 1874, 5.—*Id.*, An. List Birds Utah, 1872, Wheeler's Exped., 1874, 43.—*Id.*, Rep. Orn. Specs., 1873, Wheeler's Exped., 1874, 78, 109.—COUES, Birds Northwest, 1874, 107.

Carpodacus frontalis var. *frontalis*, RIDG., Am. Jour., v, 1873, 40.—BD., BREW., & RIDG., N. A. Birds, i, 1874, 466, pl. xxi, f. 3-4.

Carpodacus familiaris, WOODH., Sitgreave's Exp. Zuñi & Col. Riv., 1854, 88.—HEERM., P. R. R. Rep., x, pt. ii, 1859, 50.

Common throughout Utah and Nevada, generally near the settlements. Large flocks seen at Beaver, in the middle of September, searching beneath weeds for seeds.

Though by no means wanting in the wild districts, where it is perfectly independent, relying wholly on its own resources for subsistence and habi-

tation, the House Finch, as its name implies, seems most at home when it has taken up its residence within the limits of civilization, and with the change of habitat there ensues a corresponding modification of its habits. It loses wholly the rather shy suspicious disposition which it possesses in the solitude of the wilderness, and appears willing to meet man more than half-way in his efforts to induce it to take up its abode in the towns, where, in Arizona and New Mexico, if it does not receive a warm welcome, it is at least tolerated; and, once permitted to establish itself, there seems to be no limit to its confiding familiarity. In this, as well as the noisy chirpings and twitterings with which they greet each other, and especially in their habit of availing themselves of every nook and corner about the house and outbuildings to place their nests, they recall to mind the English Sparrows as they are domiciled in the East. Indeed, I am by no means certain but that, if introduced here in our cities, and the same care and painstaking given them which has been afforded to the foreign strangers, they might live and thrive, and be found almost, if not quite, as useful as insect exterminators as appear to be the English Sparrows.

The nature of their food is very varied, and, besides insects, to obtain which they resort to the trees and bushes, they may be seen in the Mexican settlements hopping about the doors of the houses in search of the crumbs and refuse thrown out; while the stable yards and corrals are favorite resorts. In one point, at least, their advantage over the sparrows would be decided, and readily appreciated, since, instead of being entirely deficient in musical ability, they possess a really beautiful song, and, as if aware of this, they are prodigal of their efforts to please the ear. In summer, a dozen or more may often be seen sitting together on the rafters and eaves of the houses, or in the trees along the streets, apparently engaged in a real musical contest, several of the males pouring forth for some minutes an almost continuous stream of music, as if each were doing his best to outrival the others.

Apparently rather rare in the vicinity of Fort Garland, Colo.; but at Taos, N. Mex., seventy-five miles farther south, I saw great numbers. A large colony had established their nests in the interstices of a thatched roof of a shed directly adjoining the house. These nests were bulky, inartistic

structures, made of twigs and sheeps' wool; eggs, five in number, greenish-blue, spotted with black.

In every portion of New Mexico and Arizona visited by the survey, they have been found numerous. They were very abundant at Camp Apache the first of December, frequenting the ravines and hill sides covered with piñons and cedars, as well also as the stubble fields and weeds, where they feed eagerly upon the seeds. They probably pass the winter here, and even, I think, considerably farther north.

No.	Sex.	Locality.	Date.	Collector.	Wing.	Tail.	Bill.	Tarsus.
52	♀ jun.	Washington, Utah	July 25, 1872	H. W. Henshaw and Dr. H. C. Yarrow.	.....	.....	.....	.....
124	♀ ad.	..... do	July 29, 1872	..... do .....	.....	.....	.....	.....
21	♂ ad.	..... do	Aug. 1, 1872	..... do .....	.....	.....	.....	.....
41	♀ ad.	..... do	Aug. 2, 1872	..... do .....	.....	.....	.....	.....
42	♂ ad.	..... do .....	..... do .....	..... do .....	.....	.....	.....	.....
176	o	Panquitch, Utah	Sept. 17, 1872	H. W. Henshaw .....	.....	.....	.....	.....
296	♀ jun.	Beaver, Utah	Sept. 25, 1872	H. W. Henshaw and Dr. H. C. Yarrow.	.....	.....	.....	.....
297	♂	..... do .....	..... do .....	..... do .....	.....	.....	.....	.....
309	♀ jun.	North Creek, Utah	Sept. 26, 1872	..... do .....	.....	.....	.....	.....
231	♀ jun.	Iron Springs, Utah	Oct. 4, 1872	H. W. Henshaw .....	.....	.....	.....	.....
256	♂ ad.	Iron City, Utah	Oct. 6, 1872	..... do .....	.....	.....	.....	.....
257	♀ jun.	..... do .....	..... do .....	..... do .....	.....	.....	.....	.....
346	♂ ad.	Washington, Utah	Oct. 23, 1872	H. W. Henshaw and Dr. H. C. Yarrow.	.....	.....	.....	.....
347	♀	..... do .....	..... do .....	..... do .....	.....	.....	.....	.....
348	♀ jun.	..... do .....	..... do .....	..... do .....	.....	.....	.....	.....
359	♂ jun.	..... do	Oct. 24, 1872	..... do .....	.....	.....	.....	.....
768	♂ ad.	Fort Garland, Colo....	May 28, 1873	H. W. Henshaw	3. 10	2. 55	0. 40	0. 67
613	♂ jun.	Camp Apache, Ariz ...	Aug. 25, 1873	..... do	3. 12	2. 63	0. 40	0. 65

CHRY SOMITRIS TRISTIS (Linn.).

Fringilla tristis, LINN., Syst. Nat., i, 1766, 320.

Chrysomitris tristis, WOODH., Sitgreave's Exp. Zuñi & Col. Riv., 1854, 82.—NEWB., P. R. R. Rep., vi, 1857, 87.—BD., Birds N. A., 1858, 421.—HEERM., P. R. R. Rep., x, pt. iv, 1859, 50.—COOP. & SUCKL., P. R. R. Rep., xii, pt. ii, 1860, 197.—HAYD., Trans. Am. Phil. Soc., xii, 1862, 165.—STEV., U. S. Geol. Surv. Terr., 1870, 464.—COOPER, Birds Cal., i, 1871, 167.—ALLEN, Bull. Mus. Comp. Zoöl., 1872, 176.—COUES, Key N. A. Birds, 1872, 131, pl. 3, figs. 7, 8, 9, 10.—SNOW, Birds Kan., 1872, 9.—AIKEN, Proc. Bost. Soc. Nat. Hist., 1872, 199.—MERRIAM, U. S. Geol. Surv. Terr., 1872, 679 (Ogden; Fort Hall, Mont.).—BD., BREW., & RIDG., N. A. Birds, i, 1874, 471, pl. xxii,

figs. 7, 8.—YARROW & HENSHAW, Rep. Orn. Specs., 1872, Wheeler's Exped., 1874, 13.—HENSHAW, An. Lyc. Nat. Hist. N. Y., xi, 1874, 5.—*Id.*, An. List Birds Utah, 1872, Wheeler's Exped., 1874, 43.—*Id.*, Rep. Orn. Specs., 1873, Wheeler's Exped., 1874, 60.—ALLEN, Proc. Bost. Soc. Nat. Hist., June, 1874, 15, 17, 25.—COUES, Birds Northwest, 1874, 116.

In Eastern Nevada, where it was seen by Dr. H. C. Yarrow, and throughout Utah, this was a common species, inhabiting generally the groves of cottonwood, in which they appear to nest.

Very abundant in large flocks in the cottonwood groves along the Platte River near Denver. These fairly resounded with the twitterings and chirpings of the young males, which appeared to be practicing for the full concerts that follow later. Both sexes were moulting and in curiously pied plumage.

In Southern Colorado, the species seems to occur much less frequently. I did not detect it at all about Fort Garland; but Mr. Aiken has met with a flock at Pueblo in November. Has not yet been noted in Arizona or New Mexico, but may yet be found occurring as a winter visitor.

No.	Sex.	Locality.	Date.	Collector.	Wing.	Tail.	Bill.	Tarsus.
127	♂	Provo, Utah.....	July 29, 1872	H. W. Henshaw and Dr. H. C. Yarrow.	.....	.....	.....	.....
143	♂ ad.	..... do	July 30, 1872	..... do .....	.....	.....	.....	.....
273	♂ ad.	Washington, Utah	Oct. 10, 1872	..... do .....	.....	.....	.....	.....
478	♂ jun.	Provo, Utah.....	Dec. 1, 1872	..... do .....	.....	.....	.....	.....
A 20	.....	(Alcoholic).....	— —, 1873	..... do .....	.....	.....	.....	.....
7	♂	Denver, Colo.....	May 6, 1873	H. W. Henshaw.....	2. 87	2. 02	0. 45	0. 56
100	♂ ad.	..... do .....	..... do .....	..... do	2. 70	2. 06	0. 47	0. 52
371	♂ ad.	El Paso County, Colo.	May 12, 1874	C. E. Aiken .....	.....	.....	.....	.....

CHRYSOMITRIS PSALTRIA (Say).

Arkansas Finch.

PLATE IV, FIG 2.

Fringilla psaltria, SAY, Long's Exped. to Rocky Mts., ii, 1823, 40.

Chrysomitris psaltria, BD., Birds N. A., 1858, 422.—XANTUS, Proc. Acad. Nat. Sci. Phila., 1859, 191 (Fort Tejon, Cal.).—KENNERLY, P. R. R. Rep., Whipple's Route, 1859, 28.—COUES, Proc. Acad. Nat. Sci. Phila., 1868, 83.—COOPER, Birds Cal., 1870, 168.—ALLEN, Bull. Mus. Comp. Zoöl., 1872, 176 (Middle Kansas).—COUES, Key N. A. Birds, 1872, 132.—BD., BREW., & RIDG., N.

A. Birds, i, 1874, 474, pl. xxii, f. 9, 10.—YARROW & HENSHAW, Rep. Orn. Specs., 1872, Wheeler's Exped., 1874, 13.—HENSHAW, An. Lyc. Nat. Hist. N. Y., xi, 1874, 5.—*Id.*, An. List Birds Utah, 1872, Wheeler's Exped., 1874, 43.—*Id.*, Rep. Orn. Specs., 1873, Wheeler's Exped., 1874, 109.—COUES, Birds Northwest, 1874, 116.

Carduelis psaltria, HEERM., P. R. R. Rep., x, pt. ii, 1859, 50.

Chrysomitris (Pseudomitris) psaltria, COUES, Proc. Acad. Nat. Sci. Phila., 1866, 80 (Fort Whipple, Ariz.).

CHRYSOMITRIS PSALTRIA (Say), var. ARIZONAE, Coues.

Arizona Goldfinch.

PLATE IV, FIG. 1.

Chrysomitris mexicana var. *arizonæ*, COUES, Proc. Acad. Nat. Sci. Phila., 1866, 82.—COOPER, Birds Cal., i, 1870, 170.

Chrysomitris psaltria var. *arizonæ*, COUES, Key N. A. Birds, 1872, 132, f. 72.—BD., BREW., & RIDG., N. A. Birds, i, 1874, 476, pl. xxii, f. 11.—HENSHAW, Rep. Orn. Specs., 1873, Wheeler's Exped., 1874, 109.—COUES, Birds Northwest, 1874, 117.

Chrysomitris mexicana, (?) HENRY, Proc. Acad. Nat. Sci. Phila., 1859, 117 (New Mexico).

The Arkansas Goldfinch in its typical dress appears to be the form prevailing over the entire portion of Colorado and Utah, and probably also in the more northern parts of Arizona and New Mexico. At Pueblo, Colo., Mr. Aiken obtained several specimens, which, though most resembling *psaltria*, have a few faint dashes of black mingled with the green of the back, thus showing at this point a slight approach toward the Arizona form. Near Santa Fé, several specimens were taken in June, without doubt breeding here, which are quite typical of the variety *arizonæ*, and it is about in this latitude that this form replaces the more northern *psaltria*, the two, however, becoming in winter mingled together, so that occasionally both may be taken from the same flock. Their habits correspond pretty closely with those of the common Goldfinch (*C. tristis*). They feed very much upon the seeds of various weeds, and are very fond of those of the thistle, and in the fall may always be found in the neighborhood of these plants. In the plates the difference between the two species may plainly be perceived.

Var. *psaltria*.

No.	Sex.	Locality.	Date.	Collector.	Wing.	Tail.	Bill.	Tarsus.
274	♀ jun.	Washington, Utah	Oct. 10, 1872	H. W. Henshaw and Dr. H. C. Yarrow.	.....	.....	.....	.....
275	♂ jun.	..... do .....	..... do .....	..... do .....	.....	.....	.....	.....
356	♂ jun.	..... do	Oct. 23, 1872	..... do .....	.....	.....	.....	.....
365	♀ jun.	Saint George, Utah ...	Oct. 26, 1872	..... do .....	.....	.....	.....	.....
366	♂ jun.	..... do .....	..... do .....	..... do .....	.....	.....	.....	.....
367	♂ jun.	..... do .....	..... do .....	..... do .....	.....	.....	.....	.....
368	♂ jun.	..... do .....	..... do .....	..... do .....	.....	.....	.....	.....
478	♀ ad.	Inscription Rock, N. Mex.	Aug. 23, 1873	H. W. Henshaw.....	2.50	1.80	0.37	0.50
477	♂ ad.	..... do .....	..... do .....	..... do	2.45	1.83	0.38	0.53
710	♂ ad.	Camp Apache, Ariz....	Sept. 7, 1873	..... do	2.50	1.85	0.40	0.50
773	♀ ad.	Gila River, Ariz	Sept. 14, 1873	..... do	2.45	1.75	0.39	0.50
12	♂ ad.	Pueblo, Colo	July 12, 1874	C. E. Aiken	2.55	1.92	0.38	0.53
13	♀ ad.	..... do	July 24, 1874	..... do .....	.....	.....	.....	.....
26	♂ ad.	..... do	July 25, 1874	..... do .....	.....	.....	.....	.....
47	♂ ad.	..... do	July 27, 1874	..... do .....	.....	.....	.....	.....
48	♀ ad.	..... do .....	..... do .....	..... do .....	.....	.....	.....	.....

Var. *arizonæ*.

No.	Sex.	Locality.	Date.	Collector.	Wing.	Tail.	Bill.	Tarsus.
768	♂ ad.	Gila River, Ariz	July 14, 1874	H. W. Henshaw.....	.....	.....	.....	.....
9	♀ jun.	Santa Fé, N. Mex	July 17, 1874	..... do .....	.....	.....	.....	.....
32	♂ ad.	..... do	July 22, 1874	Dr. J. T. Rothreck....	.....	.....	.....	.....
33	♂ ad.	..... do .....	..... do .....	..... do .....	.....	.....	.....	.....
899	♂ ad.	Camp Grant, Ariz....	Sept. 29, 1874	H. W. Henshaw.....	.....	.....	.....	.....
990	♂ jun.	Camp Apache, Ariz....	Oct. 10, 1874	..... do .....	.....	.....	.....	.....
1093	♀ jun.	..... do	Oct. 30, 1874	..... do .....	.....	.....	.....	.....

CHRY SOMITRIS PINUS (Wils.).

Pine Finch.

Fringilla pinus, WILS., Am. Orn., ii, 1810, 133, pl. xvii, f. 1.

Chrysomitris pinus, BD., Birds N. A., 1858, 425.—XANTUS, Proc. Acad. Nat. Sci. Phila., 1859, 191 (Fort Tejon, Cal.).—HENRY, Proc. Acad. Nat. Sci. Phila., 1859, 107 (New Mexico).—COOP. & SUCKL., P. R. R. Rep., xii, pt. ii, 1860, 197.—HAYD., Trans. Am. Phil. Soc., xii, 1862, 765.—COUES, Proc. Acad. Nat. Sci. Phila., 1866, 83 (Fort Thorn, N. M.; Dr. Henry).—COOPER, Birds Cal., 1870, 173.—ALLEN, Bull. Mus. Comp. Zool., 1872, 176 (mountains of Colorado).—COUES, Key N. A. Birds, 1872, 131, pl. 3, figs. 11, 12.—SNOW, Birds Kan., 1872, 9.—AIKEN, Proc. Bost. Soc. Nat. Hist., 1872, 199.—MERRIAM,

U. S. Geol. Surv. Terr., 1872, 679.—BD., BREW., & RIDG., N. A. Birds, i, 1874, 480.—HENSHAW, An. Lyc. Nat. Hist. N. Y., xi, 1874, 5.—*Id.*, An. List Birds Utah, 1872, Wheeler's Exped., 1874, 43.—*Id.*, Rep. Orn. Specs., 1873, Wheeler's Exped., 1874, 79.—COUES, Birds Northwest, 1874, 115.

Linaria pinus, HEERM., P. R. R. Rep., x, pt. ii, 1859, 49.

May 29, near Fort Garland, Colo., a flock of perhaps fifteen individuals were seen. They were greedily feeding upon the buds of the deciduous trees, which, during the spring, appear to constitute the larger portion of their diet. These were in the breeding dress, and the species undoubtedly spends the summer in the mountains.

To the breeding range of this species are to be added the high mountainous portions of Arizona, probably as far south as Mexico, and with little doubt those portions of Western New Mexico correspondingly elevated. Individuals in the worn breeding dress, and also the young not long from the nest, were taken at Mount Graham July 30, where the species was well represented in numbers. They appear to be resident, inhabiting the pine region during the summer, where they were found until the middle of September. They were usually seen at this season. A few at a time mingled with flocks of insectivorous birds, and with them spent much time on the ground searching for the minute grass and other seeds. Later, they appeared lower down, and in small flocks, and often with the other Goldfinches, whose habits correspond closely, frequented the dead weeds, and especially the sunflowers.

No.	Sex.	Locality.	Date.	Collector.	Wing.	Tail.	Bill.	Tarsus.
180	♂ ad.	Fort Garland, Colo.	May 29, 1873	H. W. Henshaw.	2.88	1.98	0.41	0.57
181	♀ ad.	..... do .....	..... do .....	..... do	2.73	1.82	0.40	0.55
182	♂ ad.	..... do .....	..... do .....	..... do	2.68	1.88	0.48	0.54
230	♂ ad.	Mount Graham, Ariz..	July 19, 1874	..... do	2.77	1.81	0.39	0.54
231	Jun.	..... do	July 30, 1874	..... do	2.77	1.93	0.33	0.53
768	♀	..... do	Sept. 21, 1874	..... do	2.87	1.98	0.37	0.54
782	♀ jun.	..... do .....	..... do .....	..... do	2.80	2.01	0.37	0.57
812	♂ jun.	..... do	Sept. 23, 1874	..... do	2.93	2.00	0.37	0.55
820	♀ jun.	..... do .....	..... do .....	..... do	2.90	2.15	0.39	0.52

LOXIA CURVIROSTRA, L., var. AMERICANA (Wils.).

Red Crossbill.

- Curvirostra americana*, WILS., Am. Orn., iv, 1811, 44, pl. xxxi, figs. 1, 2.—BD., Birds N. A., 1858, 426.—COOP. & SUCKL., P. R. R. Rep., xii, pt. ii, 1860, 198.—HAYD., Trans. Am. Phil. Soc., xii, 1862, 165.—COUES, Proc. Acad. Nat. Sci. Phila., 1866, 84 (Fort Whipple, Ariz.).—COOPER, Birds Cal., i, 1870, 148 (Sierra Nevada).—COUES, Key N. A. Birds, 1872, 129, pl. iii, figs. 13, 14, 15.—SNOW, Birds Kan., 1872, 9.
- Loxia americana*, NEWB., P. R. R. Rep., vi, 1857, 87.—ALLEN, Proc. Bost. Soc. Nat. Hist., June, 1874, 25.
- Loxia curvirostra* var. *americana*, COUES, Key N. A. Birds, 1872, 351.—HENSHAW, Rep. Orn. Specs., 1873, Wheeler's Exped., 1874, 79.—BD., BREW., & RIDG., N. A. Birds, i, 1874, 484, pl. xxiii, figs. 1-4.—COUES, Birds Northwest, 1874, 109.

LOXIA CURVIROSTRA, L., var. MEXICANA, Strickland.

Mexican Crossbill.

- Loxia mexicana*, STRICKLAND, Jardine Contrib. Orn., 1851, 43.—BD., Birds N. A. 1858, 94.
- Curvirostra mexicana*, STEV., U. S. Geol. Surv. Terr., 1870, 464.
- Curvirostra americana* var. *mexicana*, COUES, Key N. A. Birds, 1872, 129.
- Loxia curvirostra* var. *mexicana*, BD., BREW., & RIDG., N. A. Birds, i, 1874, 488.—COUES, Birds Northwest, 1874, 109.

The Mexican Crossbill differs from its near relative of more northern regions in the brighter coloration, but chiefly in its larger bill; the differences between extremes of the two forms being very great. In the late work on North American Birds, all specimens from the Central Rocky Mountains of the United States are referred to the Mexican variety; but I am informed by Mr. Ridgway that this is a mistake, the true *mexicana* not having been observed within our boundaries until during the past season when it was found by our parties to inhabit the mountains of Southern Arizona, specimens from this region being quite identical with those from the Mexican table lands. Near Fort Garland, I obtained specimens of the Crossbill, which are perfectly typical of the var. *americana* as restricted. At Pagosa, however, about seventy-five miles west of Fort Garland, Colo., Mr. Aiken obtained during the past season two Crossbills, one an adult, which, both in intensity of coloration and size of bill, approximate closely to those obtained by myself in Arizona, and certainly approach much closer to the Mexican variety than to *americana*. I therefore, without much doubt, refer them to

the former bird. The second specimen, a young bird, though in the streaked plumage peculiar to the first stage (taken September 7), has the still undeveloped bill conspicuously larger than in the typical *americana*. It seems probable, then, that the Mexican variety follows the mountain ranges northward, and breeds at least as far north as extreme Southern Colorado.

During the latter part of September, the Mexican Crossbill was seen in considerable numbers among the pines and other coniferous trees of the Mount Graham range. They flew about from tree top to tree top in small flocks of from five to fifteen, and were always busily engaged in cutting open with their powerful scissor like bills the pine seeds, their favorite diet. In habits and notes, they do not differ from the common Red Crossbill.

Var. americana.

No.	Sex.	Locality.	Date.	Collector.	Wing.	Tail.	Bill.	Tarsus.
289	♀	Fort Garland, Colo....	June 7, 1873	H. W. Henshaw.....	3.29	2.17	0.68	0.66
372	♀	..... do	June 19, 1873	..... do	3.25	2.13.	0.60	0.63

Var. mexicana.

No.	Sex.	Locality.	Date.	Collector.	Wing.	Tail.	Bill.	Tarsus.
210	♂ ad.	Pagosa, Colo	Sept. 7, 1874	C. E. Aiken	3.77	2.29	0.78	0.72
211	♀ jun.	..... do .....	..... do .....	..... do	3.72	2.48	0.68	0.73
746	.....	Mount Graham, Ariz ..	Sept. 19, 1874	H. W. Henshaw	3.95	2.62	0.78	0.72
805	♂ ad.	..... do	Sept. 22, 1874	..... do	4.00	2.65	0.78	0.74
806	.....	..... do	Sept. 22, 1874	..... do	3.97	2.58	0.74	0.72
807	♂ ad.	..... do	Sept. 23, 1874	..... do	3.90	2.68	0.77	0.72
875	♂ ad.	..... do	Sept. 25, 1874	..... do	3.97	2.63	0.84	0.72
876	♂ ad.	..... do .....	..... do .....	..... do	3.85	2.66	0.85	0.73

LEUCOSTICTE AUSTRALIS, Allen.

Allen's Brown-capped Finch.

PLATES V & VI.

Leucosticte tephrocotis var. *australis*, ALLEN, MSS.—RIDG., Bull. Essex. Inst., v, 1873, 182, 189, 190.—BD., BREW., & RIDG., N. A. Birds, iii, 1874, 509.

Leucosticte australis, RIDG., Bull. Geol. Surv. Terr., No. 2, 2d ser. 1875, 79 (monographic).

The following interesting notes are given by Dr. Rothrock, who found the species very abundant in the mountains back of Fairplay in the South Park, and also at Mounts Harvard, Evans, Red Mountains, and elsewhere:

"These birds are, in habitat, the associates of the White-tailed Ptarmigan, and, like that bird, are never found below the timber line in summer, ranging thence upward to the summits of the highest peaks. It is never found singly, but usually in flocks of from six to thirty, and rarely far away from large bodies of snow; its favorite resort being the edges of snow banks, where they find grass seeds, and also a small black coleopterous insect. Even when found among the scrub pines, which was rarely the case, it was noticed that they seldom alighted on a tree, but kept constantly on the ground. At all times, they were rather shy and suspicious. The specimens taken were all in breeding dress."

Mr. Aiken obtained two specimens of this species at Mount Blanco, N. M., which is perhaps near the limit of its southward range. I did not find it among the White Mountains of Arizona at an altitude of 12,000 feet.

No.	Sex.	Locality.	Date.	Collector.	Wing.	Tail.	Bill.	Tarsus.
69	♂ ad.	South Park, Colo	July 2, 1873	Dr. J. T. Rothrock	3.98	3.00	0.38	0.75
69A	♂ ad.	..... do . . . . .	..... do . . . . .	..... do	4.13	3.07	0.50	0.74
69B	♂ ad.	..... do . . . . .	..... do . . . . .	..... do	4.20	3.12	0.43	0.75
69C	♂ ad.	..... do . . . . .	..... do . . . . .	..... do	4.23	3.13	0.42	0.75
69D	♂ ad.	..... do . . . . .	..... do . . . . .	..... do	4.24	3.12	0.48	0.75
194	Jun.	Mount Blanco, N. Mex	Sept. 3, 1874	C. E. Aiken	4.09	2.75	0.48	0.79
195	Ad.	..... do . . . . .	..... do . . . . .	..... do	4.32	2.98	0.48	0.79

PLECTROPHANES ORNATUS, Towns.

Chestnut-collared Bunting.

Plectrophanes ornatus, TOWNS., Jour. Acad. Nat. Sci. Phila., vii, 1837, 189.—WOODH., Sitgreave's Exp. Zuñi & Col. Riv., 1854, 88 (Indian Territory).—BD., Birds N. A., 1858, 435.—HAYD., Trans. Am. Phil. Soc., xii, 1862, 165.—ALLEN, Bull. Mus. Comp. Zoöl., 1872, 177 (Middle Kansas).—COUES, Key N. A. Birds, 1872, 134.—SNOW, Birds Kan., 1872, 10.—COUES, Am. Nat., viii, 1874, 602 (Northern Dakota, Eastern Montana, breeding).—BD., BREW., & RIDG., N. A. Birds, i, 1874, 520, pl. xxiv, f. 3.—HENSHAW, Rep. Orn. Specs., 1873, Wheeler's Exped., 1874, 109.—ALLEN, Proc. Bost. Soc. Nat. Hist., June, 1874, 16, 25.—COUES, Birds Northwest, 1874, 122.

Plectrophanes melanomus, BD., Birds N. A., 1858, 436.—HEERM., P. R. R. Rep., x, 1859, Park's Route, Birds, 13 (New Mexico).—HAYD., Trans. Am. Phil. Soc., xii, 1862, 165.—COUES, Proc. Acad. Nat. Sci. Phila., 1866, 84 (Arizona).—SNOW, Birds Kan., 1872, 10.

Plectrophanus ornatus var. *melanomus*, BD., BREW., & RIDG., N. A. Birds, i, 1874, 521, pl. xxiv, f. 6.

From the 29th of September, when this species was first noted at Camp Grant, Ariz., till November 10, near Fort Tulerosa, N. Mex., it was frequently seen in large flocks on the dry, arid plains and plateaus of Southeastern Arizona and Southwestern New Mexico. They move about in companies of hundreds, and when on the ground run nimbly among the grasses searching for seeds and insects. When approached, the whole flock squats silently among the herbage, and remains so quiet, and their colors blend so nicely with the surrounding tints, that it is almost impossible to detect them, though but a few feet distant. On taking wing, each bird emits a number of short, quavering chirps, which they repeat constantly as long as on the wing. Their flight is erratic and wild, and, once startled, they are apt to keep on the wing a long time, flying hurriedly about. I have occasionally seen a flock start from the ground, and, after circling excitedly about, suddenly start off in a straight line till nearly out of sight, and then, as if urged by some new impulse, suddenly wheel about and take a direct course back, alighting within a few feet from the starting point. The single specimen taken on Mount Graham, Ariz., by Dr. Rothrock, September 24, marks the earliest date at which the species has been found thus far south. A very large series of specimens was taken at Camp Apache during the latter portion of October.

No.	Sex.	Locality.	Date.	Collector.	Wing.	Tail.	Bill.	Tarsus.
892	♀	Camp Grant, Ariz.	Sept. 29, 1873	H. W. Henshaw	3.15	2.34	0.42	0.75
895	♀	..... do .....	..... do .....	..... do	3.17	2.35	0.40	0.75
896	♀	..... do .....	..... do .....	..... do	3.20	2.40	0.45	0.75
897	♀	..... do .....	..... do .....	..... do	3.00	2.26	0.40	0.78
901	♂	San Pedro, Ariz.	Oct. 3, 1873	..... do	3.32	2.50	0.43	0.75
902	♂	..... do .....	..... do .....	..... do	3.27	2.37	0.41	0.80
904	♀	..... do .....	..... do .....	..... do	3.20	2.30	0.40	0.75
128	♀	Camp Bowie, Ariz.	Oct. 10, 1873	Dr. C. G. Newberry...	3.04	2.23	0.43	0.75
129	♀	..... do .....	..... do .....	..... do	3.28	2.49	0.41	0.86
923	♂	Gila River, Ariz.	Oct. 17, 1873	H. W. Henshaw	3.25	2.40	0.47	0.75
924	♀	..... do .....	..... do .....	..... do	3.95	2.23	0.42	0.75
939	♂	..... do .....	..... do .....	..... do	3.12	2.40	0.40	0.74
989	♂	..... do .....	..... do .....	..... do	3.25	2.45	.....	.....
836	♂ ad.	Mount Graham, Ariz. ..	Sept. 24, 1874	Dr. J. T. Rothrock....	.....	.....	.....	.....

Iris brown ; bill plumbeous-brown above, lighter beneath ; feet dusky-brown.

PLECTROPHANES MACCOWNI, Lawr.

Chestnut-shouldered Longspur.

Plectrophanes maccownii, LAWRE., An. Lyc. Nat. Hist. N. Y., v, Sept., 1851, 122.—BD., Birds N. A., 1858, 437.—HEERM., P. R. R. Rep., Park's Route, x, 1859, 13.—HAYD., Trans. Am. Phil. Soc., xii, 1862, 165.—COUES, Proc. Acad. Nat. Sci. Phila., 1866, 84 (Southern Arizona, Dr. Heermann).—STEV., U. S. Geol. Surv. Terr., 1870, 464.—ALLEN, Bull. Mus. Comp. Zoöl., 1872, 177 (Cheyenne, Western Kansas, in winter).—COUES, Key N. A. Birds, 1872, 134.—SNOW, Birds Kan., 1872, 10.—COUES, Am. Nat., viii, 1874, 602 (Milk River, Montana, breeding).—BD., BREW., & RIDG., N. A. Birds, i, 1874, 523, pl. xxiv, f. 1.—HENSHAW, Rep. Orn. Specs., 1873, Wheeler's Exped., 1874, 110.—ALLEN, Proc. Bost. Soc. Nat. Hist., June, 1874, 16, 17, 26.—COUES, Birds Northwest, 1874, 124.

Found throughout much the same region as the preceding, and with very similar habits.

Both species appear to become common in Eastern Middle Arizona at about the same time; their general arrival from their northern breeding grounds not taking place till in early October. From this time, they are generally dispersed over the country, seeking the plains and low lands generally, and apparently finding in such localities an abundance of food for their wants in the seeds of the weeds and grasses, and such insects as they can discover at this season. At Camp Apache, both species were very numerous the latter part of October, frequenting here chiefly the stubble fields, and such spots as in the East the Titlark invariably selects in the interior country. Though the similarity of their wants and habits brought both species to the same spots, I noticed that they rarely mingled; and, though occasionally a few of one species would be found in a flock of the other, these exceptions were quite rare, and generally the flocks maintained their individuality intact.

No.	Sex.	Locality.	Date.	Collector.	Wing.	Tail.	Bill.	Tarsus.
130	♀ jun.	Camp Bowie, Ariz	Oct. 10, 1873	Dr. C. G. Newberry...	3. 17	2. 10	0. 45	0. 70
919	♀	Gila River, Ariz	Oct. 16, 1873	H. W. Henshaw	3. 37	2. 18	0. 46	0. 72
952	♂	Fort Bayard, N. Mex..	Oct. 22, 1873	..... do	3. 45	2. 40	0. 46	0. 75
954	♂	..... do .....	..... do .....	..... do	3. 43	2. 37	0. 50	0. 75
955	♂	..... do .....	..... do .....	..... do	3. 37	2. 25	0. 46	0. 69
956	♀	..... do .....	..... do .....	..... do	3. 30	2. 28	0. 45	0. 75
958	♀	..... do .....	..... do .....	..... do	3. 65	2. 60	0. 45	0. 76
950	♀	..... do .....	..... do .....	..... do	3. 40	2. 30	0. 47	0. 75

CENTRONYX BAIRDI (Aud.).

Baird's Sparrow.

Emberiza bairdii, AUD., Birds Am., vii, 1843, 359, pl. d.

Centronyx bairdii, BD., Birds N. A., 1858, 441.—COUES, Key N. A. Birds, 1872, 135.—*Id.*, Am. Nat., vii, 1873, 695 (Dakota; abundant; breeding).—BD., BREW., & RIDG., N. A. Birds, i, 1874, 351, pl. xxv, f. 3.—HENSHAW, Rep. Orn. Specs., 1873, Wheeler's Exped., 1874, 110.—*Id.*, Am. Nat., April, 1874, 241.—COUES, Birds Northwest, 1874, 125.—ALLEN, Proc. Bost. Soc. Nat. Hist., June, 1874, 17, 27.

Passerculus bairdii, COUES, Am. Nat., 1873, 697.

Centronyx ochrocephalus, AIKEN, Am. Nat., vii, 1873, 237 (autumnal plumage).—SCOTT, Am. Nat., vii, 1873, 564.

The interesting fact of the discovery of Baird's Bunting in large numbers in Northern Dakota has been announced by Dr. Coues. Additional light is thrown upon the range of this almost unknown species by its discovery in Southeastern Arizona and Southwestern New Mexico. I found it in immense numbers, from September 20 till late in October, throughout the rolling plains along the bases of the mountains, and even quite high up among the foot hills. It was usually associated with the Savanna and Yellow-winged Sparrows, and seems to embrace in its habits certain characteristics of both species. Its flight is particularly like that of the former bird, but even more wild and irregular. It pursues its zigzag course for a couple of hundred yards, and then, suddenly turning sharply to one side, alights behind some friendly bush or tuft of grass. Like the Yellow-winged Sparrow, it is difficult to flush, but seeks rather to evade search by running nimbly through the grass, changing its course frequently, and hiding wherever possible, flying only when hard pressed. A large number of specimens were secured, all molting, and many in extremely ragged plumage. From their condition, it is presumed that they were not migrants, but breed in the immediate locality.

During the past season, 1874, these sparrows were met with under circumstances quite similar in character as compared with the experience of the previous season. I did not, however, obtain evidence showing conclusively that they pass the breeding season in this region, though the early date at which the first individuals were seen, August 16, and their condition, in some instances they being scarcely able to fly from the loss of feathers by

molting, renders this supposition very probable. I did not see them north of the Gila, but from this river southward to the Mexican border their diffusion is quite general. It is probable some pass the winter within our borders. From Mr. Aiken's investigations in Colorado, it would appear the species occurs there as a spring and fall migrant, but apparently is not at those seasons very numerous. A specimen was taken by him August 22 near the Rio Grande River, Colorado.

The following measurements, taken from fresh specimens, were selected from a series of over thirty.

No.	Sex.	Locality.	Date.	Collector.	Length.	Stretch.	Wing.	Tail.	Bill.	Tars.
804	♂	Mt. Graham, Ariz.	Sept. 21, 1873	H.W. Henshaw	.....	.....	2.80	2.27	0.47	0.83
807	♂	..... do .....	..... do .....	..... do .....	.....	.....	2.75	2.30	0.44	0.83
812	♂	Camp Grant, Ariz.	Sept. 22, 1873	..... do	5.49	9.37	3.00	2.31	0.43	0.80
813	♂	..... do .....	..... do .....	..... do	5.74	9.25	2.93	2.25	0.45	0.79
814	♀	..... do .....	..... do .....	..... do	5.43	8.80	2.74	2.19	0.45	0.80
815	♂	..... do .....	..... do .....	..... do	5.43	9.25	3.00	2.37	0.41	0.79
816	♀	..... do .....	..... do .....	..... do	5.49	9.13	2.74	2.25	0.45	0.77
817	♂	..... do .....	..... do .....	..... do	5.62	9.19	3.00	2.25	0.43	0.80
818	♀	..... do .....	..... do	M. N. Maguet	5.37	8.80	2.62	2.12	0.45	0.77
819	♀	..... do	Sept. 23, 1873	H.W. Henshaw	5.49	8.74	2.62	2.12	.....	.....
821	♂	..... do .....	..... do .....	..... do	5.68	9.06	3.00	2.17	0.45	0.85
822	♂	..... do .....	..... do .....	..... do	5.46	9.06	2.80	2.12	0.45	0.82
823	♂	..... do .....	..... do .....	..... do	5.61	9.37	3.00	2.37	0.44	0.82
835	♂	..... do .....	..... do .....	..... do	5.74	9.37	3.06	2.30	0.43	0.83
836	♂	..... do .....	..... do .....	..... do	5.66	9.25	3.00	2.25	0.47	0.81
837	♂	..... do .....	..... do .....	..... do	5.48	9.43	2.80	2.18	0.47	0.82
838	♂	..... do .....	..... do .....	..... do	5.36	9.31	2.80	2.25	0.43	0.77
839	♂	..... do .....	..... do .....	..... do	5.66	9.06	2.74	2.18	0.45	0.81
920	♀	Gila River, N. Mex.	Oct. 16, 1873	..... do .....	.....	.....	2.65	1.95	0.46	0.81
177	♀ jun.	Del Norte, Colo.	Aug. 22, 1874	C. E. Aiken	.....	.....	.....	.....	.....	.....

PASSERCULUS SAVANNA (Wils.), var. ALAUDINUS, Bp.

Western Savanna Sparrow.

Passerculus alaudinus, Bp., Comp. Rend., xxxvii, Dec., 1853, 918 (California).—Bd., Birds N. A., 1858, 446.—XANTUS, Proc. Acad. Nat. Sci. Phila., 1859, 191 (Fort Tejon, Cal.).—Bd., U. S. & Mex. Bound. Surv., ii, pt. ii, 1859, Birds, 14.—HEERM., P. R. R. Rep., x, pt. iv, 1859, 49.—COOP. & SUCKL., P. R. R. Rep., xii, pt. ii, 1860, 199.—COOPER, Birds Cal., i, 1870, 181.—STEV., U. S. Geol. Surv. Terr., 1870, 464.—SNOW, Birds Kan., 1872, 10.—MERRIAM,

PASSERES—FRINGILLIDAE—P. SAVANNA VAR. ALAUDINUS. 255

U. S. Geol. Surv. Terr., 1872, 679.—YARROW, Rep. Orn. Specs., 1871, Wheeler's Exped., 1874, 34.

Passerculus savanna var. *alaudinus*, BD., BREW., & RIDG., N. A. Birds, i, 1874, 537.—YARROW & HENSHAW, Rep. Orn. Specs., 1872, Wheeler's Exped., 1874, 15.—HENSHAW, Rep. Orn. Specs., 1873, Wheeler's Exped., 1874, 61, 79, 111.—BD., BREW., & RIDG., N. A. Birds, 1874, pl. xxiv, f. 11.—HENSHAW, An. Lyc. Nat. Hist. N. Y., xi, 1874, 5.—*Id.*, An. List Birds Utah, 1872, Wheeler's Exped., 1874, 44.—ALLEN, Proc. Bost. Soc. Nat. Hist., June, 1874, 27.

Passerculus savanna, ALLEN, Bul. Mus. Comp. Zool., 1872, 177.—WOODH., Sitgreave's Exp. Zuñi & Col. Riv., 1854, 85.—COUES, Birds Northwest, 1874, 127 (includes both eastern and western variety).

This, the western race of the Savanna Sparrow, replaces that bird in the Middle Region, and extends southward through Arizona and New Mexico, having been found by us a summer resident as far as the border line of Mexico. It is everywhere common, frequenting with indifference the moist meadowy lands in the vicinity of streams and the dry arid plains. In Colorado, Mr. Aiken secured specimens from various localities, and found it numerous. At Denver, it was common the 1st of May, having apparently arrived long before; but, from the 1st to the 12th, a continual increase in numbers was noted.

No.	Sex.	Locality.	Date.	Collector.	Wing.	Tail.	Bill.	Tarsus.
.....	♂ ad.	Nevada	Sept. 8, 1871	F. Bischoff .....	.....	.....	.....	.....
123	♀ jun.	Thistle Valley, Utah...	July 20, 1872	H. W. Henshaw .....	.....	.....	.....	.....
78	♂ jun.	Provo, Utah	July 26, 1872	Dr. H. C. Yarrow and H. W. Henshaw.	.....	.....	.....	.....
79	♂ ad.	..... do .....	..... do .....	..... do .....	.....	.....	.....	.....
81	♂ ad.	..... do .....	..... do .....	..... do .....	.....	.....	.....	.....
39	♂ ad.	..... do	Aug. 2, 1872	..... do .....	.....	.....	.....	.....
39 A	♀ ad.	..... do .....	..... do	H. W. Henshaw .....	.....	.....	.....	.....
40	♂ ad.	..... do .....	..... do	H. W. Henshaw and Dr. H. C. Yarrow.	.....	.....	.....	.....
52	♂ ad.	Denver, Colo.	May 12, 1873	H. W. Henshaw	2.83	2.23	0.43	0.78
121	♂ ad.	..... do	May 17, 1873	..... do	2.80	2.15	0.43	0.80
212	♂ ad.	Fort Garland, Colo....	May 30, 1873	..... do	2.81	2.17	0.43	0.82
213	♂ ad.	..... do .....	..... do .....	..... do	2.79	2.14	0.43	0.75
214	♂ ad.	..... do .....	..... do .....	..... do	2.83	2.24	0.48	0.82
608	♀ jun.	Mount Graham, Ariz ..	Aug. 21, 1873	..... do	2.60	2.20	0.40	0.73
665	♂ jun.	Camp Apache, Ariz ..	Aug. 23, 1873	..... do	2.65	2.26	0.43	0.82
620	♂	..... do	Aug. 26, 1873	..... do	2.75	2.23	0.42	0.80
634	♀ jun.	..... do	Aug. 27, 1873	..... do	2.50	2.10	0.43	0.75
847	.....	Camp Grant, Ariz. ....	..... do .....	..... do	2.75	2.26	0.45	0.75
894	♀	..... do	Sept. 29, 1873	..... do	2.60	2.10	0.42	0.77

PASSERCULUS SAVANNA (Wils.).

Savanna Sparrow.

I learn from Mr. Aiken that during the migrations the typical *savanna* of the East occurs in nearly the same abundance as the variety *alaudinus*, and that during the past season he found the former breeding near Pueblo, Col. This is the first observation which gives this variety a summer habitat so far to the west.

POECETES GRAMINEUS (Gm.), var. CONFINIS, Bd.

Grass Finch; Bay-winged Bunting.

Poocætes gramineus var. *confinis*, BD., Birds N. A., 1858, 448 (in text).—COUES, Key N. A. Birds, 1872, 136.—MERRIAM, U. S. Geol. Surv. Terr., 1872, 680.—YARROW & HENSHAW, Rep. Orn. Specs., 1872, Wheeler's Exped., 1874, 14.—HENSHAW, An. Lyc. Nat. Hist. N. Y., xi, 1874, 5.—*Id.*, An. List Birds Utah, 1872, Wheeler's Exped., 1874, 44.—*Id.*, Rep. Orn. Specs., 1873, Wheeler's Exped., 1874, 61, 80, 111.—COUES, Am. Nat., viii, 1874, 602.—*Id.*, Birds Northwest, 1874, 129.

Poocætes confinis, YARROW, Rep. Orn. Specs., 1871, Wheeler's Exped., 1874, 34.

Poocætes gramineus, BD., U. S. & Mex. Bound. Surv., ii, pt. ii, 1859, Birds, 15.—HENRY, Proc. Acad. Nat. Sci. Phila., 1859, 107 (New Mexico).—COOP. & SUCKL., P. R. R. Rep., xii, pt. ii, 1860, 200.—COUES, Proc. Acad. Nat. Sci. Phila., 1868, 83.—ALLEN, Bull. Mus. Comp. Zoöl., 1872, 177.

Zonotrichia graminea, WOODH., Sitgreave's Exp. Zuñi & Col. Riv., 1854, 84.—NEWB., P. R. R. Rep., vi, 1857, 88.—HEERM., P. R. R. Rep., x, pt. ii, 1859, 47.

This and the preceding species are perhaps the most common and generally distributed in the West of the sparrow tribe. They both frequent much the same localities, but the Grass Finch is more constantly found on the dry plains, and entirely away from the vicinity of water, and besides by preference frequents the higher plateaus.

Abundant in Southern Colorado. Nests on the ground among the sage brush. Two nests were obtained in South Park, Colorado, by Dr. Rothrock. Nest a slight structure of dried grasses, lined slightly with cottony substances from plants. Eggs four or five in number, of a greenish-white ground color, blotched all over with light brown and obsolete markings of purple, with a few black streakings.

I have observed no differences in habit in this variety as distinguished from the eastern form, and the songs of the two are quite identical, not

PASSERES—FRINGILLIDAE—C. PASSERINUS VAR. PERPALLIDUS. 257

differing more than do the strains of different individuals in the same neighborhood at the East. Mr. Aiken has observed it in El Paso County, Colorado, April 18.

No.	Sex.	Locality.	Date.	Collector.	Wing.	Tail.	Bill.	Tarsus.
...	♀ ad.	Nevada.....	June 20, 1871	F. Bischoff .....	.....	.....	.....	.....
81	♀ ad.	Strawberry Valley, Utah	Aug. 13, 1872	H. W. Henshaw .....	.....	.....	.....	.....
100	♀ jun.	Panquitch, Utah	Aug. 17, 1872	..... do .....	.....	.....	.....	.....
144	♂ jun.	Salina, Utah.....	Sept. 5, 1872	..... do .....	.....	.....	.....	.....
158	♂ jun.	Grass Valley, Utah.....	Sept. 10, 1872	..... do .....	.....	.....	.....	.....
292	♂ ad.	Beaver, Utah.....	Sept. 24, 1872	Dr. H. C. Yarrow and H. W. Henshaw.	.....	.....	.....	.....
294	♀ ad.	Toquerville, Utah.....	Oct. 14, 1872	H. W. Henshaw .....	.....	.....	.....	.....
B 8	.....	(Alcoholic).....	— —, 1873	H. W. Henshaw and Dr. H. C. Yarrow.	.....	.....	.....	.....
18	♂ ad.	Denver	May 7, 1873	H. W. Henshaw	3. 25	2. 53	0. 48	0. 82
19	♀ ad.	.....do .....	.....do .....	..... do	3. 17	2. 67	0. 45	0. 73
41	♂ ad.	.....do	May 10, 1873	..... do	3. 13	2. 55	0. 45	0. 83
784	♂	Gila River, Ariz	Sept. 15, 1873	..... do	3. 30	2. 65	0. 45	0. 83
11	♂	Camp Grant, Ariz.....	Sept. 22, 1873	M. N. Maguet	2. 98	2. 67	0. 45	0. 78
12	♂	.....do .....	.....do .....	..... do	3. 13	2. 71	0. 45	0. 85

COTURNICULUS PASSERINUS (Wils.), var. PERPALLIDUS, Ridg.

Western Yellow-winged Sparrow.

PLATE I, FIG. 2.

Coturniculus passerinus var. *perpallidus*, RIDG., MS.—COUES, Key N. A. Birds, 1872, 137.—BD., BREW., & RIDG., N. A. Birds, i, 1874, 556.—YARROW, Rep. Orn. Specs., 1871, Wheeler's Exped., 1874, 34.—YARROW & HENSHAW, Rep. Orn. Specs., 1872, Wheeler's Exped., 1874, 15.—HENSHAW, An. Lyc. Nat. Hist. N. Y., xi, 1874, 5.—*Id.*, An. List Birds Utah, 1872, Wheeler's Exped., 1874, 44.—*Id.*, Rep. Orn. Specs., 1873, Wheeler's Exped., 1874, 112.—ALLEN, Proc. Bost. Soc. Nat. Hist., June, 1874, 16, 17, 27.—COUES, Birds Northwest, 1874, 132.

Coturniculus passerinus, WOODH., Sitgreave's Exp. Zuñi & Col. Riv., 1854, 86.—BD., U. S. & Mex. Bound. Surv., ii, pt. ii, 1859, Birds, 15.—HEERM., P. R. R. Rep., x, pt. iv, 1859, 49.—KENNERLY, P. R. R. Rep., (Whipple's Route), 1859, 28.—HENRY, Proc. Acad. Nat. Sci. Phila., 1859, 107 (New Mexico).—COUES, Proc. Acad. Nat. Sci. Phila., 1866, 84 (Bill Williams' Fork, Kennerly).—ALLEN, Bul. Mus. Comp. Zoöl., 1872, 177 (western edge of plains; Ogden, Utah).

This pale western race of the Yellow-winged Sparrow is found in the Middle Region, extending thence west to the Pacific. Though occurring in

Utah and Colorado, it appears to be far less numerous there than on the grassy plains and valleys of New Mexico and Arizona, where it breeds in great abundance. In the Sonoita Valley, within a few miles of the Mexican border, the long grass was fairly swarming with the old and young of this species; a few of the latter in early September still unable to care for themselves. In walking, every few yards one or more of these sparrows were started up from their hiding places, and, after flying a few yards in a feeble, hesitating sort of manner, would drop down and conceal themselves, running nimbly along the ground, and showing much adroitness in their manner of hiding behind any slight elevation, so as to evade scrutiny. In September, their numbers are increased by accessions from the more northern districts, and upon each plain and grassy plateau hundreds may be found, all seemingly impelled by the instinct of migration. The extreme southern parts, however, of Arizona and New Mexico may afford a home for at least a portion of the multitudes which throng here during the fall. The specimens obtained are all typical of this race, and differ very decidedly from the eastern form (*passerinus*) in the general predominance of the light tints through the entire plumage.

No.	Sex.	Locality.	Date.	Collector.	Wing.	Tail.	Bill.	Tarsus.
.....	♂ ad.	Nevada	Sept. 8, 1871	F. Bischoff .....	.....	.....	.....	.....
149	♀ jun.	Gunnison, Utah	Sept. 7, 1872	H. W. Henshaw .....	.....	.....	.....	.....
6	♂	Southern Arizona	Sept. —, 1873	M. N. Maguet	2.43	2.13	0.48	0.76
13	♂	Camp Grant, Ariz. ....	..... do .....	..... do	2.50	2.09	0.47	0.77
10	♂	Mount Graham, Ariz. ....	..... do .....	..... do	2.40	2.05	0.50	0.75
610	♂	..... do .....	..... do	H. W. Henshaw	2.50	2.06	0.50	0.76
612	♂	..... do .....	..... do .....	..... do	2.50	2.07	0.43	0.73
613	♀	..... do .....	..... do .....	..... do	2.40	2.10	0.47	0.71
628	♂	..... do .....	..... do .....	..... do	2.60	2.15	0.47	0.70
629	♀	..... do .....	..... do .....	..... do	2.45	2.05	0.46	0.70
630	♀	..... do .....	..... do .....	..... do	2.62	2.23	0.45	0.73
627	♂	..... do .....	..... do .....	..... do	2.50	2.08	0.49	0.76
782	♂	Gila River, Ariz. ....	..... do .....	..... do	2.55	2.10	0.55	0.73
573	♂ jun.	Camp Crittenden, Ariz.	— —, 1874	..... do .....	.....	.....	.....	.....
586	♂ jun.	..... do .....	..... do .....	..... do .....	.....	.....	.....	.....
616	Jun.	..... do .....	..... do .....	..... do .....	.....	.....	.....	.....
670	Ad.	..... do .....	..... do .....	..... do .....	.....	.....	.....	.....

CHONDESTES GRAMMACA (Say).

Lark Finch.

Fringilla grammaca, SAY, Long's Exp. Rocky Mts., i, 1823, 139.

Chondestes grammaca, WOODH., Sitgreave's Exp. Zuñi & Col. Riv., 1854, 86.—BD., Ives' Col. Exped., 1857-58, pt. iv, 6.—*Id.*, Birds N. A., 1858, 456.—*Id.*, U. S. & Mex. Bound. Surv., ii, pt. ii, 1859, Birds, 15.—*Id.*, Proc. Acad. Nat. Sci. Phila., 1859, 304 (Cape Saint Lucas).—XANTUS, Proc. Acad. Nat. Sci. Phila., 1859, 191 (Fort Tejon, Cal.).—HEERM., P. R. R. Rep., x, pt. iv, 1859, 48.—HENRY, Proc. Acad. Nat. Sci. Phila., 1859, 107 (New Mexico).—COOP. & SUCKL., P. R. Rep., xii, pt. ii, 1860, 200.—HAYD., Trans. Am. Phil. Soc., xii, 1862, 166.—COUES, Proc. Acad. Nat. Sci. Phila., 1866, 84 (Fort Whipple, Ariz.).—*Id.*, *ib.*, 1868, 83.—COOPER, Birds Cal., i, 1870, 113.—STEV., U. S. Geol. Surv. Terr., 1870, 464.—ALLEN, Bull. Mus. Comp. Zoöl., 1872, 177.—COUES, Key N. A. Birds, 1872, 146, f. 90.—SNOW, Birds Kan., 1872, 10.—HOLDEN, Proc. Bost. Soc. Nat. Hist., 1872, 201.—MERRIAM, U. S. Geol. Surv. Terr., 1872, 680.—BD., BREW., & RIDG., N. A. Birds, i, 1874, 562, pl. xxxi, f. 1.—YARROW & HENSHAW, Rep. Orn. Specs., 1872, Wheeler's Exped., 1874, 15.—HENSHAW, An. Lyc. Nat. Hist. N. Y., xi, 1874, 5.—*Id.*, An. List Birds Utah, 1872, Wheeler's Exped., 1874, 44.—*Id.*, Rep. Orn. Specs., 1873, Wheeler's Exped., 1874, 61.—ALLEN, Proc. Bost. Soc. Nat. Hist., June, 1874, 15, 18, 28.—COUES, Birds Northwest, 1874, 159.

The Lark Finch has been obtained at many localities by our parties, but has been met with more frequently and in greater numbers in Utah and Colorado than in the more southern portions of its habitat in Arizona and New Mexico, where, however, the species is by no means wanting. Its habits seem to vary somewhat in different localities. In Utah, it appeared particularly terrestrial in its habits; and at Provo I remember that the dusty by-ways just outside the town were favorite places of resort, the birds gathering thither in small parties, and busying themselves apparently very successfully in searching for food. This was in the latter part of July, and the males were without song, and very shy, and careful to avoid all scrutiny. Near Denver, in early May, these birds were quite common in small companies along the banks of the Platte River, where they frequented the trees and bushes quite as much as the more open ground. They appeared then to be mating, and I often saw several males in pursuit of some female, whose charms had proved sufficient to awaken the tender passion in the breasts of a number of emulous admirers. Its warbling song at this season is not excelled by any of its tribe, if, indeed, it is equaled.

No.	Sex.	Locality.	Date.	Collector.	Wing.	Tail.	Bill.	Tarsus.
118	♀ jun.	Provo, Utah.....	July 24, 1872	H. W. Henshaw and Dr. H. C. Yarrow.	.....	.....	.....	.....
119	♀ jun.	..... do	July 31, 1872	..... do .....	.....	.....	.....	.....
180	♀ jun.	..... do .....	..... do .....	..... do .....	.....	.....	.....	.....
33	♂ jun.	..... do	Aug. 2, 1872	..... do .....	.....	.....	.....	.....
34	♀ ad.	..... do	Aug. 3, 1872	..... do .....	.....	.....	.....	.....
47	♀ jun.	..... do .....	..... do .....	..... do .....	.....	.....	.....	.....
3	♂ ad.	Denver, Colo.....	May 6, 1873	H. W. Henshaw.....	3.65	3.05	0.50	0.80
17	♂ ad.	..... do	May 7, 1873	..... do	3.43	2.90	0.50	0.75
27	♂ ad.	..... do	May 9, 1873	..... do	3.48	3.08	0.50	0.78
12	♂ ad.	..... do	June —, 1873	Dr. J. T. Rothrock.....	3.20	2.79	0.50	0.72
5	♂	..... do .....	..... do .....	..... do	3.45	2.88	0.52	0.77
341	♀ ad.	Camp Bowie, Ariz	Aug. 10, 1874	..... do .....	.....	.....	.....	.....
347	♀ ad.	..... do .....	..... do .....	..... do .....	.....	.....	.....	.....
356	♂ ad.	..... do .....	..... do .....	..... do .....	.....	.....	.....	.....
368	♀ jun.	..... do .....	..... do .....	..... do .....	.....	.....	.....	.....

ZONOTRICHIA LEUCOPHRYS (Forst.).

White-crowned Sparrow.

Emberiza leucophrys, FORST., Philos. Trans., lxii, 1772, 382, 426.

Zonotrichia leucophrys, WOODH., Sitgreave's Exp. Zuñi & Col. Riv., 1854, 84.—BD., U. S. & Mex. Bound. Surv., ii, pt. ii, 1859, Birds, 15.—*Id.*, Proc. Acad. Nat. Sci. Phila., 1859, 304 (Cape Saint Lucas).—HAYD., Trans. Am. Phil. Soc., xii, 1862, 166.—COOPER, Birds Cal., i, 1870, 196.—STEV., U. S. Geol. Surv. Terr., 1870, 464.—ALLEN, Bull. Mus. Comp. Zool., 1872, 177 (Eastern Kansas, May; mountains of Colorado).—COUES, Key N. A. Birds, 1872, 144.—SNOW, Birds Kan., 1872, 10.—AIKEN, Proc. Bost. Soc. Nat. Hist., 1872, 200.—MERRIAM, U. S. Geol. Surv. Terr., 1872, 681.—BD., BREW., & RIDG., N. A. Birds, i, 1874, 566, pl. xxv, figs. 9, 10.—YARROW, Rep. Orn. Specs., 1871, Wheeler's Exped., 1874, 35.—YARROW & HENSHAW, Rep. Orn. Specs., 1872, Wheeler's Exped., 1874, 14.—HENSHAW, An. Lyc. Nat. Hist. N. Y., xi, 1874, 5.—*Id.*, An. List Birds Utah, 1872, Wheeler's Exped., 1874, 44.—*Id.*, Rep. Orn. Specs., 1873, Wheeler's Exped., 1874, 61, 80, 112.—COUES, U. S. Geol. Surv. Terr., 1874, 154.

Zonotrichia leucophrys?, NEWB., P. R. R. Rep., vi, 1857, 87.

The White-crowned Sparrow breeds abundantly in the parks of the Wahsatch Mountains in Utah, and young and old were obtained there in August. Dr. Rothrock also found it breeding in South Park, Colorado, in July. After the first of June, the species is only to be found in the high districts of the mountains, where alone they breed. During the migrations, it occurs in immense numbers, and is distributed over the country generally, though occurring in greatest numbers in the lower districts, frequenting

especially the bushes and thickets of the streams. I believe they winter in greater or less numbers in Southern Arizona.

No.	Sex.	Locality.	Date.	Collector.	Wing.	Tail.	Bill.	Tarsus.
....	♂ ad.	Bull Run, Nev	May 25, 1871	F. Bischoff.....	—	.....	.....	.....
71	♂ jun.	Daneills's Cañon, Utah	Aug. 12, 1872	H. W. Henshaw .....	.....	.....	.....	.....
80	♀ ad.	Strawberry Valley, Utah.	Aug. 13, 1872	..... do .....	.....	.....	.....	.....
4	♂ ad.	Denver, Colo.....	May 6, 1873	..... do	3.02	3.16	0.43	0.92
16	♂ ad.	..... do	May 7, 1873	..... do	3.15	3.32	0.43	0.86
42	♂ ad.	..... do	May 10, 1873	..... do	3.16	3.12	0.44	0.93
87	♂ ad.	..... do	May 14, 1873	..... do	3.12	3.12	0.43	0.85
107	♀ ad.	..... do	May 17, 1873	..... do	2.95	3.00	0.43	0.85
67	Ad.	..... do	June 26, 1873	Dr. J. T. Rothrock ...	3.18	3.30	0.50	0.95
120	♀ ad.	Camp Bowie, Ariz	Oct. 6, 1873	Dr. C. G. Newberry....	2.95	3.00	0.46	0.88
125	♀ ad.	..... do	Oct. 10, 1873	..... do	3.12	3.11	0.44	0.85

ZONOTRICHIA LEUCOPHRYS (Forst.), var. INTERMEDIA, Ridgw.

Ridgway's Sparrow.

PLATE VII, FIGS. 1, 2.

- Zonotrichia leucophrys* var. *intermedia*, RIDGW., MS.—COUES, Check-List, app., No. 183b.—YARROW & HENSHAW, Rep. Orn. Specs., 1872, Wheeler's Exped., 1874, 14.—HENSHAW, An. Lyc. Nat. Hist. N. Y., xii, 1874, 6.—*Id.*, An. List Birds Utah, 1872, Wheeler's Exped., 1874, 44.—*Id.*, Rep. Orn. Specs., 1873, Wheeler's Exped., 1874, 62, 112.—COUES, U. S. Geol. Surv. Terr., 1874, 156.
- Zonotrichia leucophrys* var. *gambeli*, COUES, Key N. A. Birds, 1872, 145 (in part).
- Zonotrichia intermedia*, YARROW, Rep. Orn. Specs., 1871, Wheeler's Exped., 1874, 35.
- Zonotrichia gambelii*, BD., Ives' Col. Exped., 1857-58, pt. iv, 6.—*Id.*, Birds N. A., 1858, 460.—*Id.*, U. S. & Mex. Bound. Surv., ii, pt. ii, 1859, Birds, 15.—HEERM., P. R. R. Rep., x, pt. ii, 1859, 48 (New Mexico; Texas).—KENNERLY, P. R. R. Rep., Whipple's Route, 1859, 28.—HENRY, Proc. Acad. Nat. Sci. Phila., 1859, 107 (New Mexico).—COOP. & SUCKL., P. R. R. Rep., xii, pt. ii, 1860, 201.—HAYD., Trans. Am. Phil. Soc., xii, 1862, 166.—COUES, Proc. Acad. Nat. Sci. Phila., 1866, 84 (Fort Whipple, Ariz.).—*Id.*, *ib.*, 1868, 83.—STEV., U. S. Geol. Surv. Terr., 1870, 464.—ALLEN, Bul. Mus. Comp. Zool., 1872, 177 (Wahsatch Mountains).—HOLD., Proc. Bost. Soc. Nat. Hist., xv, 1872, 199.—MERRIAM, U. S. Geol. Surv. Terr., 1872, 681.

Under the variety *intermedia*, Mr. Ridgway distinguishes the Middle Province form from the true *gambeli* as restricted to the Pacific coast. This variety is to be known by its lighter coloration and the chestnut-brown dorsal streaks instead of black. Up to the 10th of May, a few individuals about Denver were seen accompanying flocks of the preceding; but they

were evidently stragglers, the main body having passed on earlier. None apparently remain to breed, but all pass farther north.

Numerous flocks met with in Southern Utah about the first of October, frequenting the neighborhood of small streams. At this time, the preceding species appeared to have departed farther south, as only one specimen was secured; *leucophrys* appearing to be replaced by *intermedia*, which probably winters in the neighborhood of Saint George.

This discrepancy between the migrations of these two forms I have noticed each season, and it would appear that the bulk of *leucophrys* breeds somewhat farther south than the region inhabited in the summer by var. *intermedia*; this bird making its appearance in the fall rather later than *leucophrys* and preceding that species in the northern migration in spring. Notwithstanding the close relationship existing between these two sparrows, and the apparent slightness of the characteristics which distinguish them, I cannot but think that they may yet be found to be separate species, and not merely varieties the one of the other. Certainly, the Gambel's Finch (var. *intermedia*) can scarcely be held to be merely the western form of *leucophrys*, since the latter bird in its typical state is known to breed in abundance as far west as the Wahsatch Mountains (Ridgway, Henshaw), and has even been found in spring as far west as the Pacific coast (Cape Saint Lucas), as above referred to, while it seems to me highly probable that the var. *intermedia* breeds much farther to the eastward than it has yet been recorded, and that thus the summer habitats of the two overlap. Throughout its entire range, *leucophrys* everywhere retains its peculiarities; the species when taken at its westernmost limit showing no differences other than individual from the specimens taken in the East, while from *gambeli* they are always readily distinguishable. I am not aware that the Gambel's Finch (var. *intermedia*) has been found farther East in the breeding-season than the Sierra Nevada, (Ridgway), yet the lateness of its stay in spring (May 11, Denver) seems to preclude the possibility of a journey very far to the northward to find a summer home, and I confidently expect that the two forms will yet be found breeding in the same districts, and retaining each its own distinct traits and characteristics. In fall, it spreads over New Mexico and Arizona generally, and probably winters in the southern portions.

The bill of this bird is bright yellow with a trace of dusky only at the tip of upper mandible, while in *leucophrys* it is much darker, often dusky throughout.

Figures are given of var. *gambeli* and var. *intermedia*.

No.	Sex.	Locality.	Date.	Collector.	Wing.	Tail.	Bill.	Tarsus.
174	♂ ad.	Panquitch, Utah	Sept. 17, 1872	H. W. Henshaw				
172	♀ ad.	..... do .....	..... do .....	..... do				
175	♀ jun.	..... do .....	..... do .....	..... do				
173	♀ jun.	..... do .....	..... do .....	..... do				
214	♂ jun.	Iron Springs, Utah....	Oct. 3, 1872	..... do				
211	♂ ad.	..... do .....	..... do .....	..... do				
212	♀ ad.	..... do .....	..... do .....	..... do				
213	♂ ad.	..... do .....	..... do .....	..... do				
215	♀ jun.	..... do .....	..... do .....	..... do				
223	♂ ad.	..... do	Oct. 4, 1872	..... do				
224	♂ ad.	..... do .....	..... do .....	..... do				
225	♂ ad.	..... do .....	..... do .....	..... do				
227	♀ jun.	..... do .....	..... do .....	..... do				
226	♂ ad.	..... do .....	..... do .....	..... do				
228	♀ jun.	..... do .....	..... do .....	..... do				
229	♂ jun.	..... do .....	..... do .....	..... do				
272	♂ jun.	Toquerville, Utah....	..... do .....	..... do				
253	♂ ad.	..... do	Oct. 6, 1872	..... do				
254	♂ ad.	..... do .....	..... do .....	..... do				
255	♀ jun.	..... do .....	..... do .....	..... do				
270	♂ ad.	..... do	Oct. 10, 1872	..... do				
271	♂ ad.	..... do .....	..... do .....	..... do				
296	♀ jun.	..... do	Oct. 14, 1872	..... do				
316	♀ jun.	..... do	Oct. 16, 1872	Dr. H. C. Yarrow and H. W. Henshaw.				
317	♂ jun.	..... do .....	..... do .....	..... do				
297	♂ jun.	..... do	Oct. 17, 1872	H. W. Henshaw				
326	♂ jun.	..... do	Oct. 19, 1872	H. W. Henshaw and Dr. H. C. Yarrow.				
349	♂ ad.	Washington, Utah....	Oct. 23, 1872	..... do				
352	♀ ad.	..... do .....	..... do .....	..... do				
356	♀ jun.	..... do .....	..... do .....	..... do				
354	♂ ad.	..... do	Oct. 24, 1872	..... do				
355	♂ ad.	..... do .....	..... do .....	..... do				
B 6	.....	(Alcoholic)	— —, 1873	..... do				
B 7	.....	..... do .....	..... do .....	..... do				
790	♂	Gila River, Ariz	Sept. 16, 1873	H. W. Henshaw	2.90	2.92	0.45	0.82
98	♀ jun.	Pueblo Viejo, N. Mex..	Sept. 18, 1873	Dr. C. G. Newberry...	2.94	2.85	0.42	0.83
122	♀ jun.	Camp Bowie, Ariz	Oct. 7, 1873	..... do	2.88	3.00	0.44	0.86
950	♂ jun.	Fort Bayard, N. Mex..	Oct. 19, 1873	H. W. Henshaw	2.90	2.97	0.42	0.84
950A	.....	..... do .....	..... do .....	..... do	2.80	2.98	0.42	0.83

Genus JUNCO, Wagler.

Synopsis of the genus.

COMMON CHARACTERS.—Prevailing color plumbeous; the abdomen, crissum, and lateral tail-feathers white:

A. Ash of the jugulum with its posterior surface concave, and abruptly defined against the white of abdomen; sides tinged with ash; upper parts pure ash:

1. *hyemalis*.

2. var. *aikeni*.

B. Jugulum abruptly defined against the white of abdomen, but convex; sides pinkish; dorsal region dark rufous brown:

1. *oregonus*.

2. var. *annectens*.

C. Back bright rufous.

1. *cinereus*.

2. var. *alticola*.

3. var. *dorsalis*.

4. var. *caniceps*.

By the above arrangement, the group is divided into three distinct species, each having a single variety in the United States, while to *caniceps* as varieties are referred, though somewhat doubtfully,* the extreme southern forms *cinereus* and *alticola*.

Hyemalis of the Eastern Province is represented in the high northern Rocky Mountains(?) by the variety *aikeni*, distinguished by its larger size, the white bands of the wings, the greater amount of white on the tail feathers, and the generally paler coloration; features all readily traceable to the effects of its cold alpine habitat. *Annectens*, also inhabiting the northern Rocky Mountains, is referable to *oregonus* of the Pacific coast, which it resembles in the fulvous sides and in the dark rufous-brown of the dorsal region; features peculiar to these two forms. From it, it is separable, as a variety, by much the same differences, though less in degree, that exist between *hyemalis* and *aikeni*; differences assignable, too, to the same causes. It is larger, with paler colors throughout, having the plumbeous black of *oregonus* replaced by a

* The close relationship between *cinereus* and the varieties *caniceps* and *dorsalis* is made apparent by a large suite of the former, taken in the Rocky Mountains (see under *Junco cinereus*). This arrangement is precisely the same as published in Report of 1874; the additional material since gathered serving only to confirm the views as to the correctness of this arrangement. *Junco cinereus*, however, being the older name, is here taken as the type of the species instead of *caniceps*.

light ash, and also, as Mr. Aiken informs me, not infrequently shows a decided tendency to the white banding of the wings. This is well shown in a specimen taken at Fountain, Colo., in December, which has two well defined bands, though not quite so conspicuous as in typical examples of *aikeni*. *Junco caniceps* of the central Rocky Mountains of the United States is at once distinguished from any of the above by the bright, reddish, chestnut-brown of the interscapular region.

In the southern Rocky Mountains, in New Mexico and Arizona, is found var. *dorsalis*, which seems to combine certain features peculiar to both *caniceps* and *cinereus*, and also in certain other points to differ from either. In the restriction of red to the interscapular region, it is like *caniceps*; but, in quite a number of specimens collected in New Mexico during the past season the tertiaries are strongly tinged with rufous, showing in this respect an approach to *cinereus*, where the chestnut of the back extends over the wing-coverts and inner secondaries.

The bill above is brownish-black, below whitish, thus differing from *caniceps*, which has a flesh-colored bill, and apparently approaching *cinereus*, where it is black above, below yellow. Like *cinereus*, also, the pale ash of the throat fades gradually into the white of abdomen, instead of being, as in *caniceps*, abruptly defined.

Of quite a large series of specimens collected by myself the past season, and others in the Smithsonian collection, I have seen none which are not readily assignable to one variety or the other by the distinctive features pointed out. The theory of hybridization, which might be admissible were only one or two specimens known possessing intermediate characters, seems wholly inadequate as an explanation in the case of either *annectens* or *dorsalis*, where the forms extend over very extensive regions, and preserve their distinctive characteristics intact. Whether *cinereus* of the table lands of Mexico, with a local variety, *alticola*, of the mountains of Guatemala, may not justly be entitled to specific rank, is a matter of considerable doubt. While the typical forms of *caniceps* and *cinereus* are widely different, *dorsalis*, intermediate in its habitat, seems also intermediate in its characters, and it therefore may be best to treat the two (*caniceps* et *cinereus*) as only separable as varieties rather than as distinct species.

JUNCO HYEMALIS (Linn.).

Black Snowbird.

Fringilla hyemalis, LINN., Syst. Nat., i, 10th ed., 1758, 183 (not of GMELIN or LATHAM).

Struthus hyemalis, WOODH., Sitgreave's Exp. Zuñi & Col. Riv., 1854, 83.

Junco hyemalis, BD., Birds N. A., 1858, 468.—HAYD., Trans. Am. Phil. Soc., xii, 1862, 167.—COUES, Proc. Acad. Nat. Sci. Phila., 1866, 85 (Fort Whipple, Ariz.).—*Id.*, Key N. A. Birds, 1872, 141.—AIKEN, Proc. Bost. Soc. Nat. Hist., 1872, 201.—BD., BREW., & RIDG., N. A. Birds, i, 1874, 580, pl. xxvi, f. 5.—YARROW & HENSHAW, Rep. Orn. Specs., 1872, Wheeler's Exped., 1874, 15.—HENSHAW, An. Lyc. Nat. Hist. N. Y., xi, 1874, 6.—*Id.*, An. List Birds Utah, 1872, Wheeler's Exped., 1874, 44.—COUES, U. S. Geol. Surv. Terr., 1874, 141.

Perhaps rare, but a single specimen having been secured at Iron Springs, Utah, October 4. Not recorded before from so far west. It is by no means certain that the occurrence of this snowbird here is merely accidental. The specimen obtained was shot from among a flock of the *Junco oregonus*, which was exceedingly numerous; and, its true identity not being known at the time, I took no pains to ascertain its relative numbers as compared with *oregonus*. It may occur during the migrations regularly.

No.	Sex.	Locality.	Date.	Collector,	Wing.	Tail.	Bill.	Tarsus.
232	♀ jun.	Iron Springs, Utah ...	Oct. 4, 1872	H. W. Henshaw .....	.....	.....	.....	.....

JUNCO HYEMALIS (Linn.), var. AIKENI, Ridg.

White-winged Snowbird.

Junco hyemalis var. *aikeni*, AIKEN, Proc. Bost. Soc. Nat. Hist., xv, 1872, 201.—COUES, Check-List, app., No. 174^a.—*Id.*, Key N. A. Birds, 1872, 141 (in text).—RIDG., Am. Nat., vii, 1873, 613, 615 (characterized by two white wing-bands across tip of median and greater coverts, and an additional feather of tail white).—BD., BREW., & RIDG., N. A. Birds, i, 1874, 584, pl. xxvi, f. 6.—HENSHAW, Rep. Orn. Specs., 1873, Wheeler's Exped., 1874, 114.—COUES, U. S. Geol. Surv. Terr., 1874, 141.

This race of the common snowbird (*hyemalis*) is found late in the fall and winter, distributed over quite a large area in the middle Rocky Mountains of the United States. I found it and the two succeeding forms, mingled

indiscriminately in large flocks, in El Paso County, Colorado, the middle of December. Mr. Aiken has had abundant opportunity to note the time and manner of its migrations, and from these it seems pretty certain that it finds its summer home very far to the northward. According to Mr. Aiken, the first stragglers from the north do not make their appearance till about the 5th of October, and then in gradually increasing numbers till the 1st of December, when they come in large flocks, the last to arrive being the old and fully plumaged males. While many of the females and young birds proceed farther to the south, the greater number of the adult males winter at some point farther to the north than El Paso County, as of the whole number seen during the winter only about two-fifths are males. Early in February, the old birds begin to start northward; the general migration being delayed about a month. The habits of this race do not differ from those of its congeners.

JUNCO OREGONUS (Towns).

Oregon Snowbird.

Fringilla oregona, TOWNS., Jour. Acad. Nat. Sci. Phila., vii, 1837, 188.

Niphaea oregona, BD., Stans. Rep. Exp. Great Salt Lake, 1852, 316.

Struthus oregonus, WOODH., Sitgreave's Exp. Zuñi & Col. Riv., 1854, 83.—NEWB., P. R. R. Rep., vi, 1857, 89.

Junco oregonus, BD., Ives' Col. Exped., 1857-58, pt. iv, 6.—*Id.*, Birds N. A., 1858, 466.—HEERM., P. R. R. Rep., x, pt. iv, 1859, 47.—KENNERLY, P. R. R. Rep., Whipple's Route, 1859, 28.—XANTUS, Proc. Acad. Nat. Sci. Phila., 1859, 192 (Fort Tejon, Cal.).—HENRY, Proc. Acad. Nat. Sci. Phila., 1859, 107 (New Mexico).—COOP. & SUCKL., P. R. R. Rep., xii, pt. ii, 1860, 202.—HAYD., Trans. Am. Phil. Soc., xii, 1862, 166.—COUES, Proc. Acad. Nat. Sci. Phila., 1866, 85 (Fort Whipple, Ariz.).—SNOW, Birds Kan., 1872, 10.—COOPER, Birds Cal., i, 1870, 199.—STEV., U. S. Geol. Surv. Terr., 1870, 464.—COUES, Key N. A. Birds, 1872, 141.—HOLDEN & AIKEN, Proc. Bost. Soc. Nat. Hist., 1872, 200.—BD., BREW., & RIDG., N. A. Birds, i, 1874, 584, pl. xxvi, f. 2.—HENSHAW, An. Lyc. Nat. Hist. N. Y., xi, 1874, 6.—*Id.*, An. List Birds Utah, 1872, Wheeler's Exped., 1874, 44.—*Id.*, Rep. Orn. Specs., 1873, Wheeler's Exped., 1874, 114.—COUES U. S. Geol. Surv. Terr., 1874, 142.

Met with in large flocks in Southern Utah about the middle of October; also common at Provo in December.

Like its congener, the snowbird of the extreme east, whose habits appear to be the exact counterpart of its own, there takes place at the close

of the breeding season a complete and general diffusion of this species over the country to the southward of its summer habitat. It winters in great numbers in Southern Utah, and in Colorado well up into the middle of the Territory; though Mr. Aiken informs me that in El Paso County comparatively few of this species remain during the winter, the greater proportion passing on farther to the south. As a winter resident in Arizona and New Mexico, it is by far the most numerous represented of the genus, and is found everywhere, low down in the mountains, in the foot hills, and along the streams of the valleys and plains. I have never found it in the mountains of this region in summer, and am quite positive that none remain here to breed.

No.	Sex.	Locality.	Date.	Collector.	Wing.	Tail.	Bill.	Tarsus.
324	♂	Toquerville, Utah...	Oct. 19, 1872	H. W. Henshaw and Dr. H. C. Yarrow.	.....	.....	.....	.....
328 A	♂	.....do .....	.....do .....	.....do .....	.....	.....	.....	.....
353	♀	Washington, Utah ..	Oct. 23, 1872	.....do .....	.....	.....	.....	.....
435	♂	Provo, Utah.....	Nov. 25, 1872	.....do .....	.....	.....	.....	.....
460	♂	.....do	Nov. 29, 1872	.....do .....	.....	.....	.....	.....
947	♀	Fort Bayard, N. Mex	Oct. 19, 1873	H. W. Henshaw	3.07	2.78	0.43	0.78
916	♀	Camp Apache, Ariz .	Oct. 9, 1874	.....do .....	.....	.....	.....	.....
1003	♀	.....do	Oct. 11, 1874	.....do .....	.....	.....	.....	.....
1010	♀	.....do	Oct. 17, 1874	.....do .....	.....	.....	.....	.....
1058	♀	.....do	Oct. 24, 1874	.....do .....	.....	.....	.....	.....
1056	♂ ad.	.....do	Oct. 25, 1874	.....do .....	.....	.....	.....	.....
1057	♂ ad.	.....do .....	.....do .....	.....do .....	.....	.....	.....	.....
1050	♂ ad.	.....do	Oct. 30, 1874	.....do .....	.....	.....	.....	.....
1092	♂ ad.	.....do .....	.....do .....	.....do .....	.....	.....	.....	.....

JUNCO OREGONUS (Towns.), var. ANNECTENS, Bd.

Pink-sided Snowbird.

PLATE VIII.

Junco annectens, Bd., MSS.—COOPER, Birds Cal., i, 1870, 564.

Junco oregonus var. *annectens*, HENSHAW, Rep. Orn. Specs., 1873, Wheeler's Exped., 1874, 115.

Junco oregonus, MERRIAM, U. S. Geol. Surv. Terr., 1872, 681 (Idaho; Wyoming), specimens prove on examination to be typical of this race).

This variety occurs in Colorado, New Mexico, and Arizona only as a winter visitant; its distribution in summer being quite northern. It was

found breeding in abundance in Idaho and Wyoming by Mr. Merriam, as above referred to.

Numerous in El Paso County, Colorado, in December. Considerable numbers winter here, although, from the fact that a large majority of these are males, Mr. Aiken is led to believe that the greater number spend the winter farther south. I met with it near Silver City, Southwestern New Mexico, late in October, but it was not common.

No.	Sex.	Locality.	Date.	Collector.	Wing.	Tail.	Bill.	Tarsus.
963	♂ jun.	Silver City, N. Mex ...	Oct. 24, 1873	H. W. Henshaw	3.43	3.18	0.48	0.79

JUNCO CINEREUS (Swains.), var. CANICEPS (Woodh.).

Red-backed Snowbird.

Struthus caniceps, WOODH., Sitgreave's Exp. Zuñi & Col. Riv., 1854, 83.

Junco caniceps, BD., Birds N. A., 1858, 468, pl. 72, f. i.—HAYD., Trans. Am. Phil. Soc., xii, 1862, 167.—COUES, Proc. Acad. Nat. Sci. Phila., 1866, 85 (Fort Whipple, Ariz.; includes probably var. *dorsalis* also).—COOPER, Birds Cal., i, 1870, 201.—ALLEN, Bull. Mus. Comp. Zoöl., 1872, 177 (mountains of Colorado).—AIKEN, Proc. Bost. Soc. Nat. Hist., 1872, 200.—BD., BREW., & RIDG., N. A. Birds, i, 1874, 587, pl. xxvi, f. 3.—HENSHAW, An. Lyc. Nat. Hist. N. Y., xi, 1874, 6.—*Id.*, An. List Birds Utah, 1872, Wheeler's Exped., 1874, 44.—*Id.*, Rep. Orn. Specs., 1873, Wheeler's Exped., 1874, 80.

Junco cinereus var. *caniceps*, COUES, Key N. A. Birds, 1872, 141.—*Id.*, U. S. Geol. Surv. Terr., 1874, 143.

In the heavy pine woods in the neighborhood of Fort Garland and among the bushes that fringe the small mountain streams, this snowbird was the most abundant species of the locality. By the 1st of June, the greater number appeared to be paired and breeding, though I was not able, after a careful search, to find their nests. The song consists of a rapid succession of low, trilling notes, which is usually emitted from the top of some low spruce or pine. Upon leaving the mountains of Colorado, this species was left behind, and in New Mexico was replaced in the mountains by the closely allied form *dorsalis*.

No.	Sex.	Locality.	Date.	Collector.	Wing.	Tail.	Bill.	Tarsus.
207	♂ ad.	Mountains near Fort Garland, Colo.	May 30, 1873	H. W. Henshaw	3. 17	3. 02	0. 50	0. 79
208	.....	do	do	do	3. 02	2. 81	0. 48	0. 82
209	♀ ad.	do	June 3, 1873	do	2. 98	2. 83	0. 47	0. 81
229	♂ ad.	do	do	do	3. 14	2. 92	0. 50	0. 77
264	♂ ad.	do	do	do	3. 11	2. 98	0. 49	0. 78
282	♀ ad.	do	June 6, 1873	do	3. 14	2. 81	0. 50	0. 75
283	♂ ad.	do	do	do	3. 30	3. 00	0. 47	0. 79
284	♂ ad.	do	do	do	3. 36	3. 06	0. 47	0. 78
292	♀	do	June 7, 1873	do	2. 92	2. 71	0. 47	0. 80
114	♀ ad.	Sangre de Cristo, Colo.	Aug. 9, 1874	C. E. Aiken .....	.....	.....	.....	.....
160	♀ jun.	Indian Creek, Colo....	Aug. 15, 1874	do .....	.....	.....	.....	.....
212	.....	Alimosa Creek, Colo ..	Aug. 29, 1874	do .....	.....	.....	.....	.....

JUNCO CINEREUS (Swains.), var. DORSALIS, Henry.

PLATE IX.

Junco dorsalis, HENRY, Proc. Acad. Nat. Sci., Phila., x, May, 1858, 117.—Bd., Birds N. A., 1858, 467.—HENRY, Proc. Acad. Nat. Sci. Phila., 1859, 107 (New Mexico).
Junco caniceps var. *dorsalis*, HENSHAW, Rep. Orn. Specs., 1873, Wheeler's Exped., 1874, 115.

This variety appears to take the place entirely of *caniceps* in the mountains of New Mexico and Arizona, extending southward in summer at least as far as the White Mountains, in the pine woods of which it is very abundant. I detected nothing peculiar in its habits that is not equally characteristic of the other members of the genus. The song is indistinguishable from that of *caniceps*. In the mountains near Camp Apache, I found many young birds July 13, though many individuals were apparently still engaged in the duties of incubation. A nest found here was very cunningly placed in a slight hollow, beneath a tussock of grass, and so arranged that the merest accident alone could have led to its discovery. As it was, I came near treading upon it, and thus startled the female, who was setting at the time. She glided off through the grass, fluttering about and feigning lameness, but, finding it of no avail, and that her home was being invaded, flew into a tree close by, and her angry notes and plaintive cries soon called her mate to her side, who showed an equal anxiety, and approached almost within arm's length, and expressed his indignation at my high handed proceedings in the

strongest terms of bird language. This nest was merely a collection of coarse grasses and dried stalks of weeds, disposed in a circular form, and lined with finer material of the same. It contained four eggs, which a few more days would have seen hatched. Of these, two appear to be unspotted, and are a pale greenish-white throughout. A third has a few very minute brownish-red spots scattered irregularly over the surface, though, at first sight, it appears immaculate. The fourth has faint, obsolete frecklings of the same color interspersed over the whole surface, and confluent at the larger end in a ring.

Dimensions, 0.84 by 0.62; 0.77–0.63.

A large series collected in the White Mountains in July, 1874, agree well in the constancy of their markings.

Bill brownish black above, below whitish; legs and feet brown; iris hazel.

No.	Sex.	Locality.	Date.	Collector.	Wing.	Tail.	Bill.	Tarsus.
459	♂ jun.	Neutria, N. Mex.	July 19, 1873	H. W. Henshaw	3.00	3.18	0.43	0.78
544	♂ ad.	White Mountains, Ariz.	Aug. 10, 1873	..... do	3.20	3.18	0.43	0.86
673	♂	..... do	Sept. 1, 1873	..... do	3.25	3.23	0.43	0.79
683	♂	..... do	Sept. 2, 1873	..... do	3.12	3.06	0.43	0.86
684	♀	..... do	Sept. 4, 1873	..... do	3.15	3.06	0.47	0.79
695	♀	..... do	Sept. 3, 1873	..... do	3.14	3.15	0.43	0.75
983	♀	Mountains of South-western New Mexico.	Nov. 5, 1873	..... do	3.16	3.12	0.39	0.79
984	♂	..... do	Nov. 5, 1873	..... do	3.22	3.19	0.43	0.74
89	♀	White Mountains, Ariz.	Sept. 1, 1873	Dr. C. G. Newberry	3.07	2.96	0.46	0.74

JUNCO CINEREUS (Swains.).

Mexican Snowbird.

PLATE X.

Fringilla cinerea, SWAINS., Syn., Birds Mex., in Phil. Mag., i, 1827, 435.

Junco cinereus, CABAN., Mus. Hein., 1850, 134.—BD., Birds N. A., 1858, 465.

SP. CHAR.—Above plumbeous ash. A broad patch of rufous chestnut across the inter scapular region, a variable amount of which extends on to the coverts and inner secondaries. Under parts pale ash, becoming ashy white on the middle of the abdomen. Sides and flanks tinged faintly with ashy brown. Lores abruptly black, shading into dusky about the orbital region. Outer tail-feather only usually white; second with varying

amount of brown; third marked with white along the inner margin of inner web. Bill black above, bright yellow below. Iris bright yellow.

Fall specimens have the chestnut of the back much darker; the ashy brown on the flanks much more conspicuous. In young birds, the iris is light yellow, or, more rarely, hazel.

The Mexican Snowbird, hitherto known only from the table lands of Mexico, was found by our party to inhabit, in great abundance, the mountains of Southern Arizona, where they were found breeding in August at an altitude of about 9,500 feet. They inhabited all sorts of localities, being found in the deep pine woods, in the more open aspen groves on the mountain sides, and along the little alpine streams that made their way down here and there from hidden springs in the mountains, and were often entirely shut in by the growth of alders and other deciduous shrubs. A lumberman's camp, which had been established here a few months before, proved to be a favorite point of rendezvous; and thither they flocked in the early morning, in merry sociable companies, to glean the oats scattered about by the horses during the morning meal, and the crumbs thrown out from the log-shanties. In a very short space of time, they had familiarized themselves to the presence of man, and, instead of shunning his neighborhood, had evidently taught themselves to look upon him rather in the light of a benefactor than an enemy. A single nest was found here August 1, which contained four fresh eggs. This doubtless was a second hatching, as great numbers of the young were about, and a few just beginning to assume the adult livery.

The nest was placed beneath a small overhanging rock in a deep grove of pines. It was quite similar in construction to the one just noted; but the grasses and fibrous materials were more firmly woven and more warmly lined with fine grass. The eggs have the same greenish-white ground color, which in two is almost immaculate; but careful examination shows the presence of a few minute punctate reddish-brown spots, irregularly disposed over the surface, while, in the third and fourth, these, though still minute, are more pronounced.

The interval existing between the two forms of *caniceps* and *cinereus*, as shown by a large *suite* of the former, collected by the expedition in Southern Colorado in 1873, and an equally large number of the latter, gathered in

Southern Arizona during the past season (1874), is indeed quite great. But when a series of snowbirds, collected in the mountains near Camp Apache, Ariz., is examined, it is found, while the gap is by no means entirely filled up, nor the complete transition from the one extreme to the other shown, that in the combination of the characters distinguishing the other two forms, var. *dorsalis* with an intermediate habit is really midway between the two extremes. Indeed, it seems not improbable that with a series from other localities a complete inosculation of the two forms might be shown. In the large number of specimens before me representing each variety, however, there are none not readily assignable to one or the other varieties.

Of many specimens of *Juncos* taken at Mount Graham, Arizona, August 1-4, all the adult birds were typical *cinereus*. The perfectly black upper mandible, in strong contrast with the yellow of the lower, the clear light cinereous, continuous throughout the under parts, the chestnut of the back extending over the scapulars and secondaries, the coal black lores, and, when alive, perhaps most conspicuous of all, the bright yellow iris, visible at quite a distance, are points which sufficiently distinguish this form. Curiously enough, however, the young were found to present certain differences, the variation from the usual or normal type being directly toward the *dorsalis* form; this fact, perhaps, finding an explanation in the well known law of the reversion of the young toward the original type. Thus at least five-sixths of the young possessed the characteristic points of *cinereus* as markedly as their parents; but occasionally a bird was found which, lacking the bright yellow iris and yellow lower mandible, possessed the clear hazel eye and flesh colored under mandible of *dorsalis*. Little or no variation was found in the adult birds, and later in the season, in September, when most of the young had molted the first plumage, they were almost indistinguishable from the old; all, so far as I could learn, having the iris yellow.

No.	Sex.	Locality.	Date.	Collector.	Wing.	Tail.	Bill.	Tarsus.
245	♀ ad.	Mount Graham, Ariz.	Aug. 1, 1874	H. W. Henshaw.....	3.07	2.95	0.44	0.83
246	♂ ad.	..... do .....	..... do .....	..... do	3.07	2.97	0.50	0.85
247	♀ ad.	..... do .....	..... do .....	..... do	3.03	2.88	0.43	0.80
260	♂ jun.	..... do .....	..... do .....	..... do	3.25	3.17	0.47	0.80
276	♂ ad.	Santa Rita Mts., Ariz.	Aug. 30, 1874	..... do	3.23	3.02	0.48	0.86
544	♂ jun.	..... do .....	..... do .....	..... do	3.17	3.13	0.46	0.85
545	Jun.	..... do .....	..... do .....	..... do	3.27	3.25	0.48	0.83
546	♂ jun.	..... do .....	..... do .....	..... do	3.13	3.00	0.50	0.80
748	♂ ad.	Mount Graham, Ariz.	Sept. 19, 1874	..... do	3.02	3.05	0.45	0.77
750	Ad.	..... do .....	..... do .....	..... do	3.17	3.05	0.45	0.83
751	♀ jun.	..... do .....	..... do .....	..... do	3.03	3.10	0.48	0.84
763	♀ jun.	..... do	Sept. 20, 1874	Dr. J. T. Rothrock....	3.15	3.17	0.43	0.83
764	Jun.	..... do .....	..... do .....	..... do	2.90	2.98	0.45	0.83
765	♂ ad.	..... do	Sept. 21, 1874	H. W. Henshaw.....	3.07	3.05	0.47	0.83
756	♀ ad.	..... do .....	..... do	Dr. J. T. Rothrock....	3.12	3.12	0.43	0.83
766	♀ jun.	..... do .....	..... do	H. W. Henshaw.....	2.98	3.10	0.42	0.82
823	♀ jun.	..... do	Sept. 23, 1874	Dr. J. T. Rothrock....	2.95	2.75	0.38	0.78
857	♂ ad.	..... do .....	..... do	H. W. Henshaw.....	3.17	3.10	0.47	0.82

POOSPIZA BILINEATA (Cass.).

Black-throated Sparrow.

Emberiza bilineata, CASS., Proc. Acad. Nat. Sci. Phila., v, Oct., 1850, 104, pl. iii (Texas).—WOODH., Sitgreave's Exp. Zuñi & Col. Riv., 1854, 87.

Poospiza bilineata, BD., Ives' Col. Exped., 1857-58, pt. iv, 6.—*Id.*, Birds N. A., 1858, 470.—*Id.*, U. S. & Mex. Bound. Surv., ii, pt. ii, 1859, Birds, 15.—HEERM., P. R. R. Rep., Park's Route, x, pt. iv, 1859, 14.—HENRY, Proc. Acad. Nat. Sci. Phila., 1859, 107 (New Mexico).—COUES, Proc. Acad. Nat. Sci. Phila., 1866, 86 (Fort Whipple, Ariz.).—*Id.*, *ib.*, 1868, 83.—COOPER, Birds Cal., 1870, 203.—COUES, Key N. A. Birds, 1872, 140.—SNOW, Birds Kan., 1872, 10.—COUES, Am. Nat., vii, 1873, 323.—BD., BREW., & RIDG., N. A. Birds, 1875, 590, pl. xxvi, f. 8.—YARROW, Rep. Orn. Specs., 1871, Wheeler's Exped., 1874, 35.—HENSHAW, An. Lyc. Nat. Hist. N. Y., xi, 1874, 6.—*Id.*, An. List Birds Utah, 1872, Wheeler's Exped., 1874, 44.—*Id.*, Rep. Orn. Specs., 1873, Wheeler's Exped., 1874, 115.

Amphispiza bilineata, COUES, U. S. Geol. Surv. Terr., 1874, 234 (type of genus).

This sparrow is an inhabitant of the dry *mesas* and plains, and apparently extends its range over the whole of Arizona and perhaps also New Mexico; their numbers constantly increasing to the south till, in the region south of the Gila, it is perhaps the most characteristic of the small sparrows. In summer, the sage plains appear to be most frequented by them, though they also are always found on the rocky hills among the low scanty shrubbery. Their nests are usually placed in some low bush, as often one of the *Artemisias* as any other; none of those found by our party being more than four feet from the ground, oftener one or two. They are of circular form,

and composed of coarse stiff grasses lined inside with very fine grass, hempen material, and very often a few horse hairs. July 24, several nests examined contained newly hatched young, while one contained three fresh eggs. These are rounded oval in shape; in color a faint bluish white, without spots, and measure 0.73 by 0.57, 0.73 by 0.58, 0.72 by 0.58. In the fall they collect together in large flocks, and, with several other species, frequent the thickets, and seem to become more arboreal in habits than earlier in the season. The mesquite groves in Southern Arizona were in August fairly alive with sparrows, and, with perhaps the exception of the Chipping Sparrows (var. *arizonæ*), this was the most numerous represented species.

No.	Sex.	Locality.	Date.	Collector.	Wing.	Tail.	Bill.	Tarsus.
.....	♂ ad.	Nevada	— —, 1871	F. Bischoff .....	.....	.....	.....	.....
.....	Jun.	.....do	— —, 1871	.....do .....	.....	.....	.....	.....
432	♂ jun.	Fort Wingate, N. Mex.	July 14, 1873	H. W. Henshaw.....	2.45	2.40	0.40	0.69
511	♀ jun.	Cave Spring, Ariz.....	Aug. 1, 1873	.....do	2.45	2.37	0.45	0.70
512	♀ jun.	.....do .....	.....do .....	.....do	2.47	2.51	0.42	0.72
611	♂ ad.	Mount Graham, Ariz..	Sept. 21, 1873	.....do	2.50	2.59	0.40	0.74
675	♂ ad.	Camp Apache, Ariz.....	.....do .....	.....do	2.56	2.63	0.41	0.69
692	♂	San Pedro, Ariz	Oct. 2, 1873	.....do	2.58	2.63	0.40	0.72
771	♂ ad.	Gila River, Ariz .....	.....do .....	.....do	2.50	2.66	0.43	0.71

POOSPIZA BELLI (Cass.), var. NEVADENSIS, Ridg.

Artemisia Sparrow.

PLATE XI.

Poospiza belli var. *nevadensis*, RIDG., Rep. Birds 40th parallel (in press).—BD., BREW., & RIDG., N. A. Birds, 1874, 594.—YARROW & HENSHAW, Rep. Orn. Specs., 1872, Wheeler's Exped., 1874, 14.—HENSHAW, An. Lyc. Nat. Hist. N. Y., xi, 1874, 6.—*Id.*, An. List Birds Utah, 1872, Wheeler's Exped., 1874, 44.—*Id.*, Rep. Orn. Specs., 1873, Wheeler's Exped., 1874, 115.

Poospiza belli, KENNERLY, P. R. R. Rep., Whipple's Route, 1859, 29 (Little Colorado; New Mexico).—HENRY, Proc. Acad. Nat. Sci. Phila., 1859, 107 (New Mexico).—COUES, Proc. Acad. Nat. Sci. Phila., 1866, 86 (Fort Whipple, Ariz.).—ALLEN, Bull. Mus. Comp. Zoöl., 1872, 117 (Ogden, Utah).—COUES, Key N. A. Birds, 1872, 141.

Amphispiza belli var. *nevadensis*, COUES, U. S. Geol. Surv. Terr., 1874, 234.

This is a well marked race, differing from the true *belli* in larger size, paler coloration, and distinct streaks on the back. These are usually entirely wanting in the typical *belli*, which is restricted in its range to California. Comparative measurements of the two races are appended.

In 1872, numerous specimens were obtained of this species, which was first seen near Rush Lake, Utah, October 5. It was observed in small migratory companies of from three to ten, frequenting the sage brush on desolate plains. Very shy, and was most often seen running with great agility among the bushes; its motions being so quick that it might readily be mistaken for a mouse. In running, its long tail is carried in a perpendicular position; in this respect greatly resembling the wrens. No notes were heard save its single sparrow like chirp.

Very abundant in the valleys of the San Pedro and Gila Rivers, Arizona, in which Territory, as also New Mexico, this as well as several other species winter, coming from farther north in early fall. A rather exclusive inhabitant of the open plains, where its habits are quite terrestrial. Taken in San Luis Park, Colorado, by Mr. C. E. Aiken, where not common

Poospiza belli.

[In Smithsonian collection.]

No.	Sex.	Locality.	Date.	Collector.	Wing.	Tail.	Bill.	Tarsus.
6338	Cosumnes River .....	.....	.....	2. 74	2. 90	0. 43	0. 80
63652	Saticoy, Cal .....	.....	.....	2. 75	3. 00	0. 40	0. 75
.....	California .....	.....	.....	2. 43	2. 31	0. 32	0. 81

Poospiza belli var. *nevadensis*.

No.	Sex.	Locality.	Date.	Collector.	Wing.	Tail.	Bill.	Tarsus.
221	♀	Iron Springs, Utah..	Oct. 4, 1872	H. W. Henshaw .....	.....	.....	.....	.....
220	♀	..... do .....	..... do .....	..... do .....	.....	.....	.....	.....
222	♂	..... do .....	..... do .....	..... do .....	.....	.....	.....	.....
233	♂	..... do .....	..... do .....	..... do .....	.....	.....	.....	.....
234	♂	..... do .....	..... do .....	..... do .....	.....	.....	.....	.....
236	♂ (?)	..... do	Oct. 5, 1872	..... do .....	.....	.....	.....	.....
235	♀	..... do .....	..... do .....	..... do .....	.....	.....	.....	.....
314	♂	Toquerville, Utah...	Oct. 16, 1872	..... do .....	.....	.....	.....	.....
315	♂	..... do .....	..... do .....	..... do .....	.....	.....	.....	.....
325	♂	..... do	Oct. 19, 1872	..... do .....	.....	.....	.....	.....
371	♂	Saint George, Utah .	Oct. 28, 1872	Dr. H. C. Yarrow and H. W. Henshaw.	.....	.....	.....	.....
372	♂	..... do .....	..... do .....	..... do .....	.....	.....	.....	.....
916	♂	Gila River, Ariz	Oct. 16, 1873	H. W. Henshaw	3. 02	3. 02	0. 43	0. 83
917	♀	..... do .....	..... do .....	..... do	2. 95	2. 85	0. 43	0. 77
921	♀	..... do .....	..... do .....	..... do	3. 10	2. 97	0. 42	0. 86
174	♂	San Luis, Colo.....	Aug. 21, 1874	C. E. Aiken .....	.....	.....	.....	.....

SPIZELLA MONTICOLA (Gm.).

Tree Sparrow.

Fringilla monticola, Gm., Syst. Nat., i, 1788, 912.

Spizella monticola, Bd., Birds N. A., 1858, 472.—KENNERLY, P. R. R. Rep., Whipple's Route, 1859, 29.—COOP. & SUCKL., P. R. R. Rep., xii, pt. ii, 1860, 203.—HAYD., Trans. Am. Phil. Soc., xii, 1862, 167.—COUES, Proc. Acad. Nat. Sci. Phila., 1866, 87 (Colorado Chiquito River, Kennerly).—COOPER, Birds Cal., i, 1870, 205.—ALLEN, Bul. Mus. Comp. Zoöl., 1872 177 (Western Kansas, in winter).—COUES, Key N. A. Birds, 1872, 142.—AIKEN, Proc. Bost. Soc. Nat. Hist., 1872, 200.—SNOW, Birds Kan., 1872, 10.—BD., BREW., & RIDG., N. A. Birds, ii, 1874, 3, pl. 27, f. 5.—YARROW & HENSHAW, Rep. Orn. Specs., 1872, Wheeler's Exped., 1874, 14.—HENSHAW, Rep. Orn. Specs., 1873, Wheeler's Exped., 1874, 116.—COUES, Birds Northwest, 1874, 146.

A few individuals were met with at Beaver, Utah, about the first of November, and the species was found common at Provo in December.

In Arizona and New Mexico, the Tree Sparrow was not found by our parties. It was, however, seen on the Colorado Chiquito, New Mexico, by Dr. Kennerly, in December, and doubtless extends its winter range into portions of both those Territories. Captain Bendire writes me that it occurs about Tucson as a winter visitant. It was numerous in El Paso County, Colorado, in December, where, according to Mr. Aiken, it is an abundant winter resident. It passes to the far north to breed.

SPIZELLA SOCIALIS (Wils.), var. ARIZONAE, Coues.

Arizona Chipping Sparrow.

Spizella socialis var. *arizonae*, COUES, Proc. Acad. Nat. Sci. Phila., 1866, 87 (Fort Whipple, Ariz.).—*Id.*, Key N. A. Birds, 1872, 143 (Arizona).—BD., BREW., & RIDG., N. A. Birds, ii, 1874, 11.—YARROW & HENSHAW, Rep. Orn. Specs., 1872, Wheeler's Exped., 1874, 14.—HENSHAW, An. Lyc. Nat. Hist. N. Y., xi, 1874, 6.—*Id.*, An. List Birds Utah, 1872, Wheeler's Exped., 1874, 44.—*Id.*, Rep. Orn. Specs., 1873, Wheeler's Exped., 1874, 116.—COUES, Birds Northwest, 1874, 148.

Spizella socialis, Bd., Ives' Col. Exped., 1857-58, pt. iv, 6.—HEERM., P. R. R. Rep., x, pt. iv, 1859, 48.—XANTUS, Proc. Acad. Nat. Sci. Phila., 1859, 192 (Fort Tejon, Cal.).—HENRY, Proc. Acad. Nat. Sci. Phila., 1859, 107 (New Mexico).—COUES, Proc. Acad. Nat. Sci. Phila., 1868, 83 (Arizona, Palmer).—ALLEN, Bull. Mus. Comp. Zoöl., 1872, 177 (includes both varieties).—AIKEN, Proc. Bost. Soc. Nat. Hist., 1872, 200.—MERRIAM, U. S. Geol. Surv. Terr., 1872, 682 (Idaho; Wyoming).—HENSHAW, Rep. Orn. Specs., 1873, Wheeler's Exped., 1874, 80.—ALLEN, Proc. Bost. Soc. Nat. Hist., June, 1874, 15, 27 (Montana).

A single specimen was taken in Provo Cañon in August, and others in the Wahsatch range of mountains during the migrations in September and October. They were found to be numerous about Denver in May, and common through Arizona and New Mexico. Their habits and notes appear identical with those of the eastern *socialis*. Two broods are raised in a season. A nest, found July 24, containing young just hatched, was placed in a small piñon tree a few feet from the ground. The bird winters in the southern portion of Arizona.

No.	Sex.	Locality.	Date.	Collector.	Wing.	Tail.	Bill.	Tarsus.
B 4	♂	Provo Cañon, Utah ...	Aug. 11, 1872	H. W. Henshaw.....	.....	.....	.....	.....
153	♂	Wahsatch Mts., Utah..	Sept. 8, 1872	..... do .....	.....	.....	.....	.....
252	♂ ad.	..... do	Oct. 6, 1872	..... do .....	.....	.....	.....	.....
5	♂ ad.	Denver, Colo.....	May 6, 1873	..... do	2.77	2.52	0.40	0.68
449	♂ jun.	Fort Wingate, N. Mex.	July 16, 1873	..... do	2.80	2.65	0.36	0.65
466	♂ jun.	Inscription Rock, N. Mex.	July 23, 1873	..... do	2.84	2.68	0.38	0.65
631	♂ jun.	Camp Apache, Ariz....	Aug. 6, 1873	..... do	2.79	2.60	0.40	0.67
621	♂ jun.	..... do	Aug. 26, 1873	..... do	2.85	2.68	0.41	0.68
630	Jun.	..... do	Aug. 27, 1873	..... do	2.79	2.61	0.39	0.63
606	♂ jun.	..... do	Aug. 28, 1873	..... do	2.97	2.77	0.38	0.68
668	♂ jun.	..... do	Sept. 1, 1873	..... do	2.86	2.65	0.39	0.66
723	♂ ad.	South of Camp Apache, Ariz.	..... do .....	..... do	2.76	2.60	0.40	0.65
847	♂	Camp Grant, Ariz....	Sept. 8, 1873	..... do	2.90	2.75	0.32	0.65
110	♀ ad.	Camp Bowie, Ariz	Sept. 9, 1873	Dr. C. G. Newberry...	2.75	2.60	0.38	0.65
848	♀	Camp Grant, Ariz....	Sept. 24, 1873	H. W. Henshaw.....	2.75	2.55	0.35	0.68
42	Ad.	Santa Fé, N. Mex	June 24, 1874	..... do .....	.....	.....	.....	.....
43	♂ ad.	..... do .....	..... do .....	..... do .....	.....	.....	.....	.....
108	♂ jun.	Willow Spring, Ariz...	July 19, 1874	..... do .....	.....	.....	.....	.....
664	♂ jun.	Camp Lowell, Ariz ...	Sept. 10, 1874	..... do .....	.....	.....	.....	.....

SPIZELLA PALLIDA (Swains.).

Clay-colored Sparrow.

Emberiza pallida, SWAINS., Fn. Bor.-Am., ii, 1831, 251 (not of AUDUBON).

Spizella pallida, BD., Birds N. A., 1858, 474.—*Id.*, U. S. & Mex. Bound. Surv., ii, pt. ii, 1859, Birds, 16.—HEERM., P. R. R. Rep., x, pt. iv, 1859, 48 (California; Texas).—HAYD., Trans. Am. Phil. Soc., xii, 1862, 167.—COUES, Key N. A. Birds, 1872, 143.—BD., BREW., & RIDG., N. A. Birds, ii, 1874, 11, pl. xxvi, f. 3.—ALLEN, Proc. Bost. Soc. Nat. Hist., June, 1874, 27.—COUES, Birds Northwest, 1874, 148.

Three specimens of this sparrow were taken at Camp Crittenden, Southern Arizona, the 1st of September. As compared with the hordes of other sparrows, more especially Brewer's (var. *breweri*), their numbers seemed small. This was the only point at which it was detected, though it is probable that the species winters in this region in greater or less numbers.

No	Sex.	Locality.	Date.	Collector.	Wing.	Tail.	Bill.	Tarsus.
562	♂ jun.	Camp Crittenden, Ariz.	Sept. 1, 1874	H. W. Henshaw	2.43	2.52	0.34	0.67
581	♂	..... do	Sept. 2, 1874	..... do	2.31	2.38	0.33	0.67
622	.....	..... do	Sept. 5, 1874	..... do	2.45	2.58	0.37	0.70

SPIZELLA PALLIDA (Swains.), var. BREWERI, Cass.

Brewer's Sparrow.

Spizella breweri, CASS., Proc. Acad. Nat. Sci. Phila., viii, Feb., 1856, 40.—NEWB., P. R. R. Rep., vi, 1857, 88.—BD., Ives' Col. Exped., 1857-58, pt. iv, 6.—*Id.*, Birds N. A., 1858, 475.—*Id.*, U. S. & Mex. Bound. Surv., ii, pt. ii, 1859, Birds., 16.—KENNERLY, P. R. R. Rep., Whipple's Route, 1859, 29.—COUES, Proc. Acad. Nat. Sci. Phila., 1866, 87 (Fort Whipple, Ariz.).—*Id.*, *ib.*, 1868, 83.—COOPER, Birds Cal., i, 1870, 209.—ALLEN, Proc. Bost. Soc. Nat. Hist., June, 1874, 27 (in text).

Spizella pallida var. *breweri*, COUES, Key N. A. Birds, 1872, 143.—BD., BREW., & RIDG., N. A. Birds, ii, 1874, 13, pl. xxvii, f. 4.—YARROW, Rep. Orn. Specs., 1871, Wheeler's Exped., 1874, 35.—YARROW & HENSHAW, Rep. Orn. Specs., 1872, Wheeler's Exped., 1874, 14.—HENSHAW, An. Lyc. Nat. Hist. N. Y., xi, 1874, 6.—*Id.*, An. List Birds Utah, 1872, Wheeler's Exped., 1874, 44.—*Id.*, Rep. Orn. Specs., 1873, Wheeler's Exped., 1874, 62, 80, 116.—ALLEN, Proc. Bost. Soc. Nat. Hist., June, 1874, 28.—COUES, Birds Northwest, 1874, 151.

Spizella pallida, WOODH., Sitgreave's Exp. Zuñi & Col. Riv., 1854, 83 (New Mexico).—ALLEN, Bull. Mus. Comp. Zoöl., 1872, 177 (Eastern Kansas; western edge of plains; Ogden, Utah).—SNOW, Birds Kan., 1872, 10.

Common on the "benches" near Provo, Utah, in August. At this time, they were in flocks, preparatory to migrating.

A single specimen, the only one seen, taken in 1873, near Denver.

Rather numerous in Southern Colorado. Inhabits the sage-brush and greasewood of the plains. Its song is short and weak, and somewhat resembles that of the Yellow-winged Sparrow (*C. passerinus*). It consists of a short prelude, followed by a succession of short, quickly uttered notes, which would be very well expressed by the striking together of pebbles.

In New Mexico and Arizona, this sparrow seems to be more abundant than farther to the north, taking the place here, in the summer, of the preceding species. It seems fond of frequenting the thickets along the streams, but is also an inhabitant of the plains, and quite partial to those covered with the sage brush. Its musical abilities vary very much, though it everywhere is very persistent in its efforts, and in a locality where these birds are common the ear of an attentive listener will be greeted every few moments by the music of its pleasant song. In Arizona, I noticed a great difference in the quality of the songs as compared with those I listened to in Southern Colorado. In the former locality, these were quite well worth stopping to hear, possessing a beautiful, smooth, warbling tone, much varied with low trills. The nest is built in low bushes.

No.	Sex.	Locality.	Date.	Collector.	Wing.	Tail.	Bill.	Tarsus.
9	♂ jun.	Provo Cañon, Utah ...	July 31, 1872	H. W. Henshaw.....	.....	.....	.....	.....
10	♀ jun.	..... do .....	..... do .....	..... do .....	.....	.....	.....	.....
35	♂ ad.	..... do	Aug. 2, 1872	Dr. H. C. Yarrow and H. W. Henshaw.	.....	.....	.....	.....
36	♀ ad.	..... do .....	..... do .....	..... do .....	.....	.....	.....	.....
38	♂ jun.	Provo, Utah.....	..... do .....	..... do .....	.....	.....	.....	.....
145	♂ ad.	Salina, Utah.....	Sept. 5, 1872	H. W. Henshaw.....	.....	.....	.....	.....
178	♀ ad.	Panquitch, Utah	Sept. 17, 1872	..... do .....	.....	.....	.....	.....
230	♂	Iron Springs, Utah.....	Oct. 4, 1872	..... do .....	.....	.....	.....	.....
B 2	.....	(Alcoholic) .....	.....	H. W. Henshaw and Dr. H. C. Yarrow.	.....	.....	.....	.....
B 3	.....	..... do .....	.....	..... do .....	.....	.....	.....	.....
116	♀ ad.	Fort Garland, Colo....	May 17, 1873	H. W. Henshaw	2.32	2.52	0.38	0.63
141	♂ ad.	..... do	May 26, 1873	..... do	2.52	2.44	0.47	0.66
179	♂ ad.	..... do	May 29, 1873	..... do	2.40	2.54	0.38	0.73
411	♂ ad.	..... do	June 23, 1873	..... do	2.37	2.52	0.37	0.68
631	♀	Camp Apache, Ariz....	Aug. 16, 1873	..... do	2.45	2.55	0.31	0.65
632	♂ jun.	..... do	Aug. 26, 1873	..... do	2.27	2.56	0.35	0.69
653	♀	..... do	Aug. 27, 1873	..... do	2.38	2.57	0.33	0.64
770	♂	Gila River, Ariz	Sept. 1, 1873	..... do	2.40	2.62	0.35	0.71
12	♂ ad.	Santa Fé, N. Mex.	July 17, 1874	..... do .....	.....	.....	.....	.....
631	♂ ad.	Camp Lowell, Ariz....	Sept. 9, 1874	..... do .....	.....	.....	.....	.....
665	♂ ad.	Camp Crittenden, Ariz.	Sept. 10, 1874	..... do .....	.....	.....	.....	.....
729	♂ ad.	Camp Lowell, Ariz....	Sept. 13, 1874	..... do .....	.....	.....	.....	.....
731	♂	Sienega, Ariz .....	..... do .....	..... do .....	.....	.....	.....	.....
932	♀	Gila River, Ariz	Oct. 4, 1874	..... do .....	.....	.....	.....	.....

MELOSPIZA MELODIA (Wils.), var. FALLAX, Bd.

Western Song Sparrow.

Zonotrichia fallax, Bd., Proc. Acad. Nat. Sci. Phila., vii, June, 1854, 119 (Pueblo Creek, New Mexico).

Melospiza fallax, XANTUS, Proc. Acad. Nat. Sci. Phila., 1859, 192 (Fort Tejon, Cal.)—KENNERLY, P. R. R. Rep., Whipple's Route, 1859, 29.—HENRY, Proc. Acad. Nat. Sci. Phila., 1859, 107 (New Mexico).—COUES, Proc. Acad. Nat. Sci. Phila., 1868, 83.—Bd., Birds N. A., 1858, 481.—*Id.*, *ib.*, 1860, 481, pl. xxvii, f. 2.—COUES, Proc. Acad. Nat. Sci. Phila., 1866, 88 (Fort Whipple, Ariz.).—COOPER, Birds Cal., i, 1870, 215.—MERRIAM, U. S. Geol. Surv. Terr., 1872, 682.

Melospiza melodia var. *fallax*, COUES, Key N. A. Birds, 1872, 139.—Bd., BREW., & RIDG., N. A. Birds, ii, 1874, 22, pl. 27, f. 10.—YARROW & HENSHAW, Rep. Orn. Specs., 1872, Wheeler's Exped., 1874, 13.—HENSHAW, An. Lyc. Nat. Hist. N. Y., xi, 1874, 6.—*Id.*, An. List Birds Utah, 1872, Wheeler's Exped., 1874, 44.—*Id.*, Rep. Orn. Specs., 1873, Wheeler's Exped., 1874, 62, 81, 117.—COUES, Birds Northwest, 1874, 139.

Melospiza melodia, ALLEN, Bull. Mus. Comp. Zool., 1872, 177 (western edge of plains; Ogden, Utah).

This western variety of the Song Sparrow was found by us in considerable numbers in various parts of Utah, where alone, in the sections traversed by the survey, it was common. Leaving the settled portions of the Territory and entering the wilder districts, it almost invariably became less abundant, and then disappeared, to be again met with as we neared the towns. In Colorado, it appears to be of not uncommon occurrence, and is still less frequently met with in New Mexico and Arizona; though at certain points, as at Camp Lowell, I have seen numbers, they seemingly in this locality finding a favorite winter home. The specimens collected here are very appreciably different from any I have ever seen from Colorado and Utah, and are more typical of the western race as restricted. They are much grayer throughout, the rufous much brighter, and these points, in conjunction with the slender bill and longer tail, characterize the race quite strongly. In habits, notes, and song, the two races appear to be identical.

No.	Sex.	Locality.	Date.	Collector.	Wing.	Tail.	Bill.	Tarsus.
51	♀ ad.	Provo, Utah.....	July 25, 1872	Dr. H. C. Yarrow and H. W. Henshaw.	.....	.....	.....	.....
53	♂ ad.	..... do .....	..... do .....	..... do .....	.....	.....	.....	.....
80	♂ ad.	..... do	July 26, 1872	..... do .....	.....	.....	.....	.....
123	♀ ad.	..... do	July 29, 1872	..... do .....	.....	.....	.....	.....
149	♂ ad.	..... do	July 30, 1872	..... do .....	.....	.....	.....	.....
150	♀ ad.	..... do .....	..... do .....	..... do .....	.....	.....	.....	.....
74	♂ jun.	Daniell's Cañon, Utah.	Aug. 12, 1872	H. W. Henshaw.....	.....	.....	.....	.....
101	♂ jun.	Wahsatch Mts., Utah..	Aug. 17, 1872	..... do .....	.....	.....	.....	.....
156	♀ jun.	Grass Valley, Utah....	Sept. 10, 1872	..... do .....	.....	.....	.....	.....
157	♂	..... do .....	..... do .....	..... do .....	.....	.....	.....	.....
298	♂	Beaver, Utah.....	Sept. 25, 1872	H. W. Henshaw and Dr. H. C. Yarrow.	.....	.....	.....	.....
299	♂ ad.	..... do .....	..... do .....	..... do .....	.....	.....	.....	.....
305	♂	North Creek, Utah....	Sept. 26, 1872	..... do .....	.....	.....	.....	.....
237	♂	Iron Springs, Utah....	Oct. 5, 1872	H. W. Henshaw.....	.....	.....	.....	.....
277	♂	..... do	Oct. 10, 1872	..... do .....	.....	.....	.....	.....
303	♀	Toquerville, Utah.....	Oct. 15, 1872	..... do .....	.....	.....	.....	.....
358	♀	Washington, Utah....	Oct. 23, 1872	H. W. Henshaw and Dr. H. C. Yarrow.	.....	.....	.....	.....
357	♀	..... do	Oct. 24, 1872	..... do .....	.....	.....	.....	.....
383	♂	Beaver, Utah.....	Nov. 8, 1872	..... do .....	.....	.....	.....	.....
412	♀	Fillmore, Utah.....	Nov. 16, 1872	..... do .....	.....	.....	.....	.....
B 5	.....	(Alcoholic).....	—, 1872	..... do .....	.....	.....	.....	.....
14	♀ ad.	Denver, Colo.....	May 7, 1873	H. W. Henshaw.....	2.60	2.71	0.48	0.80
40	♀ ad.	..... do	May 10, 1873	..... do	2.55	2.83	0.45	0.82
134	♂ ad.	Fort Garland, Colo....	May 25, 1873	..... do	2.77	2.77	0.52	0.86
177	♂ ad.	..... do	May 29, 1873	..... do	2.80	2.88	0.50	0.82
428	♀ ad.	..... do	June 28, 1873	..... do	2.53	2.82	0.57	0.83
149	♀	Fort Bayard, N. Mex..	Oct. 19, 1873	..... do	2.57	2.95	0.46	0.82
920	.....	Gila River, Ariz.....	Oct. 1, 1874	Dr. J. T. Rothrock....	2.65	3.00	0.45	0.82
923	♂	Mount Graham, Ariz..	..... do	H. W. Henshaw.....	2.55	2.97	0.47	0.87
984	♂	Camp Apache, Ariz....	Oct. 10, 1874	..... do	2.64	2.98	0.47	0.82
985	♀	..... do .....	..... do .....	..... do	2.66	3.04	0.43	0.87
1083	♂	..... do	Oct. 29, 1874	..... do .....	.....	.....	.....	.....

MELOSPIZA MELODIA var. HEERMANNI, Bd.

Heermann's Song Sparrow.

Melospiza heermanni, BD., Birds N. A., 1858, 478.—*Id.*, *ib.*, 1860, 478, pl. 70, f. 1 (California).—COOPER, Birds Cal., 1870, 212.—YARROW, Rep. Orn. Specs., 1871, Wheeler's Exped., 1874, 35.

Melospiza melodia var. *heermanni*, COUES, Key N. A. Birds, 1872, 139.—BD., BREW., & RIDG., N. A. Birds, ii, 1874, 24, pl. 27, f. 9.

This appears to be a local race, quite restricted, its range being generally confined to California, extending northward as far as San Francisco,

on the east to the Humboldt Mountains, and on the southeast to the Mojave River, and into Western Arizona, as shown by a single specimen from that region collected by Mr. Bischoff.

No.	Sex.	Locality.	Date.	Collector.	Wing.	Tail.	Bill.	Tarsus.
.....	Ad.	Arizona.....	Sept. 8, 1871	F. Bischoff.....	.....	.....	.....	.....

MELOSPIZA LINCOLNI (Aud.).

Lincoln's Finch.

Fringilla lincolnii, AUD., Orn. Biog., ii, 1834, 539, pl. exciii.

Zonotrichia lincolnii, WOODH., Sitgreave's Exp. Zuñi & Col. Riv., 1854, 85.

Melospiza lincolni, BD., Birds N. A., 1858, 483.—*Id.*, U. S. & Mex. Bound. Surv., ii, pt. ii, 1859, Birds, 16.—COUES, Proc. Acad. Nat. Sci. Phila., 1866, 88 (Arizona, KENNERLY).—XANTUS, Proc. Acad. Nat. Sci. Phila., 1859, 192 (Fort Tejon, Cal.).—KENNERLY, P. R. R. Rep., Whipple's Route, 1859, 29.—HAYD., Trans. Am. Phil. Soc., xii, 1862, 167.—COOPER, Birds Cal., i, 1870, 216.—STEV., U. S. Geol. Surv. Terr., 1870, 465.—ALLEN, Bull. Mus. Comp. Zoöl., 1872, 177.—COUES, Key N. A. Birds, 1872, 138.—SNOW, Birds Kan., 1872, 10.—HOLD., Proc. Bost. Soc. Nat. Hist., 1872, 200.—BD., BREW., & RIDG., N. A. Birds, ii, 1874, 31, pl. 27, f. 13.—YARROW & HENSHAW, Rep. Orn. Specs., 1872, Wheeler's Exped., 1874, 14.—HENSHAW, An. Lyc. Nat. Hist. N. Y., xi, 1871, 6.—*Id.*, An. List Birds Utah, 1872, Wheeler's Exped., 1874, 44.—*Id.*, Rep. Orn. Specs., 1873, Wheeler's Exped., 1874, 63, 81, 117.—COUES, Birds Northwest, 1874, 135.

Peucaea lincolnii, BD., Stans. Rep. Exp. Great Salt Lake, 1852, 317.—HEERM., P. R. R. Rep., x, pt. ii, 1859, 49.

Lincoln's Sparrow appears to extend in its migrations across the continent from east to west; occurring even in Massachusetts regularly in spring and fall, though it is quite rare. In the West, however, at these seasons, its numbers are very great; in many localities outnumbering all the other sparrows. Near Denver, a few were present the first days of May; and probably the species had been making its way north for some time, individuals stopping now and then as they reached favorable localities, or till the weather became milder in advance. By the 17th, they were arriving daily in throngs, every clump of bushes and grove of trees containing numbers. Having sought out such sheltered favorable localities, they spent the days in resting and satisfying their hunger, and as night came on pursued

their course to the far north. By the last of May, nearly all had disappeared from the low grounds; and such stragglers as remained were lost sight of a few days later, doubtless finding in the mountains adjacent all the conditions necessary for their summer existence. As an abundant summer resident of the mountains of Colorado, it has been found by Messrs. Allen and Trippe ranging from about 8,000 feet to the timber line. In the mountains of New Mexico and Arizona it has not been found by any of the expeditions in summer, nor do I think it occurs there.

In fall, they occur, if possible, even more abundantly than during the vernal passage; their numbers reaching the maximum in Arizona in September, at which time they are found from an altitude of 10,000 feet in the shrubbery and weeds along the alpine streams to the lowest valleys.

Among the hordes of sparrows found along the Gila River the middle of September, no one species compared in its abundance with this finch. The tall weeds and undergrowth seemed to be alive with these birds, dozens of which would be scared up at every step, and alight on the neighboring trees. They spend all their time on the ground, searching for the small seeds and insects which constitute their food. When undisturbed, they are perfectly silent, but occasionally, when startled, emit a sharp chirp.

No.	Sex.	Locality.	Date.	Collector.	Wing.	Tail.	Bill.	Tarsus.
155	♂ ad.	Grass Valley, Utah....	Sept. 10, 1872	H. W. Henshaw .....	.....	.....	.....	.....
295	♂?jun.	..... do	Sept. 14, 1872	..... do .....	.....	.....	.....	.....
13	♂ ad.	.....	May 7, 1873	..... do	2.41	2.46	0.45	0.79
84	♂ ad.	.....	May 14, 1873	..... do	2.52	2.57	0.44	0.81
86	♂ ad.	.....	..... do .....	..... do	2.57	2.65	0.45	0.80
91	♀ ad.	.....	May 15, 1873	..... do	2.25	2.33	0.45	0.75
100	♂ ad.	.....	May 17, 1873	..... do	2.48	2.48	0.45	0.83
101	♀ ad.	.....	..... do .....	..... do	2.64	2.67	0.45	0.82
102	♂ ad.	.....	..... do .....	..... do	2.23	2.26	0.44	0.73
133	♂ ad.	Fort Garland, Colo . .	May 25, 1873	..... do	2.45	2.50	0.49	0.79
746	♀	Gila River, Ariz	Sept. 11, 1873	..... do	2.35	2.40	0.48	0.76
785	♂	..... do	Sept. 15, 1873	..... do	2.54	2.67	0.45	0.77
787	♀	..... do .....	..... do .....	..... do	2.57	2.70	0.43	0.75
789	♂	..... do .....	..... do .....	..... do	2.37	2.47	0.43	0.75
790	♀	..... do .....	..... do .....	..... do	2.47	2.65	0.48	0.84

MELOSPIZA PALUSTRIS (Wils.).

Swamp Sparrow.

Fringilla palustris, WILS., Am. Orn., iii, 1811, 49, pl. xxii, f. 1.

Melospiza palustris, BD., Birds N. A., 1858, 483.—HAYD., Trans. Am. Phil. Soc., xii, 1862, 167.—ALLEN, Bull. Mus. Comp. Zool., 1872, 177 (Eastern Kansas, May).—COUES, Key N. A. Birds, 1872, 138.—SNOW, Birds Kan., 1872, 10.—BD., BREW., & RIDG., N. A. Birds, ii, 1874, 34, pl. xxviii, figs. 1, 2.—HENSHAW, An. Lyc. Nat. Hist. N. Y., xi, 1874, 6.—*Id.*, An. List Birds Utah, 1872, Wheeler's Exped., 1874, 45.—YARROW & HENSHAW, Rep. Orn. Specs., 1872, Wheeler's Exped., 1874, 14.—COUES, Birds Northwest, 1874, 137.

A single specimen, taken at Washington, Utah, in October. This capture affords a valuable item regarding the geographical distribution of this species, as it has never before been taken west of the great plains; its western limit being Eastern Kansas. This being the only specimen taken, it must be regarded as rare; for careful search was made, and hundreds of flocks of sparrows (principally *Zonotrichia*) were closely examined with a view to finding rarities; the fields in the vicinity of Washington being fairly alive with these birds.

No.	Sex.	Locality.	Date.	Collector.	Wing.	Tail.	Bill.	Tarsus.
350	♂ ad.	Washington, Utah	Oct. 23, 1872	H. W. Henshaw and Dr. H. C. Yarrow.	.....	.....	.....	.....

PEUCAEA AESTIVALIS var. ARIZONAE, Ridg.

Arizona Sparrow.

Peucaea cassinii, BD., Birds N. A., 1858, 486 (in part).

Peucaea sp. (?), HENSHAW, Rep. Orn. Specs., 1873, Wheeler's Exped., 1874, 118.

Peucaea aestivalis var. *arizonæ*, RIDG., Am. Nat., vii, 1873, 616.—BD., BREW., & RIDG., N. A. Birds, ii, 1874, 41.

Peucaea aestivalis var. *cassini*, COUES, Key N. A. Birds, 1872, 140.

The Bachman's Finch of the Southern States is represented in Northern Mexico and along the southern borders of Arizona, and probably also in New Mexico, by this race, which appears to be sufficiently distinguished, as a variety, by its paler coloration, slenderer bill, and longer wings and tail. In Arizona, this sparrow appears to be confined exclusively to the extreme southern portion, and was found abundant only within a few miles of the

Mexican border. At Camp Grant, the most northern locality at which it was detected, only a single young bird was taken, which, however, would seem to establish the fact of the species breeding here. From the succeeding species, it differs entirely in choice of habitat, habits, and especially in the song, which are wholly dissimilar in their character. Instead of frequenting the open plains, this bird finds its home in the valleys, where it keeps among the rank, high grass, or in the dense willow thickets, always in close proximity to water. In habits, it is quite exclusively terrestrial, and most of those I saw were started from the ground, where, wholly concealed by the vegetation, they were hunting among the roots for food. When started, they rose in an unwilling, half hesitating sort of way, and, though when once fairly off they flew quite swiftly, usually terminated their flight after a few yards by dropping suddenly into the covert, and then, to render themselves still more secure, generally ran a short distance, and remained close till fairly trodden upon. Specimens could thus only be had by being shot on the wing, not always, it may be remarked, the easiest thing in the world to do.

Their singing was always accomplished from the top of some convenient bush, which the male sought for this purpose, and from which, after a few repetitions of his simple lay, he usually made an abrupt dive into the grass, as though fearful of being caught by some one in the very act. The song begins with a faint trill, followed by a succession of disjointed syllables, which may be expressed by the syllables *cha*, *chewee*, *wee*, *wee*, *wee*, *wir*, the whole delivered in rather a monotonous, listless manner, and remarkable for little else save its extreme oddity, it being entirely different from any song I ever heard. Perhaps the lateness of the season (September 1) may account for its seeming lack of musical ability, since its near relative, Bachman's Finch, is famed for its charming song.

Many of the young in nesting plumage were taken, and, late as it was, I obtained good evidence, from the appearance of some of the females, that they had not yet entirely finished cares of incubation, and I think a few still had eggs. In the few days spent here, however, I did not discover their nest, which, as is the case with *estivalis*, is probably placed on the ground. Below is given a description of a young bird taken at Camp Grant in 1873,

the species of which was left undetermined. It proves, however, to be the young in the first plumage of this variety.

Feathers above with dark-brown centers, and edged conspicuously with fulvous; brightest on the rump, where each feather is broadly tipped with the same; beneath pale ochraceous-yellow, becoming strong fulvous on the flanks and under tail-coverts; upper parts of breast and throat strongly and sides less distinctly marked with longitudinal streaks of black; wing-coverts edged and tipped with strong fulvous; inner secondaries bordered with same, but darker; tail-feathers black, margined with dull rufous; bend of wing edged with light yellow; bill above dark brown, paler beneath.

No.	Sex.	Locality.	Date.	Collector.	Wing.	Tail.	Bill.	Tarsus.
878	♂ jun.	Camp Grant, Ariz.	Sept. 27, 1873	H. W. Henshaw.....	2. 50	2. 58	0. 47	0. 80
558	♂ ad.	Camp Crittenden, Ariz.	Sept. 1, 1874	..... do	2. 55	2. 77	0. 49	0. 82
559	♀ ad.	..... do .....	..... do .....	..... do	2. 58	2. 88	0. 50	0. 82
560	Jun.	..... do .....	..... do .....	..... do .....	.....	.....	.....	.....
563	♀ ad.	..... do .....	..... do .....	..... do	2. 34	2. 55	0. 50	0. 82
577	♂ ad.	..... do	Sept. 2, 1874	..... do	2. 54	2. 85	0. 48	0. 80
578	♂ ad.	..... do .....	..... do .....	..... do	2. 63	2. 72	0. 54	0. 84
579	♂ ad.	..... do .....	..... do .....	..... do	2. 55	2. 79	0. 50	0. 83
580	♂ jun.	..... do .....	..... do .....	..... do	2. 45	2. 45	0. 48	0. 79
581	♂ jun.	..... do .....	..... do .....	..... do	2. 54	2. 70	0. 50	0. 82
582	♂ jun.	..... do .....	..... do .....	..... do	2. 36	2. 57	0. 48	0. 77
(?)	(?)	..... do .....	..... do .....	..... do	2. 29	2. 62	0. 50	0. 83
605	♀ ad.	..... do .....	..... do .....	..... do	2. 37	2. 54	0. 47	0. 79
720	♂ ad.	Sienege, Ariz.	Sept. 13, 1874	..... do	2. 50	2. 68	0. 50	0. 82

PEUCAEA CASSINI (Woodh.).

Cassin's Sparrow.

Zonotrichia cassinii, WOODH., Proc. Acad. Nat. Sci. Phila., vi, April, 1852, 60 (San Antonio, Tex.).

Passerculus cassinii, WOODH., Sitgreave's Exp. Zuñi & Col. Riv., 1854, 85, pl. 4.

Peucea cassini, BD., Birds N. A., 1858, 485 (in part.)—HEERM., P. R. R. Rep., Parke's Route, x, 1859, 12, pl. iv, f. 2.—BD., U. S. & Mex. Bound. Surv., ii, pt. ii, 1859, Birds, 16.—COOPER, Birds Cal., i, 1870, 219.—SNOW, Birds Kan., 1872, 11.—BD., BREW., & RIDG., N. A. Birds, ii, 1874, 42, pl. 28, f. 5.—COUES, Birds Northwest, 1874, 140.—*Id.*, Check-List, app., No. 170 *bis*.

Peucea aestivalis var. *cassini*, ALLEN, Bull. Mus. Comp. Zoöl., 1872, 137 (Middle Kansas).

There can, I think, be no question of the propriety of ranking this sparrow as a valid species, not only from the difference of coloration, but also the pattern of the markings, and the entire distinctness of its song and

habits. Besides which, as remarked by Mr. Ridgway, the variety just noted, which is unquestionably referable to the *P. æstivalis*, as its western form, is found in the same region. I had excellent opportunities for noting the great dissimilarity in habits of the two.

Cassin's Sparrow was found by us in Southeastern Arizona, from a point a little north of the Gila River to near the southern border, being distributed evenly over this region, and found very numerous in all localities suited to its nature. The contrast in the character of the places where it was met with by us was very great. Thus, in traveling over the desolate plateau region, on nearing the Gila Valley this species was found frequenting the barren hill sides, where nothing but the cacti and the most hardy vegetation could maintain a foothold, and where the fierce heat of the sun's rays beat down upon the sandy ground. Here, however, this sparrow was found in numbers; and, mingled with the sweet strains of the Mockingbirds, and the humbler efforts of the Black-throated Buntings, was heard the continual melody of these little songsters. They sent forth the strains from the tops of the bushes, and again from mid-air; then, with quivering wings and outstretched legs, they re-alighted upon low bushes, whence they had taken their flight the moment before, the better perhaps to be heard by their mates. From this locality, as we moved southward, they were hardly lost sight of for three weeks.

On nearing Camp Grant, at Eureka Spring, I found a little meadowy tract, which was the home selected by a large colony of them, and where they had probably nested some time before, or possibly still had nests. Mingled with them were both old and young of the Yellow-winged Sparrow. In the early morning, the songs of half a dozen males could be heard in the air, at first distinctly, then blended and lost in the general medley. The song is very plaintive, but quite pretty and attractive; it is usually uttered when the bird, having ascended to perhaps the height of twenty feet, begins slowly to descend; and it terminates just as the bird alights. I have often remarked the nicety with which the little singer graduated the distance to the length of his song; it always being just completed as the perch is reached, while it never seems hurried or varied in length. It begins with a low tremulous trill, followed by slow and plaintive syllables, the last of which

is softer and more prolonged, and in a lower key. Though little varied, and on this account somewhat monotonous, it yet possesses an indescribable sweetness and pathos, especially when heard, as is often the case, during the still hours of the night. During a night's march from Camp Grant to Camp Bowie, I do not think an interval of five minutes passed unbroken by the song of one of these sparrows. Ere fairly out of hearing of the notes of one performer, the same plaintive strain was taken up by another invisible musician a little farther on, and so it continued till just before dawn. During the night, I am inclined to think, they sing entirely from their perches, remaining stationary. They were found to be most numerous on the dry plains, covered with a growth of short grass, interspersed with small shrubs and bushes.

No.	Sex.	Locality.	Date.	Collector.	Wing.	Tail.	Bill.	Tarsus.
209	♂ ad.	Near Camp Grant, Ariz.	July 28, 1874	H. W. Henshaw	2.51	2.74	0.48	0.77
484	♂ ad.	Near Camp Crittenden, Ariz.	Aug. 4, 1874	..... do	2.58	2.69	0.50	0.79
292	♂ ad.	Near Camp Bowie, Ariz.	Aug. 5, 1874	..... do	2.63	2.68	0.48	0.75
474	♂ ad.	..... do	Aug. 7, 1874	..... do	2.55	2.65	0.47	0.73
707	♀ ad.	Near Camp Crittenden, Ariz.	Aug. 24, 1874	..... do	2.45	2.64	0.43	0.73
709	♀ ad.	Near Camp Lowell, Ariz.	Sept. 1, 1874	..... do	2.52	2.73	0.47	0.74
710	♂	..... do .....	..... do .....	..... do	2.55	2.77	0.77	0.75
					2.55	2.78	0.45	0.77
721	♂	..... do	Sept. 11, 1874	..... do	2.50	2.75	0.50	0.73
722	♀	..... do	Sept. 13, 1874	..... do	2.43	2.59	0.47	0.70
727	♂	Sienega, Ariz.	Sept. 15, 1874	..... do	2.59	2.70	0.49	0.75
1343	Ad.	..... do .....	..... do .....	..... do	2.54	2.73	0.45	0.75

PEUCAEA RUFICEPS (Cass.).

Ammodromus ruficeps, CASS., Proc. Acad. Nat. Sci. Phila., vi, Oct., 1852, 184 (California).—HEERM., P. R. R. Rep., x, pt. ii, 1859, 49.

Peucaea ruficeps, BD., Birds N. A., 1858, 486.—COOPER, Birds Cal., 1870, 218.—COUES, Key N. A. Birds, 1872, 140.—BD., BREW., & RIDG., N. A. Birds, 1874, ii, 45.

PEUCAEA RUFICEPS (Cass.), var. BOUCARDI, Sclat.

Peucaea ruficeps var. *boucardi*, HENSHAW, Rep. Orn. Specs., 1873, Wheeler's Exped., 1874, 117.

Under this variety of the Rufous-crowned Sparrow are included a series of ten sparrows, collected in Arizona from Camp Apache southward and near Fort Bayard, N. Mex. From the typical *ruficeps*, as shown by specimens in the Smithsonian Institution, they differ in the generally darker

coloration, especially shown in the rufous of the head, and in the stouter, darker bill, showing in these respects their relationship with *boucardi*.

Young birds in the nesting-plumage have the entire upper parts ashy-brown; beneath pale yellowish-white, profusely streaked across the breast and along the sides with dark-brown; greater wing-coverts tipped with fulvous; secondaries margined outwardly with dull-rufous.

This sparrow was found to prefer rocky localities, generally in the vicinity of the streams. In some places it was not uncommon, usually in small companies of from three to eight. I never saw it near the pines, and, at this season at least, doubt that it is ever found among them. Indeed, all its habits and motions, as it busies itself searching for food among the rocks and bushes, are similar to those of the Song Sparrow (*M. fallax*), for which I mistook it more than once; its chirp of alarm was also similar.

Bill dark-brown above, paler below; legs and feet light-brown.

In 1874, these sparrows were met with under much the same conditions as the year previous. They are numerous in the region south of Camp Apache, living among the oaks, not venturing far up into the mountains nor descending to the plains. I regret that I can add so little to the meager knowledge possessed of the habits of this bird. I never heard their song. They apparently breed quite early, as by the middle of July the young, fully grown and fledged, were taken. Its actions, so far as I have observed, are unlike those of any other *Peucea*, and bear a close resemblance to those of the Song Sparrows.

No.	Sex.	Locality.	Date.	Collector.	Wing.	Tail.	Bill.	Tarsus.
591	♂ ad.	Camp Apache, Ariz.	Aug. 21, 1873	H. W. Henshaw	2. 53	2. 73	0. 50	0. 75
713	♀ ad.	Thirty miles south of Camp Apache, Ariz.	Sept. 7, 1873	..... do	2. 47	2. 76	0. 51	0. 75
719	♂ ad.	..... do	Sept. 8, 1873	..... do	2. 38	2. 86	0. 47	0. 78
720	♀ jun.	..... do .....	..... do .....	..... do	2. 38	2. 63	0. 47	0. 80
744	♀ ad.	..... do	Sept. —, 1873	..... do	2. 35	2. 72	0. 50	0. 79
758	♂	Gila River, Ariz.	Sept. 11, 1873	..... do	2. 30	2. 73	0. 51	0. 74
764	♂ ad.	..... do	Sept. 12, 1873	C. R. Turner	2. 55	2. 92	0. 50	0. 77
890	♂	Camp Grant, Ariz.	Sept. 27, 1873	H. W. Henshaw	2. 57	3. 20	0. 46	0. 81
898	♂ jun.	..... do	Sept. 30, 1873	..... do	2. 44	3. 76	0. 45	0. 80
946	♂	Fort Bayard, N. Mex.	Oct. 19, 1873	..... do	2. 63	3. 15	0. 47	0. 74

PEUCAEA CARPALIS, Coues.

The Rufous-winged Sparrow.

Peucaea carpalis, COUES, Am. Nat., vii, 1873, 322.—BD., BREW., & BIDG., N. A. Birds, 1874, iii, app. 515.

This little bird was discovered by Captain Bendire near Tucson, Ariz., where he found it an abundant resident. On getting down into Southern Arizona, I looked very carefully for the species, and am inclined to attribute my want of success on the Gila River, and the region south, especially near Camp Crittenden, more to the fact that my search was not directed to the proper places, than to the absence of the bird in this region, which appears as well adapted to its habits as the country about Camp Lowell, where it was originally found, and where I detected it in abundance. Supposing that, like the *Peucaea cassini* and *arizonæ*, it would be found inhabiting the grass covered plains, or the meadowy places near the streams, I at first directed my examination to such places, but in vain. They were found only among the mesquite thickets, where, with hundreds of the Black-throated Finches and Chipping Sparrows, but especially the first named bird, they spent nearly all the time on the ground, hopping about in search of small seeds and insects. When suddenly started, the whole flock betook themselves to the nearest trees for a moment, till, re-assured, they descended to their wonted occupation.

In its appearance, the Rufous-winged Sparrow has little to attract attention, and, in its behavior, is so much like its commoner and less desirable associates, that I found difficulty in properly distinguishing between this and the other sparrows, many of which I killed by mistake. Unlike the other *Peucaea*, they never attempted concealment by hiding in the grass, but immediately took wing, and from the nearest bush or tree scrutinized the cause of their alarm, till satisfied that no danger was to be apprehended.

With respect to this species, Captain Bendire communicates the following:

“I first noticed this bird in the early part of June, 1872, when I found several of its nests, generally placed in small mesquite bushes, in localities not very far from water. About Tucson, the bird is a common one, and in

its habits closely resembles the Black-throated Sparrow ; the two species being generally found together, not only during the winter, but also in the breeding season. The eggs of the two species closely resemble each other, those of the present bird being slightly larger and more elongated ; and while but three form the usual nest complement of the Black-throated Sparrow, this species usually lays four and five. Several sets of the former bird were found which were spotted, but such never appears to be the case with those of the Rufous-winged Sparrow. In the winter, these birds may be seen in small flocks, mingled with the Black-throated Sparrows, the Cassin's Finches, White-winged Blackbirds, Bell's Finches, and others. They generally are found among the shrubbery near the water courses, and seldom wander far from these. In habits and actions, it resembles greatly the Chipping Sparrow. Its nest appears to be the one most favored by the Dwarf Cow Bunting (*Molothrus* var. *obscurus*) as the recipient of its eggs.

A large *suite* of specimens, and in better condition than those at hand when Dr. Coues described the species, enables me to give a description somewhat more precise, especially as regards the coloration.

Adult summer plumage : entire crown dull bay, the feathers on the occipital region margined with dull ash ; a broad superciliary line of dull ash, and generally a prominent median stripe of same ; back and rump grayish brown, lighter near the neck ; scapulars and interscapular region sharply streaked with blackish brown ; bend of wing bright chestnut ; wings and tail dull brown ; primaries margined faintly with white ; greater coverts tipped with same ; inner quills and greater coverts margined conspicuously with ochraceous ; under parts ashy white, chin whiter ; the ash most conspicuous across the breast ; a sharply defined though short maxillary streak of black, above which is a second from the angle of the mouth ; bill dusky brown above, pale flesh color below ; iris hazel ; legs light brown. In fall specimens, the colors are purer and fresher ; the bay of the head is darker ; the ashy median line more conspicuous ; light margins to the wings broader ; the outer tail feathers margined, and even tipped with dull white.

First plumage : above streaked heavily with black feathers, margined with ochraceous brown, as also are the quills and greater coverts ; bend of

PASSERES—FRINGILLIDAE—P. TOWNSENDI VAR. SCHISTACEA. 293

wing without sign of rufous ; beneath faint ochraceous white, heavily streaked on breast and sides with black ; wings and tail dull brown ; maxillary stripe, and one from commissure, just visible.

No.	Sex.	Locality.	Date.	Collector.	Wing.	Tail.	Bill.	Tarsus.
647	♂ ad.	Near Camp Lowell, Ariz	Sept. 9, 1874	H. W. Henshaw	2.27	.....	0.43	0.73
648	♂ jun.	.....do .....	.....do .....	.....do	2.48	2.78	0.40	0.73
649	.....	.....do .....	.....do .....	.....do	2.50	3.04	0.42	0.80
650	♀ ad.	.....do .....	.....do .....	.....do	2.38	2.62	0.41	0.71
676	♀ ad.	.....do	Sept. 11, 1874	.....do	2.38	2.88	0.40	0.72
677	♂ jun.	.....do .....	.....do .....	.....do	2.48	2.82	0.42	0.75
678	♀ ad.	.....do .....	.....do .....	.....do	2.42	2.62	0.40	0.73
679	♂ jun.	.....do .....	.....do .....	.....do	2.37	2.78	0.42	0.72
685	♂ ad.	.....do .....	.....do .....	.....do	2.54	2.70	0.40	0.73
686	♀ ad.	.....do .....	.....do .....	.....do	2.44	2.80	0.40	0.77
687	♀ jun.	.....do .....	.....do .....	.....do	2.62	2.92	0.42	0.75
693	♀ jun.	.....do .....	.....do .....	.....do	2.48	2.80	0.40	.....
694	♀ jun.	.....do .....	.....do .....	.....do	2.42	2.77	0.45	0.77
695	Jun.	.....do	Sept. 12, 1874	.....do	2.52	2.87	0.43	0.73
696	♂ ad.	.....do .....	.....do .....	.....do	2.53	2.77	0.45	0.75
697	♂ ad.	.....do .....	.....do .....	.....do	2.47	2.79	0.47	0.77
698	♂ jun.	.....do .....	.....do .....	.....do	2.35	2.88	0.43	0.72
700	♂ o	.....do .....	.....do .....	.....do .....	.....	.....	.....	.....
705	♀ jun.	.....do .....	.....do .....	.....do	2.39	2.82	0.40	0.75
706	♀ jun.	.....do .....	.....do .....	.....do	2.47	2.82	0.40	0.70

PASSERELLA TOWNSENDI (Aud.), var. SCHISTACEA, Bd.

Passerella schistacea, Bd., Birds N. A., 1858, 490, pl. lxix, f. 3.—XANTUS, Proc. Acad. Nat. Sci. Phila., 1859, 192 (Fort Tejon, Cal.).—SNOW, Birds Kan., 1872, 11 (one specimen).

Passerella townsendii var. *schistacea*, COUES, Key N. A. Birds, 1872, 352.—BD., BREW., & RIDG., N. A. Birds, ii, 1874, 56, pl. 28, f. 9.—YARROW & HENSHAW, Rep. Orn. Specs., 1872, Wheeler's Exped., 1874, 15.—HENSHAW, An. Lyc. Nat. Hist. N. Y., xi, 1874, 6.—*Id.*, An. List Birds Utah, 1872, Wheeler's Exped., 1874, 45.—*Id.*, Rep. Orn. Specs., 1873, Wheeler's Exped., 1874, 118.—COUES, Birds Northwest, 1874, 162.

Passerella iliaca var. *schistacea*, ALLEN, Bul. Mus. Comp. Zoöl., 1872, 177 (Ogden, Utah ; Wahsatch Mountains).

East of the Wahsatch Mountains, Utah, where this species was found abundant by Mr. Ridgway in summer, it appears in the light more of a straggler than as a regular visitant in this region. It has been met with once in Kansas, its most eastern record. At Provo, Utah, Dr. Yarrow

obtained a single specimen in July, and, I think, it doubtless breeds there, but is probably rare, since this was the only individual seen. One specimen was taken in Arizona in September; this, so far as I am aware, being its only recorded occurrence there.

No.	Sex.	Locality.	Date.	Collector.	Wing.	Tail.	Bill.	Tarsus.
136	♀ ad.	Provo, Utah.....	July 20, 1872	Dr. H. C. Yarrow .....	.....	.....	.....	.....
738	♀ jun.	Forty miles south of Camp Apache, Ariz.	Sept. 1, 1873	H. W. Henshaw.....	3.00	3.45	0.48	0.86

CALAMOSPIZA BICOLOR (Towns.).

Lark Bunting.

Fringilla bicolor, TOWNS., Journ. Acad. Nat. Sci. Phila., vii, 1837, 189.

Calamospiza bicolor, BD., Birds N. A., 1858, 492.—*Id.*, Proc. Acad. Nat. Sci. Phila., 1859, 304 (Cape Saint Lucas).—HEERM., P. R. R. Rep., Parke's Route, 1859, 15.—BD., U. S. & Mex. Bound. Surv., ii, pt. ii, 1859, Birds, 16.—HENRY, Proc. Acad. Nat. Sci. Phila., 1859, 107 (New Mexico).—HAYD., Trans. Am. Phil. Soc., xii, 1862, 167.—COUES, Proc. Acad. Nat. Sci. Phila., 1866, 84.—*Id.*, *ib.*, 1868, 83.—COOPER, Birds Cal., i, 1870, 225.—STEV., U. S. Geol. Surv. Terr., 1870, 465.—ALLEN, Bull. Mus. Comp. Zool., 1872, 177 (Middle Kansas, etc.).—COUES, Key N. A. Birds, 1872, 147.—SNOW, Birds Kan., 1872, 11.—HOLD., Proc. Bost. Soc. Nat. Hist., 1872, 201.—BD., BREW., & RIDG., N. A. Birds, ii, 1874, 61, pl. xxix, figs. 2, 3.—YARROW & HENSHAW, Rep. Orn. Specs., 1872, Wheeler's Exped., 1874, 15.—HENSHAW, An. Lyc. Nat. Hist. N. Y., xi, 1874, 6.—*Id.*, An. List Birds Utah, 1872, Wheeler's Exped., 1874, 45.—*Id.*, Rep. Orn. Specs., 1873, Wheeler's Exped., 1874, 119.—ALLEN, Proc. Bost. Soc. Nat. Hist., June, 1874, 17, 28.—COUES, Birds Northwest, 1874, 163.

Seen in Snake Valley, Nevada, by Dr. Yarrow, where it has not been noted before. Not seen in Utah. Occurring in small flocks near Denver, May 22.

A few in the worn breeding plumage were seen in the neighborhood of Zuñi, N. Mex., in July. Leaving here, the species was not again met with until October, when they were found in large flocks in the San Pedro and Gila Valleys, Arizona. They feed almost entirely at this season upon the seeds of various grasses, and, when engaged in searching for these, show little of the shyness attributed to them at other periods of the year. By the

middle of October, the males have assumed the plumage of the females, and are indistinguishable from them and the young, except that the streakings underneath are heavier and blacker, particularly about the throat, and there is also much black on the wings.

In 1874, in the section south of Camp Grant, Ariz., these birds were found in immense numbers. They had evidently finished breeding; but the close association into large flocks, which takes place somewhat later, had not yet occurred, though old and young frequented the same locality, and mingled freely together, as they employed themselves in searching among the bushes and grass for seeds. By the first of September, they were found about Camp Lowell to have gathered into true flocks, composed of many individuals, all moved by the same impulses, and flying about from point to point as the necessities for food and water impelled them. Many of the males were still in adult dress, the change of plumage probably occurring during this month. Great numbers of the individuals reared in Arizona probably pass to the south, their places being taken by those from farther north, so that, late in November, their relative abundance was still undiminished. It so remains, doubtless, through the winter.

No.	Sex.	Locality.	Date.	Collector.	Wing.	Tail.	Bill.	Tarsus.
503	♂ ad.	Zuñi, N. Mex	July 25, 1873	H. W. Henshaw	3.45	2.92	0.56	0.93
899	♀	San Pedro, Ariz	Oct. 3, 1873	M. N. Maguet	3.25	2.74	0.52	0.91
907	♀	..... do .....	..... do .....	..... do	3.28	2.65	0.54	0.90
913	♀	..... do .....	..... do	H. W. Henshaw	3.25	2.54	0.52	0.90
930	♂ ad.	Gila River, Ariz	Oct. 17, 1873	..... do	3.55	2.95	0.60	0.95
931	♂ ad.	..... do .....	..... do .....	..... do	3.40	3.03	0.53	0.90
935	♂ ad.	..... do .....	..... do .....	..... do	3.41	2.85	0.53	0.90
936	♂	..... do .....	..... do .....	..... do	3.41	2.95	0.52	0.98
937	♀	..... do .....	..... do .....	..... do	3.37	2.87	0.56	0.95
940	♀	..... do .....	..... do .....	..... do	3.00	2.67	0.54	0.90

EUSPIZA AMERICANA (Gm.).

Black-throated Bunting.

Emberiza americana, GM., Syst. Nat., i, 1788, 872.

Euspiza americana, WOODH., Sitgreave's Exp. Zuñi & Col. Riv., 1854, 87 (Indian Territory; Texas; New Mexico).—BD., Birds N. A., 1858, 494.—HAYD., Trans. Am. Phil. Soc., xii, 1862, 168.—ALLEN, Bul. Mus. Comp. Zool., 1872, 177

(Kansas; Colorado City).—COUES, Key N. A. Birds, 1872, 148.—SNOW, Birds Kan., 1872, 11.—BD., BREW., & RIDG., N. A. Birds, ii, 1874, 65, pl. xxviii, figs. 11, 12.—HENSHAW, Rep. Orn. Specs., 1873, Wheeler's Exped., 1874, 119.—ALLEN, Proc. Bost. Soc. Nat. Hist., June, 1874, 17, 29.—COUES, Birds Northwest, 1874, 164.

The abundance of this bunting in Texas has been attested by several observers. It extends through New Mexico, where it was found by Dr. Woodhouse, and reaches the extreme southeastern portion of Arizona, where I have taken it the past two seasons. In 1873, I supposed it to be a mere straggler in this section, as I saw but a single individual; but the past year we found it occurring in small numbers, usually four or five together, associated sometimes with other sparrows, in the cañons and among the brush of the rocky hill sides.

No.	Sex.	Locality.	Date.	Collector.	Wing.	Tail.	Bill.	Tarsus.
896	♀ jun.	San Pedro, Ariz.	Sept. 3, 1873	H. W. Henshaw.....	3.18	2.50	0.55	0.86
458	♀ jun.	Sienega, Ariz.	Aug. 22, 1874	..... do	2.95	2.23	0.52	0.87
466	.....	Near Camp Crittenden, Ariz.	Aug. 23, 1874	J. M. Rutter.....	3.30	2.67	0.54	0.85
485	♂ jun.	..... do	Aug. 24, 1874	H. W. Henshaw.....	3.07	2.48	0.54	0.84
699	Jun.	Camp Lowell, Ariz....	Sept. 11, 1874	..... do	3.00	2.35	0.54	0.82

HEDYMELES MELANOCEPHALUS (Swains.).

Black-headed Grosbeak.

Guiraca melanocephala, SWAINS., Syn. Mex. Birds, Philos. Mag., i, 1827, 438.—BD., Birds N. A., 1858, 498.—XANTUS, Proc. Acad. Nat. Sci. Phila., 1859, 192 (Fort Tejon, Cal.).—BD., Proc. Acad. Nat. Sci. Phila., 1859, 304 (Cape Saint Lucas).—COOP. & SUCKL., P. R. R. Rep., xii, pt. ii, 1860, 216.—HAYD., Trans. Am. Phil. Soc., xii, 1862, 168.—COUES, Proc. Acad. Nat. Sci. Phila., 1866, 88 (Fort Whipple, Ariz.).—*Id.*, *ib.*, 1868, 84.—COOPER, Birds Cal., i, 1870, 228.—SNOW, Birds Kan., 1872, 11.—MERRIAM, U. S. Geol. Surv. Terr., 1872, 683.

Coccyborus melanocephalus, HEERM., P. R. R. Rep., x, pt. ii, 1859, 51.

Goniaphea melanocephala, HENRY, Proc. Acad. Nat. Sci. Phila., 1859, 107 (New Mexico).—ALLEN, Bull. Mus. Comp. Zoöl., 1872, 178 (Middle Kansas; Colorado; Ogden, Utah).—COUES, Key N. A. Birds, 1872, 149.—ALLEN, Proc. Bost. Soc. Nat. Hist., June, 1874, 15, 17, 29.—COUES, Birds Northwest, 1874, 167.

Hedymeles melanocephalus, BD., BREW., & RIDG., N. A. Birds, ii, 1874, 73, pl. 30, figs. 1, 2.—YARROW, Rep. Orn. Specs., 1871, Wheeler's Exped., 1874, 35.—YAR-

ROW & HENSHAW, Rep. Orn. Specs., 1872, Wheeler's Exped., 1874, 15.—HENSHAW, An. Lyc. Nat. Hist. N. Y., xi, 1874, 6.—*Id.*, An. List Birds Utah, 1872, Wheeler's Exped., 1874, 45.—*Id.*, Rep. Orn. Specs., 1873, Wheeler's Exped., 1874, 63, 81, 119.

This bird replaces, in the Middle and Western Region, the Rose-breasted Grosbeak of the East, whose habits generally coincide closely with its own; but, unlike that species, the Black-headed Grosbeak, instead of being quite local in its distribution and rather rare, is generally diffused, and wherever found is apt to be very numerous. It seems to evince no special predilection for locality, but to find a congenial summer home in the thick cottonwood groves and the deciduous trees and bushes along streams, whence it finds its way upward; and I have found it in Arizona to inhabit numerous the pine woods of the mountains, where I have never observed it, however, higher than between 7,000 and 8,000 feet, and generally lower. It appears especially fond of the buds of various deciduous trees and plants, and the bills of many of those taken had been stained and gummed with their juices. It has a superb song, which, though greatly resembling that of its eastern cousin, is, I think, in some respects, its superior; while possessing the same sweetness of tone and beauty of expression, it is more rapidly and powerfully given, while the cadences rise and fall in rapid succession, thus giving a more varied character to the tone.

In the pine woods near Camp Apache, Ariz., just after the sun had fairly sunk below the woods, these grosbeaks ascended to the tops of the tallest pines, and thence sent forth their sweet strains till long after dusk had settled down upon the deep forest, and it became so dark that my way back to the camp fire was rendered difficult by the obstructing roots and logs I could no longer see. It was by means of these delightful concerts with which they closed each day that I became aware of the presence of the birds here, since, during the day, I never observed them, and judge they must have kept themselves far up among the pines, from which they obtained their food. They were very shy, ceasing their notes the instant I came near the tree upon which the singer perched, and flying off to a distance to resume their song undisturbed. The species appears to be about equally numerous in Utah, Colorado, New Mexico, and Arizona.

No.	Sex.	Locality.	Date.	Collector.	Wing.	Tail.	Bill.	Tarsus.
.....	♂ ad.	Bull Run, Nev.....	May 25, 1871.	F. Bischoff .....	.....	.....	.....	.....
25	♂ jun.	Provo, Utah.....	July 24, 1872	H. W. Henshaw and Dr. H. C. Yarrow.	.....	.....	.....	.....
131	♂ ad.	.....do .....	.....do .....	.....do .....	.....	.....	.....	.....
26	♂ ad.	.....do	July 29, 1872	.....do .....	.....	.....	.....	.....
114	♀ jun.	.....do .....	.....do .....	.....do .....	.....	.....	.....	.....
115	♀ ad.	.....do .....	.....do .....	.....do .....	.....	.....	.....	.....
116	♀ jun.	.....do .....	.....do .....	.....do .....	.....	.....	.....	.....
117	♂ jun.	.....do .....	.....do .....	.....do .....	.....	.....	.....	.....
133	♀ jun.	.....do .....	.....do .....	.....do .....	.....	.....	.....	.....
134	♀ jun.	.....do	July 30, 1872	.....do .....	.....	.....	.....	.....
135	♀ ad.	.....do .....	.....do .....	.....do .....	.....	.....	.....	.....
132	♀ jun.	.....do .....	.....do .....	.....do .....	.....	.....	.....	.....
135	♂ ad.	Fort Garland, Colo....	May 25, 1873	H. W. Henshaw	3.93	3.15	0.70	0.91
373	♂ ad.	.....do	June 19, 1873	.....do	4.27	3.69	0.72	0.88
642	♂ jun.	Camp Apache, Ariz ...	Aug. 28, 1873	.....do	3.75	3.12	0.76	0.85
690	♀ jun.	.....do	Sept. 3, 1873	.....do	4.00	3.40	0.70	0.88
95	♀ ad.	.....do	Sept. 12, 1873	Dr. C. G. Newberry...	3.10	3.15	0.73	0.86
132	♀ jun.	.....do	July 14, 1874	H. W. Henshaw .....	.....	.....	.....	.....
378	♀ jun.	Camp Bowie, Ariz ...	Aug. 12, 1874	Dr. Freeman .....	.....	.....	.....	.....
403	♀ jun.	.....do	Aug. 15, 1874	Dr. J. T. Rothrock...	.....	.....	.....	.....
405	♂ jun.	.....do .....	.....do .....	.....do .....	.....	.....	.....	.....
406	♂ jun.	.....do .....	.....do .....	.....do .....	.....	.....	.....	.....
407	♂ jun.	.....do .....	.....do .....	.....do .....	.....	.....	.....	.....
408	♀ jun.	.....do .....	.....do .....	.....do .....	.....	.....	.....	.....
432	Jun.	.....do	Aug. 17, 1874	H. W. Henshaw.....	.....	.....	.....	.....
551	.....	Camp Crittenden, Ariz.	Sept. 1, 1874	.....do .....	.....	.....	.....	.....
592	♂ jun.	.....do	Sept. 2, 1874	.....do .....	.....	.....	.....	.....

GUIRACA CAERULEA (Linn.).

Blue Grosbeak.

Loxia caerulea, LINN., Syst. Nat., i, 1766, 306.

Guiraca caerulea, WOODH., Sitgreave's Exp. Zuñi & Col. Riv., 1854, 81.—NEWB., P. R. R. Rep., vi, 1857, 88.—BD., Birds N. A., 1858, 499.—XANTUS, Proc. Acad. Nat. Sci. Phila., 1859, 192 (Fort Tejon, Cal.).—BD., U. S. & Mex. Bound. Surv., ii, pt. ii, 1859, Birds, 16.—HENRY, Proc. Acad. Nat. Sci. Phila., 1859, 107 (New Mexico).—HAYD., Trans. Am. Phil. Soc., xii, 1862, 168.—COUES, Proc. Acad. Nat. Sci. Phila., 1866, 88 (Fort Whipple, Ariz.).—YARROW, Rep. Orn. Specs., 1871, Wheeler's Exped., 1874, 35.—COOPER, Birds Cal., i, 1870, 230.—BD., BREW., & RIDG., N. A. Birds, ii, 1874, 77, pl. xxix, figs. 4, 5.

Coccyborus caerulea, HEERM., P. R. R. Rep., x, pt. ii, 1859, 51.

Goniaphea caerulea, COUES, Key N. A. Birds, 1872, 149, f. 93.—*Id.*, Birds Northwest, 1874, 169.

A fine male of this species was collected by Mr. Aiken at Pueblo, Colo.,

where the species appeared to be not uncommon, frequenting the cotton-woods and clumps of trees along the streams.

I found this grosbeak as far north as near Santa Fé, N. Mex. Crossing into Arizona, it appeared to get more numerous as we neared Camp Apache, and at Camp Grant and to the southward was a very well represented species. It does not appear to visit the mountainous districts at all, but was found on the heavily brushed streams from the time they made their appearance at the base of the mountain, till, as is usually the case in this region, the waters finally disappeared in the thirsty sands of the plains below, the luxuriant vegetation which encloses the banks ceasing when the stream sinks. They were exceedingly shy, and gave me little opportunity for observing their habits. These are correspondent to some degree with those of the other species; though it shows a partiality for scrub and low bushes, in which it is more like the Indigo Bird. The song suggests those of the others, but, though at its finest is possessed of much sweetness of tone, lacks the full rich mellowness of tone and variety of modulation so conspicuous in the vocal efforts of the other two species.

Young in nesting plumage and scarcely fledged were found July 30. The anxiety of the old birds was most apparent. Yet, even when the safety of their offspring was threatened, their natural timidity prevailed over their feelings so far that they kept themselves at a distance, and were content to manifest their solicitude by loud and mournful notes.

No.	Sex.	Locality.	Date.	Collector.	Wing.	Tail.	Bill.	Tarsus.
.....	♂ ad.	Nevada	Aug. 9, 1871	F. Bischoff .....	.....	.....	.....	.....
448	♂ ad.	Sienega, Ariz.	July 20, 1874	H. W. Henshaw	3.60	3.15	0.72	0.82
203	♂ jun.	Ash Creek, Ariz.	July 22, 1874	J. M. Rutter	3.43	3.15	0.72	0.82
215	♂ ad.	Camp Grant, Ariz.	July 29, 1874	H. W. Henshaw	3.64	3.13	0.64	0.82
216	♂ ad.	..... do .....	..... do .....	..... do	3.60	3.05	0.65	0.79
225	♂ ad.	..... do	July 30, 1874	..... do	3.61	3.14	0.65	0.73
226	♂ ad.	..... do .....	..... do .....	..... do	3.68	3.15	0.67	0.81
227	♀ ad.	..... do	July 31, 1874	..... do	3.35	3.85	0.65	0.83
240	♂ ad.	..... do .....	..... do .....	..... do	3.62	2.09	0.68	0.82
82	♂ ad.	Pueblo, Colo. ....	..... do	C. E. Aiken	3.55	3.00	0.65	0.83
629	♂ jun.	Camp Apache, Ariz. ..	Aug. 27, 1874	H. W. Henshaw	3.43	2.90	0.42	0.75
623	♀ ad.	Camp Lowell, Ariz.	Sept. 9, 1874	..... do	3.43	3.00	0.64	0.75

CYANOSPIZA AMOENA (Say).

Lazuli Finch.

Emberiza amœna, SAY, Long's Exped. Rocky Mts., i, 1823, 47.

Spiza amœna, WOODH., Sitgreave's Exp. Zuñi & Col. Riv., 1854, 87.—HEERM., P. R. R. Rep., x, pt. iv, 1859, 46.

Cyanospiza amœna, BD., Birds N. A., 1858, 504.—XANTUS, Proc. Acad. Nat. Sci. Phila., 1859, 192 (Fort Tejon, Cal.).—HENRY, Proc. Acad. Nat. Sci. Phila., 1859, 107 (New Mexico).—COOP. & SUCKL., P. R. R. Rep., xii, pt. ii, 1860, 205.—HAYD., Trans. Am. Phil. Soc., xii, 1862, 168.—COUES, Proc. Acad. Nat. Sci. Phila., 1866, 89 (Fort Whipple, Ariz.).—COOPER, Birds Cal., i, 1871, 233.—COUES, Key N. A. Birds, 1872, 149.—SNOW, Birds Kan., 1872, 11.—HOLD., Proc. Bost. Soc. Nat. Hist., 1872, 201.—MERRIAM, U. S. Geol. Surv. Terr., 1872, 683.—BD., BREW., & RIDG., N. A. Birds, ii, 1874, pl. xxx, figs. 11, 12.—YARROW, Rep. Orn. Specs., 1871, Wheeler's Exped., 1874, 35.—YARROW & HENSHAW, Rep. Orn. Specs., 1872, Wheeler's Exped., 1874, 15.—HENSHAW, An. Lyc. Nat. Hist. N. Y., xi, 1874, 6.—*Id.*, An. List Birds Utah, 1872, Wheeler's Exped., 1874, 45.—*Id.*, Rep. Orn. Specs., 1873, Wheeler's Exped., 1874, 63, 81, 120.—ALLEN, Proc. Bost. Soc. Nat. Hist., June, 1874, 15, 29.—COUES, Birds Northwest, 1874, 170.

Very common throughout the Territory of Utah, inhabiting the dense thickets near water courses. A number of nests were found at Provo in the latter part of July, containing either young, or eggs just ready to hatch. The bird was seen also in Nevada. These nests, were all built upon low thorny bushes, and both nests and eggs resemble those of *C. cyanea*.

Not seen at all about Fort Garland; the elevation perhaps being too great for it. Common on the Huerfano River, sixty miles northeast of Fort Garland, and also near Pueblo, where it was taken by Mr. Aiken. It inhabits the lowlands generally, and, like the Indigo Bird, is fond of neighborhoods sparsely covered with low bushes. Its habits generally are much like those of the Indigo Bird; a resemblance borne out by the similarity of songs, though that of this finch is weaker and not so well sustained, while those strains are less melodious. Its diffusion in Arizona and New Mexico is equally general.

In a male taken in October, the blue is clouded and almost obscured by rufous, which overspreads the whole plumage.

No.	Sex.	Locality.	Date.	Collector.	Wing.	Tail.	Bill.	Tarsus.
.....	♂ ad.	Bull Run, Nev	May 23, 1871	Dr. W. J. Hoffman.....	.....	.....	.....	.....
.....	♂ ad.	..... do	May 25, 1871	..... do .....	.....	.....	.....	.....
.....	♂ ad.	..... do .....	..... do	F. Bischoff.....	.....	.....	.....	.....
108	♂ ad.	Provo, Utah.....	July 29, 1872	H. W. Henshaw and Dr. H. C. Yarrow.	.....	.....	.....	.....
125	♀ ad.	..... do .....	..... do .....	..... do .....	.....	.....	.....	.....
148	♀ ad.	..... do	July 30, 1872	..... do .....	.....	.....	.....	.....
22	♂ ad.	..... do	Aug. 1, 1872	..... do .....	.....	.....	.....	.....
23	♀ ad.	..... do .....	..... do .....	..... do .....	.....	.....	.....	.....
102	♀ ad.	..... do	Aug. 17, 1872	..... do .....	.....	.....	.....	.....
B I	.....	(Alcoholic) .....	..... do .....	..... do .....	.....	.....	.....	.....
119	♂ ad.	..... do	May 17, 1873	H. W. Henshaw.....	2.98	2.42	0.38	0.65
598	♀ jun.	Camp Apache, Ariz....	Aug. 23, 1873	..... do	2.46	2.21	0.37	0.63
609	♂ ad.	..... do	Aug. 24, 1873	..... do	2.87	2.41	0.39	0.67
623	♀ jun.	..... do	Aug. 26, 1873	..... do	2.68	2.32	0.38	0.65
707	♂ jun.	..... do	Sept. —, 1873	..... do	2.85	2.25	0.40	0.66
891	♂ ad.	San Pedro, Ariz	Oct. 2, 1873	..... do	2.85	2.52	0.40	0.63
134	♂ ad.	Camp Apache, Ariz....	July 14, 1874	..... do .....	.....	.....	.....	.....
135	♂ ad.	..... do .....	..... do .....	..... do .....	.....	.....	.....	.....
83	♀ jun.	Pueblo, Colo	July 31, 1874	C. E. Aiken.....	.....	.....	.....	.....
84	♂ ad.	..... do .....	..... do .....	..... do .....	.....	.....	.....	.....
572	♂ jun.	Camp Crittenden, Ariz.	Sept. 1, 1874	H. W. Henshaw.....	.....	.....	.....	.....
575	♀ ad.	..... do .....	..... do .....	..... do .....	.....	.....	.....	.....
626	♀ jun.	Camp Lowell, Ariz....	Sept. 9, 1874	..... do .....	.....	.....	.....	.....

CYANOSPIZA CIRIS (Linn.).

Nonpareil.

Emberiza ciris, LINN., Kong. Sv. Vet. Akad. Hand., 1750, 278, tab. vii, f. i.

Spiza ciris, WOODH., Sitgreave's Exp. Zuñi & Col. Riv., 1854, 87 (Texas).

Cyanospiza ciris, HEERM., P. R. R. Rep., Park's Route, x, 1859, 14.—BD., U. S. & Mex.

Bound. Surv., ii, pt. ii, 1859, Birds, 17.—KENNERLY, P. R. R. Rep.,

Whipple's Route, x, 1859, 30 (San Antonio, Texas).—COUES, Key, 1872, 149.

This, one of the most conspicuous among all our birds for the beauty and brilliant colors of its plumage, is quite southern in its distribution; being known from the Southern States generally, and extending along to the westward into Texas, where it is stated to be very numerous. That it also occurs along the southern border of New Mexico is scarcely doubtful, since farther west, in Southeastern Arizona, it was met with in two localities, Camps Bowie and Crittenden. Quite a number of young and one adult male were noted at the former place; while, in the neighborhood of the

latter, along the Sonoita Valley, it appeared to inhabit the brush and undergrowth in considerable numbers. It is the most shy and retiring of the family; once suspecting danger, it hides itself in the thickest brush, and, if followed, skulks from point to point, being generally successful in its attempts to elude capture.

No.	Sex.	Locality.	Date.	Collector.	Wing.	Tail.	Bill.	Tarsus.
564	♂ jun.	Camp Crittenden, Ariz.	Sept. 1, 1874	H. W. Henshaw.....	2. 70	2. 27	0. 45	0. 76

PYRRHULOXIA SINUATA (Bp.).

Texas Cardinal.

Cardinalis sinuatus, Bp., Proc. Zool. Soc. Lond., v, 1837, 111 (Mexico).
Pyrrhuloxia sinuata, Bd., Birds N. A., 1858, 508.—HEERM., P. R. R. Rep., x, 1859, 16.—XANTUS, Proc. Acad. Nat. Sci. Phila., 1859, 304.—COUES, Proc. Acad. Nat. Sci. Phila., 1866, 90 (Arizona).—*Id.*, *ib.*, 1868, 84 (Arizona).—COOPER, Birds Cal., i, 1870, 236.—Bd., BREW., & RIDG., N. A. Birds, ii, 1874, 95.—YARROW, Rep. Orn. Specs., 1871, Wheeler's Exped., 1874, 35.

Of this species, a single specimen was obtained in Arizona by Mr. Bischoff in 1871. It appears to be of very irregular occurrence in this Territory, and is only found in the extreme southern parts. Dr. Palmer detected it near Camp Grant, where it was not found by me on either visit to this post. From Captain Bendire I learn, also, that it is found about Camp Lowell in winter, and it is probably here a resident. The species is better known as an inhabitant of Texas and Cape Saint Lucas, in both which regions it abounds.

No.	Sex.	Locality.	Date.	Collector.	Wing.	Tail.	Bill.	Tarsus.
....	♂ ad.	Arizona.....	Nov. 30, 1871	F. Bischoff.....	.....	.....	.....	.....

CARDINALIS VIRGINIANUS (Briss.), var. IGNEUS, Bd.

Cape Cardinal.

Cardinalis igneus, Bd., Proc. Acad. Nat. Sci. Phila., 1859, 305 (Cape Saint Lucas).—COUES, Proc. Acad. Nat. Sci. Phila., 1868, 84 (Southern Arizona).—COOPER, Birds Cal., i, 1870, 238.—YARROW, Rep. Orn. Specs., 1871, Wheeler's Exped., 1874, 35.

Cardinalis virginianus var. *igneus*, COUES, Key N. A. Birds, 1872, 151.—BD., BREW., & RIDG., N. A. Birds, ii, 1874, 103, pl. xxx, f. 10.—COUES, Birds Northwest, 1874, 172.

Cardinalis virginianus, BD., U. S. & Mex. Bound. Surv., ii, pt. ii, 1859, Birds, 17.

Two specimens of this bird from Southern Arizona, collected the past season, are quite typical of this race. It apparently was not uncommon. A single individual was likewise obtained in Arizona by Mr. Bischoff.

No.	Sex.	Locality.	Date.	Collector.	Wing.	Tail.	Bill.	Tarsus.
.....	♂ ad.	Arizona	Nov. 30, 1871	F. Bischoff .....	.....	.....	.....	.....
451	♂ ad.	Sienega, Ariz.	Aug. 21, 1874	H. W. Henshaw.....	4.08	5.13	0.82	1.08
456	♂ jun.	..... do	Aug. 22, 1874	..... do	3.63	4.68	0.75	1.05

PIPILO MACULATUS, Swains., var. MEGALONYX, Bd.

Long-spurred Towhee.

Pipilo megalonyx, NEWB., P. R. R. Rep., vi, 1857, 89.—BD., Birds N. A., 1858, 515, pl. 73.—KENNERLY, P. R. R. Rep., Whipple's Route, x, 1859, 30.—HEERM., P. R. R. Rep., x, pt. iv, 1859, 51.—XANTUS, Proc. Acad. Nat. Sci. Phila., 1859, 192 (Fort Tejon, Cal.).—BD., U. S. & Mex. Bound. Surv., ii, pt. ii, 1859, Birds, 17.—COUES, Proc. Acad. Nat. Sci. Phila., 1866, 89 (Fort Whipple, Ariz.).—COOPER, Birds Cal., i, 1870, 242.—MERRIAM, U. S. Geol. Surv. Terr., 1872, 684 (Ogden, Utah).

Pipilo maculatus var. *megalonyx*, COUES, Key N. A. Birds, 1872, 152.—BD., BREW., & RIDG., N. A. Birds, ii, 1874, 113.—YARROW & HENSHAW, Rep. Orn. Specs., 1872, Wheeler's Exped., 1874, 15.—HENSHAW, An. Lyc. Nat. Hist., N. Y., xi, 1874, 6.—*Id.*, An. List Birds Utah, 1872, Wheeler's Exped., 1874, 45.—*Id.*, Rep. Orn. Specs., 1873, Wheeler's Exped., 1874, 81, 120.—COUES, Birds Northwest, 1874, 175.

Pipilo erythrophthalmus var. *megalonyx*, ALLEN, Bul. Mus. Comp. Zoöl., 1872, 178 (Colorado; Utah).—HENSHAW, Rep. Orn. Specs., 1873, Wheeler's Exped., 1874, 63.

Pipilo arcticus, HENRY, Proc. Acad. Nat. Sci. Phila., 1859, 107 (New Mexico).

This long spurred variety of the Towhee Bunting replaces, in the Middle Region, the var. *arcticus* of the Missouri Region; this, in turn, giving place, in the East, to the common Black Pipilo (*erythrophthalmus*). Little can be said of the habits of this bird in the West which will serve to distinguish it from its eastern congener. It is a common bird everywhere below 7,500 feet, and has the same peculiar way of skulking in the brush and dense thickets; scratching among the leaves, and finding its food chiefly on

the ground. I have never heard but a single style of call note, and this differs *in toto* from that of the Eastern Towhee, bearing no resemblance to the familiar and oft repeated *chewink* of that bird, but is so exactly like the drawling mew of our common Catbird as to readily deceive one. The song is quite varied, now bearing little resemblance to the notes of *erythro-phthalmus*, and again being quite an exact imitation of the trilling love song of this species.

No.	Sex.	Locality.	Date.	Collector.	Wing.	Tail.	Bill.	Tarsus.
112	♂ ad.	Provo, Utah.....	July 29, 1872	H. W. Henshaw and Dr. H. C. Yarrow.	.....	.....	.....	.....
110	♀ ad.	..... do .....	..... do .....	..... do .....	.....	.....	.....	.....
113	♀ ad.	..... do .....	..... do .....	..... do .....	.....	.....	.....	.....
118	♀ jun.	..... do	July 30, 1872	..... do .....	.....	.....	.....	.....
139	♂ ad.	..... do .....	..... do .....	..... do .....	.....	.....	.....	.....
140	♀ jun.	..... do .....	..... do .....	..... do .....	.....	.....	.....	.....
111	♀ ad.	..... do	Aug. 1, 1872	..... do .....	.....	.....	.....	.....
306	♂ ad.	North Creek, Utah....	Sept. 26, 1872	..... do .....	.....	.....	.....	.....
306A	♂ ad.	..... do .....	..... do .....	..... do .....	.....	.....	.....	.....
329	♂ ad.	Toquerville, Utah....	Oct. 24, 1872	..... do .....	.....	.....	.....	.....
459	♀	Provo, Utah.....	Nov. 30, 1872	..... do .....	.....	.....	.....	.....
B 9	.....	(Alcoholic)	—, 1872	..... do .....	.....	.....	.....	.....
1	♂ ad.	Denver, Colo.	May 6, 1873	H. W. Henshaw	3.53	4.15	0.56	1.05
2	♂ ad.	..... do .....	..... do .....	..... do	3.34	4.05	0.54	1.10
28	♂ ad.	..... do	May 9, 1873	..... do	3.48	4.42	0.55	1.10
448	♂ ad.	Fort Wingate, N. Mex	July 16, 1873	..... do	3.36	4.02	0.58	1.05

PIPILO FUSCUS, Swains., var. MESOLEUCUS, Bd.

Cañon Finch.

Pipilo mesoleucus, BD., Proc. Acad. Nat. Sci. Phila., vii, June, 1854, 119 (Rocky Mountains).—*Id.*, Birds N. A., 1858, 518, pl. xxix.—*Id.*, U. S. & Mex. Bound. Surv., ii, pt. ii, 1859, Birds, 18.—HEERM., P. R. R. Rep., Parke's Route, x, 1859, 15.—KENNERLY, P. R. R. Rep., Whipple's Route, x, 1859, 30, pl. xxix.—HENRY, Proc. Acad. Nat. Sci. Phila., 1859, 107 (New Mexico).—COUES, Proc. Acad. Nat. Sci. Phila., 1866, 90.—*Id.*, *ib.*, 1868, 84.—*Id.*, Am. Nat., vii, 1873, 324.

Pipilo fuscus, COUES, Key N. A. Birds, 1872, 152.

Pipilo fuscus var. *mesoleucus*, BD., BREW., & RIDG., N. A. Birds, ii, 1874, 125, pl. xxxi, f. 10.—HENSHAW, Rep. Orn. Specs., 1873, Wheeler's Exped., 1874, 120.

I did not detect this species on the Gila, where Abert's Finch was very numerous. When nearing Camp Grant, Ariz., my attention was attracted by hearing notes issuing from a thicket on the sides of a rocky cañon, which

I was confident I had never before heard, and a short search soon revealed the author to be this finch. The notes are much deeper and harsher than those of Abert's Finch.

The habits of this species are in general much like those of the other members of the family. Like them, it is eminently terrestrial, spending nearly or quite all its time upon the ground, finding there an abundance of food, in the search for which it finds constant and busy employment. In the localities it selects for its abode, its taste differs much from that of the following species, and it was found by us in situations more congenial to the nature of the previous bird than to Abert's Finch, with which, indeed, I believe it never associates. In the vicinity of Santa Fé, N. Mex., where it was tolerably numerous in June, it was found on the barren hills covered with a growth of cedars, among which it was ready to conceal itself on the slightest appearance of danger; its distrust of man at this season being a marked feature in its character. Toward the southern part of Arizona, its appearance became more frequent, and it was especially numerous about Camp Bowie; here, as elsewhere throughout this region, inhabiting the cañons and rockiest localities, where it skulked among the straggling thickets. By the capture of a pair of these birds by Mr. Aiken, in El Paso County, Colorado, in winter, its distribution has been extended much farther north than was anticipated. The young in first plumage is ashy-brown above, the head lacking entirely the chestnut; under parts—except the belly, which is tinged with rufous—streaked with blackish markings.

No.	Sex.	Locality.	Date.	Collector.	Wing.	Tail.	Bill.	Tarsus.
4 A	.....	San Carlos, Ariz	Sept. 13, 1873	M. N. Maguet	3.57	4.55	0.58	0.99
866	♂	Camp Grant, Ariz.....	Sept. 24, 1873	H. W. Henshaw.....	3.64	.....	0.60	0.98
126	.....	Camp Bowie, Ariz	Oct. 10, 1873	Dr. C. G. Newberry...	3.58	4.24	0.57	0.98
20	♀ ad.	Santa Fé, N. Mex.....	June 20, 1874	H. W. Henshaw.....	3.60	4.20	0.56	0.98
211	♂ ad.	Camp Grant, Ariz.....	July 28, 1874	..... do	3.62	4.23	0.60	1.03
212	♀ ad.	..... do .....	..... do .....	..... do	3.63	4.31	0.60	0.98
229	♂ ad.	..... do	July 30, 1874	..... do	3.98	4.58	0.60	1.00
301	♂ ad.	Camp Bowie, Ariz	Aug. 7, 1874	J. M. Rutter	3.73	4.23	0.59	1.00
348	♂ ad.	..... do	Aug. 10, 1874	..... do	3.63	4.48	0.55	0.97
359	♂ ad.	..... do	Aug. 11, 1874	..... do	3.80	4.45	0.65	1.00
360	♂ ad.	..... do .....	..... do .....	..... do	3.88	4.48	0.59	1.00
362	♂ ad.	..... do .....	..... do .....	..... do	3.87	4.43	0.45	0.90

PIPILO ABERTI, Bd.

Abert's Towhee.

Pipilo aberti, Bd., Stans. Rep. Exp. Great Salt Lake, 1852, 325.—*Pipilo abertis* (sic), Bd., Ives' Col. Exped., 1857-58, pt. iv, 6.—KENNERLY, P. R. R. Rep., Whipple's Route, x, 1859, 30, pl. xxx.—HEERM., P. R. R. Rep., Parke's Route, x, pt. iv, 1859, 15.—Bd., U. S. & Mex. Bound. Surv., ii, pt. ii, 1859, Birds, 18.—COUES, Proc. Acad. Nat. Sci. Phila., 1866, 90.—*Id.*, *ib.*, 1868, 84.—*Id.*, Am. Nat., vii, 1873, 324.—YARROW & HENSHAW, Rep. Orn. Specs., 1872, Wheeler's Exped., 1874, 15.—HENSHAW, An. Lyc. Nat. Hist. N. Y., xi, 1874, 6.—*Id.*, An. List Birds Utah, 1872, Wheeler's Exped., 1874, 45.—*Id.*, Rep. Orn. Specs., 1873, Wheeler's Exped., 1874, 81, 121.

Though no specimens were secured, pretty good evidence of the presence of this species at the alkali lakes northwest of Fort Garland, Colo., was obtained by the discovery of a nest containing two eggs, which a careful comparison with specimens in the Smithsonian Institution satisfies me must have belonged to this bird. It had evidently been deserted a short time before. The ground color of the eggs is a faint bluish-white, with heavy black blotches and streaks at the larger end.

This was a very abundant species along the Gila River, which was the only point where it was seen. It frequented the thickest brush, whence its loud, peculiar chirp could be heard issuing at all times. It was gregarious at this time, considerable numbers being found together, and always showed great shyness, betaking itself on the least alarm to the impenetrable mesquite thickets.

In 1874, this finch was met with in the same locality and under the same circumstances as the year previous. It would appear to shun the hills and open country generally, and to choose as its haunts the river bottoms and valleys, where, in small flocks, it is confined to the densest thickets. In this dry climate, the vegetation is of a peculiarly stiff unyielding character, and this, combined with the profusion of growth found along the streams, renders progress at all times difficult, and occasionally well nigh impossible. In breaking a passage through this barrier, I have often been greeted by the loud, clear chirp of one of these birds, and in a minute the note would be re-echoed from the bushes around as the outlying individuals, warned by the note of alarm, gathered in, until the exact nature of the danger

was ascertained by a few, less timid than the rest, venturing for an instant to the tops of the bushes—when an instant retreat followed, and the locality was soon abandoned, their notes growing fainter and fainter in the distance till they finally died away. Of all the sparrows, I know of no other which is so invariably shy and suspicious as this.

It appears, in regard to the distribution of this species, that with New Mexico and Arizona as the center of its abundance, where, however, it appears to be very local, certain regions being seemingly shunned for no especial reason, it reaches to the northward into Colorado and also Utah, where, near Saint George, it was apparently not uncommon, two specimens being there secured by us and numbers seen.

No.	Sex.	Locality.	Date.	Collector.	Wing.	Tail.	Bill.	Tarsus.
345	♂ jun.	Washington, Utah	Oct. 22, 1872	Dr. H. C. Yarrow and H. W. Henshaw.	.....	.....	.....	.....
364	♀ jun.	Saint George, Utah.....	..... do .....	..... do .....	.....	.....	.....	.....
766	♂	Gila River, Ariz	Sept. 14, 1873	H. W. Henshaw.....	3. 70	4. 92	0. 58	1. 08
767	♀	..... do .....	..... do .....	..... do	3. 55	4. 71	0. 60	1. 09
796	♀ jun.	..... do .....	..... do .....	..... do	3. 53	4. 68	0. 60	1. 11
779	♂	..... do	Sept. 15, 1873	..... do	3. 46	4. 81	0. 60	1. 07
797	♂ jun.	..... do	Sept. 16, 1873	..... do	3. 41	4. 45	0. 60	1. 05
798	♂ jun.	..... do .....	..... do .....	..... do	3. 61	4. 75	0. 60	1. 09
.....	.....	..... do .....	..... do .....	..... do	3. 55	4. 75	0. 58	1. 00
914	♂ ad.	Gila River, Ariz	Oct. 2, 1874	H. W. Henshaw.....	3. 46	4. 75	0. 57	1. 10
915	♂ ad.	..... do	Oct. 3, 1874	..... do	3. 40	4. 75	0. 56	1. 11
916	♂ jun.	..... do .....	..... do .....	..... do	3. 65	4. 77	0. 59	1. 13
917	♀ ad.	..... do .....	..... do .....	..... do	3. 47	4. 63	0. 59	1. 10
927	♀ ad.	..... do	Oct. 4, 1874	..... do	3. 44	4. 56	0. 58	1. 04
919	♂ ad.	..... do	Oct. 19, 1874	..... do	3. 68	4. 78	0. 58	1. 15
921	♀ ad.	..... do .....	..... do .....	..... do	3. 50	4. 80	0. 54	1. 14

PIPILO CHLORURUS (Towns.).

Green-tailed Finch.

Fringilla chlorura, AUD., Orn. Biog., v, 1839, 336 (young).

Embernagra chlorura, HEERM., P. R. R. Rep., x, pt. ii, 1859, 46.

Pipilo chlorura, HEERM., P. R. R. Rep., Parke's Route, x, 1859, 15.—BD., U. S. & Mex.

Bound. Surv., ii, pt. ii, 1859, Birds, 18.—HENRY, Proc. Acad. Nat. Sci.

Phila., 1859, 107 (New Mexico).—HAYD., Trans. Am. Phil. Soc., xii, 1862,

169.—COUES, Proc. Acad. Nat. Sci. Phila., 1866, 90 (Fort Whipple, Ariz.).—

Id., *ib.*, 1868, 84.—MERRIAM, U. S. Geol. Surv. Terr., 1872, 684 (Idaho).

Pipilo chlorurus, BD., Birds N. A., 1858, 519.—COOPER, Birds Cal., i, 1870, 248.—ALLEN, Bull. Mus. Comp. Zool., 1872, 178 (Colorado; Utah).—COUES, Key N. A. Birds, 1872, 153.—BD., BREW., & RIDG., N. A. Birds, ii, 1874, 131, pl. xxxi, f. 4.—YARROW, Rep. Orn. Specs., 1871, Wheeler's Exped., 1874, 35.—YARROW & HENSHAW, Rep. Orn. Specs., 1872, Wheeler's Exped., 1874, 15.—HENSHAW, An. Lyc. Nat. Hist. N. Y., xi, 1874, 6.—*Id.*, An. List Birds Utah, 1872, Wheeler's Exped., 1874, 45.—*Id.*, Rep. Orn. Specs., 1873, Wheeler's Exped., 1874, 63, 82, 121.—COUES, Birds Northwest, 1874, 176.
Zonotrichia blandingiana, WOODH., Sitgreave's Exp. Zuni & Col. Riv., 1854, 85.

This finch appears to vary little in respect to numbers in the different portions of Utah, Colorado, Arizona, and New Mexico visited by the survey, but to be present in considerable numbers in the fertile valleys of the mountains, attaining on them quite a high elevation. Following the course of the streams, they will be found to inhabit the wooded portions generally, though they are not so commonly diffused over the lowlands in the breeding season as during the fall. Writers everywhere agree in attributing to them much more sprightliness of manner and activity than is seen in the other members of this genus; and, in this respect as well as their notes, as suggested by Mr. Allen, their place seems much nearer the *Zonotrichias* than the *Pipilos*. In some localities, I have found it quite shy, and anxious to evade scrutiny, hiding itself in the grass and among the bushes, from which it is often difficult to effect its dislodgment when it is inclined to keep close. At other times, its ruling trait has appeared to be a lively curiosity, impelling it to flit around the intruder from bush to bush, to watch his actions and demeanor. In fall, they are sometimes found on the dry sage plains, but this is a departure from its usual habits. It nests both in bushes and on the ground. The nests I have examined are rather carelessly made structures, composed of stalks of weeds and coarse grasses, lined with rootlets and fine grass. Eggs—usually four, more rarely five, in number—bluish-white, spotted with reddish-brown and purple. In one nest was found an egg of the Cow Bunting.

No.	Sex.	Locality.	Date.	Collector.	Wing.	Tail.	Bill.	Tarsus.
.....	♂ ad.	Bull Run, Nev.	May 23, 1871	Dr. W. J. Hoffman ....	.....	.....	.....	.....
.....	♀ ad.	..... do	May 24, 1871	..... do .....	.....	.....	.....	.....
.....	♀ ad.	..... do	June 24, 1871	F. Bischoff. ....	.....	.....	.....	.....
99	♂ ad.	Wahsatch Mts., Utah..	Aug. 18, 1872	H. W. Henshaw. ....	.....	.....	.....	.....
148	♀ ad.	Gunnison, Utah	Sept. 8, 1872	..... do .....	.....	.....	.....	.....
C	Jun.	Meadow Creek, Utah..	Sept. 15, 1872	Dr. H. C. Yarrow ....	.....	.....	.....	.....
43	♂ ad.	Denver, Colo	May 10, 1873	H. W. Henshaw.	3.07	3.66	0.50	0.93
44	♂ ad.	..... do .....	..... do .....	..... do	3.13	3.55	0.54	0.96
69	♀ ad.	..... do	May 13, 1873	..... do	2.98	3.38	0.50	0.95
70	♀ ad.	..... do .....	..... do .....	..... do	2.95	3.40	0.53	0.87
106	♂ ad.	..... do	May 17, 1873	..... do	3.14	3.60	0.53	0.95
150	♂ ad.	..... do	May 27, 1873	..... do	2.95	3.35	0.50	1.00
725	♀ jun.	Near Camp Apache, Ariz	Sept. 8, 1873	..... do	2.87	3.40	0.48	0.93
760	♀ jun.	South of Camp Apache, Ariz.	Sept. 11, 1873	..... do	2.87	3.55	0.52	0.90
5	Jun.	San Carlos, Ariz	Sept. 13, 1873	M. N. Maguet	2.83	3.39	0.50	0.94
343	Jun.	Camp Bowie, Ariz	Aug. 10, 1874	J. M. Rutter .....	.....	.....	.....	.....
640	.....	..... do	Sept. 9, 1874	Dr. J. T. Rothrock....	.....	.....	.....	.....
643	♂ jun.	..... do .....	..... do .....	..... do .....	.....	.....	.....	.....
635	♂ jun.	..... do	Sept. 11, 1874	..... do .....	.....	.....	.....	.....
719	♂ ad.	Water Hole, Ariz.	Sept. 13, 1874	H. W. Henshaw. ....	.....	.....	.....	.....

FAM. ALAUDIDAE: LARKS.

EREMOPHILA ALPESTRIS (Forst.).

Alauda alpestris, FORST., Phil. Trans., lxii, 1772, 398.

Eremophila alpestris, COUES, Key N. A. Birds, 1872, 89, f. 32.

Eremophila cornuta, BD., P. R. R. Rep., Beckwith's Route, x, 1857, 13.—*Id.*, Birds N. A., 1858, 403.—KENNERLY, P. R. R. Rep., Whipple's Route, x, 1859, 27.—COOP. & SUCKL., Nat. Hist. Wash. Terr., 1860, 195.—COUES, Proc. Acad. Nat. Sci. Phila., 1861, 221.—COOPER, Birds Cal., i, 1870, 251.—SNOW, Birds Kan., 1872, 9.

Var. LEUCOLAEMA, Coues.

Otocoris occidentalis, MCCALL, Proc. Acad. Nat. Sci. Phila., v, 1851, 218 (Santa Fé, N. Mex.).—BD., Stans. Rep. Exp. Great Salt Lake, 1852, 318.

Otocorys alpestris, NEWB., P. R. R. Rep., vi, 1857, 88.—WOODH., Sitgreave's Exp. Zuñi & Col. Riv., 1854, 88.—HEERM., P. R. R. Rep., x, pt. iv, 1859, 45.

Eremophila alpestris, ALLEN, Bul. Mus. Comp. Zool., iii, 1872, 176.—YARROW, Rep. Orn. Specs., 1871, Wheeler's Exped., 1874, 35.—YARROW & HENSHAW, Rep. Orn. Specs., 1872, Wheeler's Exped., 1874, 19.—HENSHAW, An. Lyc. Nat. Hist. N. Y., xi, 1874, 6.—*Id.*, An. List Birds Utah, 1872, Wheeler's Exped., 1874, 45.—COUES, Birds Northwest, 1874, 37.

Eremophila cornuta, BD., P. R. R. Rep., x, 1859, Beckwith's Route, Birds, 13, pl. 32.—HAYD., Rep., 1862, 174.—STEV., U. S. Geol. Surv. Terr., 1870, 464.—MERRIAM, U. S. Geol. Surv. Terr., 1872, 685.—HOLD., Proc. Bost. Soc. Nat. Hist., xv, 1872, 202.

Eremophila alpestris var. *leucolæma*, COUES, Birds Northwest, 1874, 38.—ALLEN, Proc. Bost. Soc. Nat. Hist., June, 1874, 16, 17, 20.—HENSHAW, An. List Birds Utah, 1872, Wheeler's Exped., 1874, 45 (in text).

Var. *CHRYSOLAEMA*, Wagl.

Eremophila cornuta, COUES, Proc. Acad. Nat. Sci. Phila., 1866, 79 (Arizona).—HENRY, Proc. Acad. Nat. Sci. Phila., 1859, 107 (New Mexico).

Alauda minor, GIRAUD, Birds Texas, 1841.

Otocoris rufa, HEERM., P. R. R. Rep., x, 1859, pt. vi, 45.

Eremophila cornuta var. *chrysolæma*, BD., Birds N. A., 1858, 403.—BD., U. S. & Mex. Bound. Surv., ii, pt. ii, 1859, Birds, 14.

Eremophila alpestris var. *chrysolæma*, COUES, Key N. A. Birds, 1872, 89.—BD., BREW., & RIDG., N. A. Birds, ii, 1874, 144.—HENSHAW, Rep. Orn. Specs., 1873, Wheeler's Exped., 1874, 64, 121.—COUES, Birds Northwest, 1874, 38.

The var. *chrysolæma* of the Southwestern Territory is distinguished from the pale race of the Central Region by its "smaller size, longer bill, and deeper coloration." The latter race was found extremely abundant near the vicinity of Fairfield, Utah, where the old and young resorted during the early morning to the pools of water, after which they became lost sight of, scattering over the dry plains in search of food. In the fall, they associate in immense flocks, frequenting the alkali plains and marshes.

Near Denver, this variety (var. *chrysolæma*) was quite numerous on the plains in May, and evidently preparing to breed. The male has a rather feeble but pleasing song at this season, which the birds uttered while perched on a fence rail or from the ground.

At Santa Fé, N. Mex., they were rather common on the barren hills, and without doubt had nests; but these I could not find.

The young were taken near Fort Wingate, N. Mex., June 30, by Dr. C. G. Newberry. After September, the species was found gathered in large flocks, and scattered over the dry and arid plains, where they feed upon the seeds and insects which they pick up among the sage brush and bushes. Later, in the latter part of November, the plains between Fort Wingate and Santa Fé, N. Mex., were fairly alive with these birds, and flocks numbering thousands were met with at short intervals.

No.	Sex.	Locality.	Date.	Collector.	Wing.	Tail.	Bill.	Tarsus.
.....	♂ ad.	Nevada	June 10, 1871	F. Bischoff .....	.....	.....	.....	.....
29	♂ ad.	.....	May 9, 1872	H. W. Henshaw	4. 12	2. 95	0. 50	0. 80
30	♂ ad.	.....	..... do .....	..... do	4. 14	3. 03	0. 52	0. 82
158	♂ jun.	Fairfield, Utah	Aug. 1, 1872	Dr. H. C. Yarrow .....	.....	.....	.....	.....
159	♂ jun.	..... do .....	..... do .....	..... do .....	.....	.....	.....	.....
160	♂ jun.	..... do .....	..... do .....	..... do .....	.....	.....	.....	.....
142	♂ jun.	Gunnison, Utah	Sept. 5, 1872	H. W. Henshaw .....	.....	.....	.....	.....
143	♂ jun.	..... do .....	..... do .....	..... do .....	.....	.....	.....	.....
381	♂	Beaver, Utah	Nov. 7, 1872	Dr. H. C. Yarrow and H. W. Henshaw.	.....	.....	.....	.....
B 11	.....	(Alcoholic)	— —, 1872	..... do .....	.....	.....	.....	.....

FAM. ICTERIDAE: ORIOLES.

DOLICHONYX ORYZIVORUS (Linn.)

Bobolink.

Emberiza oryzivora, LINN., Syst. Nat., i, 1766, 311.

Dolichonyx oryzivorus, WOODH., Sitgreave's Exp. Zuni & Col. Riv., 1854, 81 (Texas and Indian Territory, May).—BD., Birds N. A., 1858, 522.—HAYD., Trans. Am. Phil. Soc., xii, 1862, 169.—COOPER, Am. Nat., iii, 1869, 78.—ALLEN, Bull. Mus. Comp. Zool., 1872, 178 (Ogden, Utah).—COUES, Key N. A. Birds, 1872, 154, f. 97.—MERRIAM, U. S. Geol. Surv. Terr., 1872, 686 (Ogden, Utah).—BD., BREW., & RIDG., N. A. Birds, ii, 1874, 149, pl. xxxii, figs. 4, 5.—SNOW, Birds Kan., 1872, 11.—YARROW & HENSHAW, Rep. Orn. Specs., 1872, Wheeler's Exped., 1874, 19.—HENSHAW, An. Lyc. Nat. Hist. N. Y., xi, 1874, 7.—*Id.*, An. List Birds Utah, 1872, Wheeler's Exped., 1874, 45.—*Id.*, Rep. Orn. Specs., 1873, Wheeler's Exped., 1874, 82.—ALLEN, Proc. Bost. Soc. Nat. Hist., June, 1874, 18, 29.—COUES, Birds Northwest, 1874, 178.—

Dolichonyx oryzivorus var. *albinucha*, RIDG., MS.—COUES, Check-List, app., No. 210.—BD., BREW., & RIDG., N. A. Birds, iii, 1874, app. 517.

The Bobolink is a rather common bird in the fields about Provo, Utah, where the parent birds were noticed feeding their young July 25. In the southern part of the Territory, it appeared to be entirely wanting; nor has it been found in Arizona or New Mexico. At the Huerfano crossing, Colorado, three or four individuals were seen in company in May, apparently migrating to northern districts to spend the summer.

No.	Sex.	Locality.	Date.	Collector.	Wing.	Tail.	Bill.	Tarsus.
72	♂ ad.	Provo, Utah	July 21, 1872	H. W. Henshaw and Dr. H. C. Yarrow.	.....	.....	.....	.....

MOLOTHRUS PECORIS (Gm.).

Cowbird.

Fringilla pecoris, GM., Syst. Nat., i, 1788, 910 (female).

Molothrus pecoris, WOODH., Sitgreave's Exp. Zuñi & Col. Riv., 1854, 80.—BD., Birds N. A., 1858, 524.—*Id.*, Ives' Col. Exped., 1857-58, pt. iv, 6.—*Id.*, U. S. & Mex. Bound. Surv., ii, pt. ii, 1859, Birds, 15.—HEERM., P. R. R. Rep., x, pt. ii, 1859, 52.—HENRY, Proc. Acad. Nat. Sci. Phila., 1859, 107 (New Mexico).—HAYD., Trans. Am. Phil. Soc., xii, 1862, 169.—COUES, Proc. Acad. Nat. Sci. Phila., 1866, 90 (Fort Whipple, Ariz.).—*Id.*, *ib.*, 1868, 84.—STEV., U. S. Geol. Surv. Terr., 1870, 465.—ALLEN, Bull. Mus. Comp. Zoöl., 1872, 178.—COUES, Key N. A. Birds, 1872, 155.—SNOW, Birds Kan., 1872, 11.—YARROW & HENSHAW, Rep. Orn. Specs., 1872, Wheeler's Exped., 1874, 19.—HENSHAW, An. Lyc. Nat. Hist. N. Y., xi, 1874, 7.—*Id.*, An. List Birds Utah, 1872, Wheeler's Exped., 1874, 45.—*Id.*, Rep. Orn. Specs., 1873, Wheeler's Exped., 1874, 64, 82.—BD., BREW., & RIDG., N. A. Birds, ii, 1874, 154, pl. xxxii, figs. 6, 7.—ALLEN, Proc. Bost. Soc. Nat. Hist., June, 1874, 16, 18, 29.—COUES, Birds Northwest, 1874, 180.

Var. OBSCURUS, (Gm.)

Molothrus obscurus, CASS., Proc. Acad. Nat. Sci. Phila., 1866, 18 (Lower California and Mexico).—COOPER, Birds Cal., i, 1870, 260.

Molothrus pecoris var. *obscurus*, COUES, Key N. A. Birds, 1872, 155.—BD., BREW., & RIDG., N. A. Birds, ii, 1874, 154 (in text), pl. xxxii, f. 8.—COUES, Birds Northwest, 1874, 180.

In Utah and Colorado, the Cow Bunting appears in about the same relative abundance as in the Eastern States, and its habits here are also precisely similar. In the early spring, and into June, these birds move about in small flocks of males and females, and at this season they are perhaps more frequently met with than at any other, perhaps because they are more widely diffused; the habit of the female of intruding her eggs into the nests of smaller and weaker species to be in due season hatched, and the offspring to be fed and brought up by its per force willing foster-parents, inducing it to frequent localities where later it is rarely found. As has been noticed by many observers, these birds become, in July, exceedingly scarce, inducing in some the belief that they entirely forsake the regions in mid-summer where, earlier and later, they are numerous. I am, however, inclined to think that, when they have shifted the responsibility of their family cares upon the shoulders of more respectable and devoted birds, they merely retire to the more secluded and unfrequented districts, and thus

generally escape observation. This is the case in Utah, where, in the earlier part of the season, I have found them about the settlements in the hedges along the roads, and even in the gardens; while later in midsummer they had retired to the deep rocky cañons, where they skulked about in the bushes in a silent, reserved manner.

The presence of this bird in a locality will sometimes be made apparent by the discovery of its eggs in the nests of another species, while the birds themselves may entirely escape detection. Thus, at Fort Garland, Southern Colorado, no birds were seen, but a single egg found in a nest of the Green-tailed Finch sufficiently indicated its presence. At Denver, it was common in small flocks of six or seven; it was observed by Dr. Hoffman, in 1871, at Portzarick and at Camp Independence, Cal. In some portions of Arizona, and perhaps the extreme southwest generally, this species is replaced by the dwarf variety (var. *obscurus*), which, however, does not seem to occur in very great numbers. A single specimen was shot by Dr. Rothrock on the Gila River in October.

No.	Sex.	Locality.	Date.	Collector.	Wing.	Tail.	Bill.	Tarsus.
7	♀ jun.	Provo Cañon, Utah....	July 31, 1872	H. W. Henshaw.....	.....	.....	.....	.....
19	♂ jun.	..... do	Aug. 1, 1872	..... do .....	.....	.....	.....	.....
8	♂ ad.	Denver, Colo.....	May 6, 1873	..... do	4. 67	3. 34	0. 73	1. 08
31	♂ ad.	..... do	May 9, 1873	..... do	4. 50	3. 22	0. 66	1. 04
33	♂ ad.	..... do .....	..... do .....	..... do	4. 38	3. 29	0. 70	1. 07
24	♂ ad.	Pueblo, Colo.....	July 25, 1874	C. E. Aiken	4. 53	3. 37	0. 72	1. 10

Var. *obscurus*.

No.	Sex.	Locality.	Date.	Collector.	Wing.	Tail.	Bill.	Tarsus.
919	♂ ad.	Gila River, Ariz	Oct. 3, 1874	Dr. J. T. Rothrock....	4. 12	2. 82	0. 60	0. 93

AGELAEUS PHOENICEUS (Linn.).

Red-winged Blackbird.

Oriolus phoeniceus, LINN., Syst. Nat., i, 1766, 161.

Agelæus phoeniceus, WOODH., Sitgreave's Exp. Zuñi & Col. Riv., 1854, 80.—BD., Ives' Col. Exped., 1857-58, pt. iv, 6.—*Id.*, Birds N. A., 1858, 526.—*Id.*, U. S. & Mex. Bound. Surv., ii, pt. ii, 1859, Birds, 18.—XANTUS, Proc. Acad. Nat. Sci. Phila., 1859, 192 (Fort Tejon, Cal.).—KENNERLY, P. R. R. Rep.,

Whipple's Route, x, 1859, 30.—HENRY, Proc. Acad. Nat. Sci. Phila., 1859, 107 (New Mexico).—COOP. & SUCKL., P. R. R. Rep., xii, pt. ii, 1860, 207.—HAYD., Trans. Am. Phil. Soc., xii, 1862, 169.—COUES, Proc. Acad. Nat. Sci. Phila., 1866, 90 (Fort Whipple, Ariz.).—COOPER, Birds Cal., i, 1870, 261.—STEV., U. S. Geol. Surv. Terr., 1870, 465.—ALLEN, Bull. Mus. Comp. Zool., 1872, 178.—COUES, Key N. A. Birds, 1872, 156, pl. iv.—SNOW, Birds Kan., 1872, 11.—MERRIAM, U. S. Geol. Surv. Terr., 1872, 686.—BD., BREW., & RIDG., N. A. Birds, ii, 1874, 159, pl. xxxiv, figs. 1, 2, 3.—YARROW & HENSHAW, Rep. Orn. Specs., 1872, Wheeler's Exped., 1874, 19.—HENSHAW, An. Lyc. Nat. Hist. N. Y., xi, 1874, 7.—*Id.*, An. List Birds Utah, 1872, Wheeler's Exped., 1874, 45.—*Id.*, Rep. Orn. Specs., 1873, Wheeler's Exped., 1874, 64, 82, 121.—ALLEN, Proc. Bost. Soc. Nat. Hist., June, 1874, 18, 29.—COUES' Birds Northwest, 1874, 186.

The Redwinged, one of the most widely distributed and best known of our Blackbirds, is very numerous represented in the Middle and Southern Regions of the United States. In Utah especially, where the borders of the lakes and the occasional marshy spots along the streams afford a suitable home for them in summer, and where the grain fields, which the enterprise of the settlers has planted everywhere where water can be had in sufficient quantities to allow of their irrigation, serve as an abundant larder, which they can draw upon at will, they are very numerous. In consequence of the raids which this as well as the succeeding species are in the habit of making upon the ripening corn and grain, they are most cordially detested by the farmers, who attribute to them a great deal of damage done the crops, and a consequent pecuniary loss to themselves. Occasionally, driven by exasperation, the farmers inaugurate war against them; but their numbers are so great that, though a couple of dozen often fall at a single discharge of a gun, the diminution in their ranks seems scarcely perceptible; and though, alarmed, they beat a hasty retreat, it is only to pay a visit to some neighboring field, and a short time sees them back again with renewed spirit of devastation. They are less abundant in Arizona and New Mexico, though I have generally found them in localities where the surroundings are favorable. Dr. Coues mentions having found them in the pine woods, miles away from water, save a tiny mountain stream; a departure from their usual habits, as they are pre-eminently birds of the marshes.

No.	Sex.	Locality.	Date.	Collector.	Wing.	Tail.	Bill.	Tarsus.
406	♂ ad.	Cove Creek, Utah.....	Nov. 15, 1872	H. W. Henshaw and Dr. H. C. Yarrow.	.....	.....	.....	.....
407	♂ ad.	..... do .....	..... do .....	..... do .....	.....	.....	.....	.....
408	♂ ad.	..... do .....	..... do .....	..... do .....	.....	.....	.....	.....
461	♂ ad.	Provo, Utah.....	Nov. 30, 1872	..... do .....	.....	.....	.....	.....
67	♀ ad.	Colorado.....	May 12, 1873	H. W. Henshaw.....	4.21	3.45	0.73	0.97
7	♂ ad.	..... do	June —, 1873	Dr. J. T. Rothrock....	5.03	4.20	0.92	1.12
81	♂ ad.	Pueblo, Colo.....	July 31, 1874	C. E. Aiken.....	.....	.....	.....	.....
446	♀ ad.	Cienega, Ariz.....	Aug. 20, 1874	Dr. J. T. Rothrock....	.....	.....	.....	.....
1080	♀	Camp Apache, Ariz....	Oct. 29, 1874	H. W. Henshaw.....	.....	.....	.....	.....
1081	♀	..... do .....	..... do .....	..... do .....	.....	.....	.....	.....

XANTHOCEPHALUS ICTEROCEPHALUS (Bon.).

Yellow-headed Blackbird.

Icterus icterocephalus, BON., Am. Orn., i, 1825, 27, pl. iii.

Agelaius icterocephalus, BD., Stans. Rep. Exp. Great Salt Lake, 1852, 326.

Xanthocephalus icterocephalus, BD., P. R. R. Rep., Beckwith's Route, x, 1859, 13.—*Id.*, Ives' Col. Exped., 1857-58, pt. iv, 6.—XANTUS, Proc. Acad. Nat. Sci. Phila., 1859, 192 (Fort Tejon, Cal.).—BD., U. S. & Mex. Bound. Surv., ii, pt. ii, 1859, Birds, 18.—HENRY, Proc. Acad. Nat. Sci. Phila., 1859, 107 (New Mexico).—HAYD., Trans. Am. Phil. Soc., xii, 1862, 169.—COUES, Proc. Acad. Nat. Sci. Phila., 1866, 91 (Fort Whipple, Ariz.).—*Id.*, *ib.*, 1868, 84.—COOPER, Birds Cal., i, 1870, 267.—STEV., U. S. Geol. Surv. Terr., 1870, 465.—COUES, Am. Nat., v, 1871, 195.—ALLEN, Bul. Mus. Comp. Zoöl., 1872, 178.—COUES, Key N. A. Birds, 1872, 156, f. 98.—SNOW, Birds Kan., 1872, 11.—AIKEN, Proc. Bost. Soc. Nat. Hist., 1872, 202.—MERRIAM, U. S. Geol. Surv. Terr., 1872, 686 (Idaho).—BD., BREW., & RIDG., N. A. Birds, ii, 1874, 167, pl. xxxii, f. 9, pl. xxxiii, f. 9.—YARROW, Rep. Orn. Specs., 1871, Wheeler's Exped., 1874, 35.—YARROW & HENSHAW, Rep. Orn. Specs., 1872, Wheeler's Exped., 1874, 19.—HENSHAW, An. Lyc. Nat. Hist. N. Y., xi, 1874, 7.—*Id.*, An. List Birds Utah, 1872, Wheeler's Exped., 1874, 45.—*Id.*, Rep. Orn. Specs., 1873, Wheeler's Exped., 1874, 64, 82, 121.—ALLEN, Proc. Bost. Soc. Nat. Hist., June, 1874, 18, 30.—COUES, Birds Northwest, 1874, 188.

Agelaius xanthocephalus, WOODH.; Sitgreave's Exp. Zuñi & Col. Riv., 1854, 80.—NEWB., P. R. R. Rep., vi, 1857, 87.—HEERM., P. R. R. Rep., x, pt. ii, 1859, 52.

The large size and bright colors of this blackbird, as well as its habit of flocking together at all seasons of the year, render it conspicuous among its allies, and secure it attention wherever found. Its abundance in Utah, Colorado, New Mexico, and Arizona is attested by its having been noted everywhere in that region traversed by the survey, and by the many spec-

imens collected. During the breeding season, it retires to the marshes and sloughs, where, among the rushes, it finds suitable sites for its nests. These are quite large, and oftentimes bulky structures, but show a degree of skill in the neat manner in which the coarse grasses and rushes are woven in a firm, compact domicile, commensurate with the size of the bird. On the borders of the alkali lakes of Southern Colorado, I found them very numerous, and, as usual, in large noisy communities. In the time of depositing their eggs, the pairs seemed to vary very much. Thus, June 22, of many nests found, some contained young just hatched, others fresh eggs, while other nests still were in process of construction. Later in the fall, they unite together in large flocks of old and young, and, leaving to a great extent the marshes, wend their way into the cultivated districts, to forage on the grain fields; by this means they soon become very plump, and then furnish tidbits for the table by no means to be despised. Noted by Dr. Hoffman in considerable numbers at Camp Independence, Cal., in August.

No.	Sex.	Locality.	Date.	Collector.	Wing.	Tail.	Bill.	Tarsus.
....	♂ ad.	Camp Halleck, Nev...	May 14, 1871	F. Bischoff.....	.....	.....	.....	.....
....	♂ ad.	.....do.....	.....do.....	.....do.....	.....	.....	.....	.....
....	♂ ad.	.....do.....	.....do.....	.....do.....	.....	.....	.....	.....
....	♂ ad.	.....do.....	.....do.....	.....do.....	.....	.....	.....	.....
....	♂ ad.	.....do.....	.....do.....	.....do.....	.....	.....	.....	.....
....	♂ ad.	.....do.....	.....do.....	.....do.....	.....	.....	.....	.....
....	♂ ad.	.....do.....	.....do.....	.....do.....	.....	.....	.....	.....
....	♂ ad.	.....do.....	.....do.....	.....do.....	.....	.....	.....	.....
....	♂ ad.	.....do.....	.....do.....	.....do.....	.....	.....	.....	.....
....	♂ ad.	.....do.....	.....do.....	.....do.....	.....	.....	.....	.....
....	♀ ad.	.....do.....	.....do.....	.....do.....	.....	.....	.....	.....
....	Jun.	.....do.....	.....do.....	.....do.....	.....	.....	.....	.....
409	♂ ad.	Cove Creek, Utah.....	Nov. 15, 1872	H. W. Henshaw and Dr. H. C. Yarrow.	.....	.....	.....	.....
1	♀ ad.	.....	June 3, 1873	Dr. J. T. Rothrock....	5.29	3.71	0.85	1.35
628	♂ jun.	Camp Apache, Ariz ...	Aug. 27, 1873	H. W. Henshaw.....	5.54	4.13	0.80	1.31
175	♀ jun.	Rio Grande, Colo.....	Aug. 22, 1874	C. E. Aiken.....	.....	.....	.....	.....
732	♀	San Pedro River, Colo.	Sept. 14, 1874	Dr. J. T. Rothrock....	.....	.....	.....	.....
733	♀	.....do.....	.....do.....	.....do.....	.....	.....	.....	.....
734	♀	.....do.....	.....do.....	.....do.....	.....	.....	.....	.....
735	♀	.....do.....	.....do.....	.....do.....	.....	.....	.....	.....
908	♂ ad.	Camp Grant, Ariz.....	Oct. 3, 1874	.....do.....	.....	.....	.....	.....

STURNELLA MAGNA (Linn.), var. NEGLECTA, Aud.

Western Meadow Lark.

- Sturnella neglecta*, AUD., B. Am., vii, 1843, 339, pl. cccclxxxvii.—BD., Stans. Rep. Exp. Great Salt Lake, 1852, 316.—WOODH., Sitgreave's Exp. Zuñi & Col. Riv., 1854, 78.—NEWB., P. R. R. Rep., vi, 1857, 86.—BD., Birds N. A., 1858, 537.—*Id.*, U. S. & Mex. Bound. Surv., ii, pt. ii, 1859, Birds, 19.—XANTUS, Proc. Acad. Nat. Sci. Phila., 1859, 192 (Fort Tejon, Cal.).—HEERM., P. R. Rep., x, pt. iv, 1859, 54.—KENNERLY, P. R. R. Rep., Whipple's Route, 1859, 31.—HENRY, Proc. Acad. Nat. Sci. Phila., 1859, 107 (New Mexico).—COOP. & SUCKL., P. R. R. Rep., xii, pt. ii, 1860, 208.—COUES, Proc. Acad. Nat. Sci., Phila., 1866, 91 (Fort Whipple, Ariz.; rare).—HAYD., Trans. Am. Phil. Soc., xii, 1862, 169.—COUES, Proc. Acad. Nat. Sci. Phila., 1868, 84.—COOPER, Birds Cal., i, 1870, 270.—STEV., U. S. Geol. Surv. Terr., 1870, 465.—SNOW, Birds Kan., 1872, 11.—HOLD., Proc. Bost. Soc. Nat. Hist., 1872, 203.—MERRIAM, U. S. Geol. Surv. Terr., 1872, 687.
- Sturnella ludoviciana* var. *neglecta*, ALLEN, Bul. Mus. Comp. Zoöl., 1872, 178.—*Id.*, Proc. Bost. Soc. Nat. Hist., June, 1874, 16, 18, 30.
- Sturnella magna* var. *neglecta*, COUES, Key N. A. Birds, 1872, 157.—BD., BREW., & RIDG., N. A. Birds, ii, 1874, pl. 34, f. 1.—YARROW & HENSHAW, Rep. Orn. Specs., 1872, Wheeler's Exped., 1874, 19.—HENSHAW, An. Lyc. Nat. Hist. N. Y., xi, 1874, 7.—*Id.*, An. List Birds Utah, 1872, Wheeler's Exped., 1874, 45.—*Id.*, Rep. Orn. Specs., 1873, Wheeler's Exped., 1874, 65, 82.—COUES, Birds Northwest, 1874, 190.

In Arizona and New Mexico, the Meadow Lark is of rather infrequent occurrence in summer; the nature of the region generally being unsuited to its wants and habits. Near some of the settlements in New Mexico, however, and on a few of the more fertile grassy plains of Arizona, these birds have been noticed in the breeding season, though most of the instances when we have noted its occurrence have been in the fall, when the birds had probably moved to the southward from localities farther north.

Near Denver, Colo., I found them quite numerous in the fields about the city in May, and here the striking differences of song between this variety and our Eastern Lark (*magna*) were pointed out to me by farmers, who were completely at a loss to understand why the Meadow Lark, so familiar to them in the East, should sing "so queerly out here." Throughout Utah and Eastern Nevada, it was fairly abundant, inhabiting the grain fields and the grassy pastures on the outskirts of the towns. Dr. Hoffman also noted it in Independence Valley, and the whole of Owen's Valley, California.

No.	Sex.	Locality.	Date.	Collector.	Wing.	Tail.	Bill.	Tarsus.
181	♀ jun.	Panquitch, Utah. . .	Sept. 18, 1872	H. W. Henshaw.....	.....	.....	.....	.....
344	♂ jun.	Washington, Utah ..	Oct. 22, 1872	H. W. Henshaw and Dr. H. C. Yarrow.	.....	.....	.....	.....
351 A	♂ jun.	..... do	Oct. 23, 1872	..... do .....	.....	.....	.....	.....
352	♀ jun.	..... do .....	..... do .....	..... do .....	.....	.....	.....	.....
194	♂ ad.	Fort Garland, Colo..	May 29, 1873	H. W. Henshaw.....	4.90	3.40	1.30	1.40
48	♂	Aguazul, N. Mex....	July 2, 1874	C. E. Aiken .....	.....	.....	.....	.....
347	♂ ad.	Pueblo, Colo.....	Oct. 15, 1874	..... do .....	.....	.....	.....	.....
348	♂	..... do .....	..... do .....	..... do .....	.....	.....	.....	.....
349	.....	..... do .....	..... do .....	..... do .....	.....	.....	.....	.....
350	♀ ad.	..... do .....	..... do	H. W. Henshaw .....	.....	.....	.....	.....
1067	♂	Camp Apache, Ariz..	Oct. 26, 1874	..... do .....	.....	.....	.....	.....
1068	♂	..... do .....	..... do .....	..... do .....	.....	.....	.....	.....

ICTERUS PARISORUM, Bon.

Scott's Oriole.

Icterus parisorum, BON., "Acad. Bonon., 1836"; Proc. Zool. Soc., 1837, 109.—BD., Birds N. A., 1858, 544.—*Id.*, Proc. Acad. Nat. Sci. Phila., 1859, 305 (Cape Saint Lucas).—*Id.*, U. S. & Mex. Bound. Surv., ii, pt. ii, 1859, Birds, 19, pl. xix, f. 1.—COOPER, Birds Cal., 1870, x, 276.—COUES, Key N. A. Birds, 1872, 159.—BD., BREW., & RIDG., N. A. Birds, 1874, iii, 188, pl. xxxv, f. 9.

This oriole extends its range from Mexico into Arizona, where, however, it was only found by us close to the border; the most northern locality at which it was seen being about one hundred miles from the line. We had no opportunities for studying its habits, beyond noting the localities it affected. It appeared to be a bird peculiarly of the desert, and was only obtained in the most forbidding sections, where the dry hills were clothed only with a few straggling bush like forms, and with the various kinds of cacti, many of which were of great size. At the "Water Hole," near Camp Lowell, Ariz., I saw seven or eight of these orioles during the few hours of our stay here. They had evidently come in from the adjoining desert to slake their thirst, and their shyness under the pressing need of water was remarkable, since the minute they discovered our presence they turned about and took flight back again, seemingly determined to submit to the deprivation of water rather than endure our presence.

No.	Sex.	Locality.	Date.	Collector.	Wing.	Tail.	Bill.	Tarsus.
449	♀ ad.	Sienega, Ariz.....	Aug. 21, 1874	Dr. J. T. Rothrock....	3.85	3.65	0.82	0.94
450	Jun.	..... do .....	..... do .....	..... do	3.58	3.42	0.72	0.93
714	♂ ad.	Water Hole, Ariz	Sept. 13, 1874	..... do	3.95	3.60	0.95	0.97
715	♂ ad.	..... do .....	..... do .....	..... do	3.98	3.62	0.87	0.97
716	♂ ad.	..... do .....	..... do .....	..... do	3.93	3.50	0.92	0.97

ICTERUS CUCULLATUS, Swains.

Hooded Oriole.

Icterus cucullatus, SWAINS., Philos. Mag., i, 1827, 436.—LAWR., An. Lyc. Nat. Hist. N. Y., v, May, 1851, 116 (first introduced into fauna of United States).—BD., Birds N. A., 1858, 546.—*Id.*, U. S. & Mex. Bound. Surv., ii, pt. ii, 1859, Birds, 19.—*Id.*, Proc. Acad. Nat. Sci. Phila., 1859, 305 (Cape Saint Lucas).—COUES, Proc. Acad. Nat. Sci. Phila., 1868, 84.—COOPER, Birds Cal., 1870, i, 275.—COUES, Key N. A. Birds, 1872, 159.—BD., BREW., & RIDG., N. A. Birds, 1875, 193, pl. xxxv, f. 6.

This beautiful oriole is better known as a resident of Mexico than of our own territory; yet, in Southeastern Arizona, it occurs in the region south of the Gila River in such numbers as to warrant our speaking of it as common. In a choice of its home, its taste differs entirely from that of the oriole just mentioned. It shuns the arid districts, and is found only in the fringes of deciduous trees along the streams. Here it seeks its food among the foliage of the cottonwoods, and flies from thence to the low bushes on the cañon sides, spending much time among them, gleaning insects from the branches, or even descending occasionally to the ground. I did not hear the song; the birds, at the time of my acquaintance with them, being busy in providing for their young, and seeming to find their time too fully occupied to devote any to music. Their common notes are a rolling chatter, which somewhat resemble that of our common Baltimore Oriole, but is much weaker and fainter.

I saw quite a number of what I took to be the nests of this species, suspended low down from the branches of the cottonwoods and various deciduous trees; one or two being not more than ten feet from the ground. These were made of grasses, and woven and interwoven in such a manner as to make a very firm, durable nest, and shows that this species is not inferior

to others of its allies in the art of construction. Captain Bendire, who found this bird breeding near Tucson, Ariz., gives the following dimensions of a nest: Inner diameter, three inches; depth inside, same; outside diameter, from four to five and a half inches; depth, about four. He says the eggs are usually three, sometimes four, in number. They are of a pale bluish-white ground, spotted with dark-lilac and umber-brown about the larger end.

No.	Sex.	Locality.	Date.	Collector.	Wing.	Tail.	Bill.	Tarsus.
207	♂ jun.	Near Camp Grant, Ariz.	July 27, 1874	H. W. Henshaw.....	.....	.....	.....	.....
208	♂ ad.	..... do .....	..... do .....	..... do	3.55	3.80	0.80	0.87
209	♂ ad.	Camp Grant, Ariz. ....	..... do .....	..... do	3.54	3.77	0.77	0.82
237	♂ ad.	..... do	July 30, 1874	..... do	3.58	3.98	0.77	0.87
238	♂ jun.	..... do .....	..... do .....	..... do .....	.....	.....	.....	.....
239	♀ jun.	..... do .....	..... do .....	..... do .....	.....	.....	.....	.....
330	♂ ad.	Camp Bowie, Ariz	Aug. 9, 1874	Dr. J. T. Rothrock....	3.67	4.03	0.84	0.84
371	♀ ad.	..... do	Aug. 12, 1874	H. W. Henshaw.....	3.24	3.20	0.73	0.85
372	♀ jun.	..... do .....	..... do .....	..... do .....	.....	.....	.....	.....
394	♀ jun.	..... do	Aug. 13, 1874	..... do .....	.....	.....	.....	.....

ICTERUS BULLOCKI (Swains.).

Bullock's Oriole.

Xanthornus bullockii, SWAINS., Syn. Mex. Birds, Taylor's Phil. Mag., i, 1827, 436.

Icterus bullockii, NEWB., P. R. R. Rep., vi, 1857, 87.—BD., Birds N. A., 1858, 549.—*Id.*, U. S. & Mex. Bound. Surv., ii, pt. ii, 1859, Birds, 20.—XANTUS, Proc. Acad. Nat. Sci. Phila., 1859, 192 (Fort Tejon, Cal.).—HENRY, Proc. Acad. Nat. Sci. Phila., 1859, 107 (New Mexico).—COOP. & SUCKL., P. R. R. Rep., xii, pt. ii, 1860, 209.—HAYD., Trans. Am. Phil. Soc., xii, 1862, 170.—COUES, Proc. Acad. Nat. Sci. Phila., 1866, 91 (Fort Whipple, Ariz.).—COOPER, Birds Cal., i, 1870, 273.—COUES, Am. Nat., v, 1871, 678 (biography).—ALLEN, Bul. Mus. Comp. Zoöl., 1872, 178 (Ogden, Utah).—COUES, Key N. A. Birds, 1872, 158, f. 100.—SNOW, Birds Kan., 1872, 11.—HOLD., Proc. Bost. Soc. Nat. Hist., 1872, 203.—BD., BREW., & RIDG., N. A. Birds, ii, 1874, 199, pl. xxxiv, figs. 3, 7.—YARROW & HENSHAW, Rep. Orn. Specs., 1872, Wheeler's Exped., 1874, 19.—YARROW, Rep. Orn. Specs., 1871, Wheeler's Exped., 1874, 35.—HENSHAW, An. Lyc. Nat. Hist. N. Y., xi, 1874, 7.—*Id.*, An. List Birds Utah, 1872, Wheeler's Exped., 1874, 46.—*Id.*, Rep. Orn. Specs., 1873, Wheeler's Exped., 1874, 65, 82.—ALLEN, Proc. Bost. Soc. Nat. Hist., June, 1874, 16, 30.—COUES, Birds Northwest, 1874, 195.

Yphantès bullockii, HEERM., P. R. R. Rep., x, pt. ii, 1859, 52.

Icterus (Yphantès) bullockii, MERRIAM, U. S. Geol. Surv. Terr., 1872, 685 (Utah; Idaho).

A single individual was seen at Provo, Utah, and one shortly afterward in middle of August in the Wahsatch Mountains. Probably migrates early,

as nests presumably of this species were found, but no birds seen after this time.

The males made their appearance about the 10th, and the females a few days later. Very common, usually keeping in the tops of the tallest trees. Among the first arrivals were several males, which, in point of perfection of plumage, are equaled by none in the large collection of this species in the Smithsonian collection, and may be taken as probably indicating the highest stage of coloration. The black above is intense and quite lustrous, while the orange of the under parts is very deep, being especially intense on the breast; the yellow on the hind neck encroaches on the black tips so as to make an almost continuous collar. In Eastern and Southeastern Arizona, the species appears to be rare in summer.

No.	Sex.	Locality.	Date.	Collector.	Wing.	Tail.	Bill.	Tarsus.
71	♂ ad.	Denver, Colo	May 13, 1873	H. W. Henshaw	4.21	3.45	0.75	0.95
72	♂ ad.	..... do . . . . .	..... do . . . . .	..... do	3.91	2.27	0.74	0.97
73	♂ ad.	..... do . . . . .	..... do . . . . .	..... do	3.98	3.31	0.75	0.94
74	♂ ad.	..... do . . . . .	..... do . . . . .	..... do	4.25	3.61	0.74	0.95
75	♀ ad.	..... do . . . . .	..... do . . . . .	..... do	3.87	3.82	0.80	0.92
152	♀ ad.	..... do	May 27, 1873	..... do	4.08	3.63	0.77	0.87
3	♂ ad.	..... do	June —, 1873	Dr. J. T. Rothrock	4.05	3.41	0.73	0.94
3 A	♂ ad.	..... do . . . . .	..... do . . . . .	..... do	4.00	3.33	0.75	0.90
23	♀ jun.	Pueblo, Colo	July 25, 1874	C. E. Aiken . . . . .	.....	.....	.....	.....
58	♂ ad.	..... do	July 28, 1874	..... do . . . . .	.....	.....	.....	.....
86	♂ jun.	..... do	Aug. 1, 1874	..... do . . . . .	.....	.....	.....	.....
87	Jun.	..... do . . . . .	..... do . . . . .	..... do . . . . .	.....	.....	.....	.....
457	♀ jun.	Sienega, Ariz	Aug. 12, 1874	H. W. Henshaw . . . . .	.....	.....	.....	.....
202	♂ jun.	..... do	Aug. 21, 1874	J. M. Rutter . . . . .	.....	.....	.....	.....

SCOLECOPHAGUS CYANOCEPHALUS (Wagl.).

Brewer's Blackbird.

Psarocolius cyanocephalus, WAGL., Isis, 1829, 758.

Scolecophagus cyanocephalus, BD., Birds N. A., 1858, 552.—XANTUS, Proc. Acad. Nat. Sci. Phila., 1859, 192 (Fort Tejon, Cal.).—BD., U. S. & Mex. Bound. Surv., ii, pt. ii, 1859, Birds, 20.—HEERM., P. R. R. Rep., x, pt. ii, 1859, 53.—HENRY, Proc. Acad. Nat. Sci. Phila., 1859, 107 (New Mexico).—COOP. & SUCKL., P. R. R. Rep., xii, pt. ii, 1860, 209.—HAYD., Trans. Am. Phil. Soc., xii, 1862, 170.—COUES, Proc. Acad. Nat. Sci. Phila., 1866, 90 (Fort Whipple, Ariz.).—STEVE., U. S. Geol. Surv. Terr., 1870, 465.—ALLEN, Bull. Mus. Comp. Zool., 1872, 178 (Colorado; Utah).—COUES, Key N. A. Birds, 1872, 160.—SNOW,

Birds Kan., 1872, 12.—AIKEN, Proc. Bost. Soc. Nat. Hist., 1872, 203.—MERRIAM, U. S. Geol. Surv. Terr., 1872, 687.—BD., BREW., & RIDG., N. A. Birds, ii, 1874, 206, pl. xxxv, f. 3.—YARROW & HENSHAW, Rep. Orn. Specs., 1872, Wheeler's Exped., 1874, 19.—HENSHAW, An. Lyc. Nat. Hist. N. Y., xi, 1874, 7.—*Id.*, An. List Birds Utah, 1872, Wheeler's Exped., 1874, 46.—*Id.*, Rep. Orn. Specs., 1873, Wheeler's Exped., 1874, 65, 82, 122.—ALLEN, Proc. Bost. Soc. Nat. Hist., June, 1874, 18, 30.—COUES, Birds Northwest, 1874, 199.

Scolocophagus ferrugineus, WOODH., Sitgreave's Exp. Zuñi & Col. Riv., 1854, 78.—HOLD., Proc. Bost. Soc. Nat. Hist., 1872, 203 (error).

Scolocophagus mexicanus, NEWB., P. R. R. Rep., vi, 1857, 86.

Throughout Utah, Colorado, New Mexico, and Arizona, this blackbird is perhaps the most abundant of its tribe; in certain localities far outnumbering the combined numbers of the other species, while, in its distribution, it is much more general than any other. In its choice of habitat, it appears to be not critical, but disposed to accommodate itself to the nature of any locality, provided the spot possesses the chief desideratum—an abundance of food. During the breeding season, I have found that the borders of streams are generally selected, perhaps because they find here an easy supply of food as well as shelter for their nests. The marshes in several parts of Utah were found to afford shelter for thousands of these birds at this season; and, though they do not generally breed in colonies, yet the attractions of a particular neighborhood generally induce more than one pair to resort to it, and in many instances several nests are found near to each other, while the birds may or may not, when disengaged from their family duties, associate together.

In the choice of a nesting site, they are variable; the selection seeming to be dependent upon the whim of each individual pair of birds. In the same locality, I have found their nests in trees, bushes, tussocks of grass, and beneath the overhanging banks of streams, within a few inches of the water. They probably build most often on the ground, or, at any rate, within a few inches of it; but I have taken one nest a dozen feet from the ground, and seen others but little less. The material of which these are composed are sticks, weeds, and coarse grasses, so arranged as to make a firm, bulky structure, and apparently to further increase its stability, a lining of mud is placed inside, and the eggs rest upon a bed of rootlets and fine grasses. These vary in number from four to six, usually five; the color varies from a dull

olivaceous to a pale bluish-white; and they are thickly covered with blotches of light-brown and burnt-umber, this latter color often in the form of wavering lines. In some specimens, the brown spots are confluent and nearly hide the ground color.

The duties of incubation over, and the young well grown, the birds now come together in flocks of variable number, from twenty-five to perhaps two hundred. Their only care is to obtain food, and in constant search for this they wander restlessly about, flying from point to point, settling on the ground, and running here and there till a momentary alarm or mere whim starts them off to another quarter. Their familiarity at this season is surprising, and in marked contrast to their retiring manners during the nesting period. In Utah and Arizona, they are regular visitors to the settlements, perching on the houses, and alighting in the streets, while the stock corrals and barn yards are favorite resorts. They are nearly omnivorous, and I noticed them in Arizona, with the ravens and crows, about the slaughter yards, waiting for animal refuse.

No.	Sex.	Locality.	Date.	Collector.	Wing.	Tail.	Bill.	Tarsus.
30	♀ jun.	Provo, Utah.....	Aug. 2, 1872	H. W. Henshaw.....				
31	♀ jun.	..... do .....	..... do .....	..... do				
32	♂ jun.	..... do	Aug. 3, 1872	..... do				
165	♂ ad.	Harmony, Utah	Sept. 15, 1872	..... do				
295	♀ ad.	Beaver, Utah.....	Sept. 25, 1872	Dr. H. C. Yarrow and H. W. Henshaw.				
276	♂ ad.	Iron City, Utah.....	Oct. 10, 1872	H. W. Henshaw.....				
363	♂ ad.	Cove Creek, Utah.....	Oct. 26, 1872	Dr. H. C. Yarrow and H. W. Henshaw.				
171	♂ ad.	Fort Garland, Colo....	May 28, 1873	H. W. Henshaw.....	5.47	4.66	0.90	1.33
197	♂ ad.	..... do	May 29, 1873	..... do	5.08	4.50	0.90	1.23
377	♀ ad.	..... do	June 19, 1873	..... do	5.13	4.28	0.86	1.26
378	♂ ad.	..... do .....	..... do .....	..... do	4.73	3.75	0.77	1.17
379	♀ ad.	..... do .....	..... do .....	..... do	4.47	3.82	0.86	1.20
385	♂ ad.	..... do	June 20, 1873	..... do	5.30	4.28	0.86	1.24
424	♂ ad.	..... do	June 28, 1873	..... do	5.11	4.21	0.88	1.15
425	♂ ad.	..... do .....	..... do .....	..... do	5.15	4.10	0.87	1.22
426	♂ ad.	..... do .....	..... do .....	..... do	4.93	4.25	0.83	1.26
90	♂ jun.	Pueblo, Colo.	Aug. 1, 1874	C. E. Aiken				
879	♂	Mount Graham, Ariz..	Sept. 25, 1874	H. W. Henshaw.....				
605	♂	Camp Goodwin, Ariz..	Oct. 30, 1874	..... do				
904	♂	..... do .....	..... do .....	..... do				

QUISCALUS PURPUREUS (Bartr.), var. AENEUS, Ridg.

Bronzed Grackle.

Quiscalus aeneus, RIDG., Proc. Acad. Nat. Sci. Phila., 1869, 134.—COUES, Key N. A. Birds, 1872, 161 (not recognized as valid).

Quiscalus purpureus var. *aeneus*, BD., BREW., & RIDG., N. A. Birds, ii, 1874, 218.—HENSCHAW, Rep. Orn. Specs., 1873, Wheeler's Exped., 1874, 65.—COUES, Birds Northwest, 1874, 203.

May 14, these blackbirds were rather numerous on the outskirts of Denver, and apparently were just about to build, as they were already mated. Elsewhere in the region explored by the survey, the Bronzed Grackle was not found.

No.	Sex.	Locality.	Date.	Collector.	Wing.	Tail.	Bill.	Tarsus.
89	♂ ad.	Denver, Colo.	May 14, 1873	H. W. Henshaw.....	5.60	4.85	1.28	1.43

FAM. CORVIDAE: CROWS.

CORVUS CORAX, Linn., var. CARNIVORUS, Bartr.

American Raven.

Corvus carnivorus, BARTR., Travels in Eastern Florida, 1793, 290.—BD., P. R. R. Rep., Beckwith's Route, x, 1859, 14.—*Id.*, Birds N. A., 1858, 560.—*Id.*, U. S. & Mex. Bound. Surv., ii, pt. ii, 1859, Birds, 20.—XANTUS, Proc. Acad. Nat. Sci. Phila., 1859, 192 (Fort Tejon, Cal.).—HENRY, Proc. Acad. Nat. Sci. Phila., 1859, 108 (New Mexico).—COOP. & SUCKL., P. R. R. Rep., xii, pt. ii, 1860, 210.—HAYD., Trans. Am. Phil. Soc., xii, 1862, 170.—COUES, Proc. Acad. Nat. Sci. Phila., 1866, 91 (Fort Whipple, Ariz.).—*Id.*, *ib.*, 1868, 84.—COOPER, Birds Cal., i, 1870, 282.—STEV., U. S. Geol. Surv. Terr., 1870, 465.—SNOW, Birds Kan., 1872, 12.

Corvus corax var. *carnivorus*, BD., BREW., & RIDG., N. A. Birds, ii, 1874, 234, pl. 37, f. 6.—YARROW & HENSHAW, Rep. Orn. Specs., 1872, Wheeler's Exped., 1874, 20.—HENSHAW, An. Lyc. Nat. Hist. N. Y., xi, 1874, 7.—*Id.*, An. List Birds Utah, 1872, Wheeler's Exped., 1874, 46.—*Id.*, Rep. Orn. Specs., 1873, Wheeler's Exped., 1874, 65, 82, 122.—WOODH., Sitgreave's Exp. Zuñi & Col. Riv., 1854, 78.—HENSHAW, Rep. Orn. Specs., 1873, Wheeler's Exped., 1874, 65, 83, 122.

Corvus cacalotl, NEWB., P. R. R. Rep., vi, 1857, 82.—BD., Birds N. A., 1858, 563.—KENNERLY, P. R. R. Rep., Whipple's Route, x, 1859, 31, pl. xx.

Corvus corax, HEERM., P. R. R. Rep., x, pt. ii, 1859, 54.—ALLEN, Bul. Mus. Comp. Zoöl., 1872, 178 (Kansas; Colorado; Wyoming; Utah).—*Id.*, Proc. Bost. Soc. Nat. Hist., June, 1874, 31.—COUES, Birds Northwest, 1874, 204.
Corvus corax (var. ?), COUES, Key N. A. Birds, 1872, 162.

The raven is everywhere an abundant summer resident throughout the Middle and Southern Region. In summer, there ensues a very general dispersion of the species; the birds associating in pairs, and retiring to the solitude of the wilderness, where they find, in the clefts and openings of inaccessible cliffs, convenient and safe resting places for their nests. Such rocky fastnesses failing, they content themselves with the top of a tall pine or other tree. Their appetite is voracious, and, as quantity not quality is the chief principle governing their desires, they eat almost everything that falls in their way. Like the crow, during the spring and summer, ere the ripening seeds and grain are attainable, they are indefatigable in their search after slugs and large insects of any kind, frequenting for this purpose, in the cultivated districts, the plowed lands, or the extensive cattle ranges, where the presence of the stock is always accompanied by an abundance of insect life. The presence of a dead or exhausted and dying animal, no matter how deep in the wilderness, is detected with wonderful quickness by these feeders upon carrion, and the tidings seem fairly borne on the wings of the wind, so soon are the trees and rocks in the neighborhood covered with the ravens, who, with the vultures and coyotés, soon strip the flesh away and leave but the whitening bones. - They have sharp eyes, too, to detect the presence of man, and, always in early morning, the impatient croakings of one or two pairs were heard near our camp, as they restlessly moved about, awaiting the moment when our departure should enable them to swoop down into the camp, and quarrel over any stray morsels left behind. In the fall, as the cold weather comes on, and foraging becomes more precarious, they collect about the military posts and settlements, ready to snap up whatever chance or the wastefulness of man shall throw in their way.

As quick to learn by experience that man meditates no evil against them, as the crow in the populous section of the East is to acquire a different lesson till with it man and danger have become synonymous, the ravens seem often to totally disregard his presence, and to pursue their avocations

under his eye with the same unconcern as though they were, indeed, wholly unconscious of his presence.

No.	Sex.	Locality.	Date.	Collector.	Wing.	Tail.	Bill.	Tarsus.
382	♀ ad.	Beaver, Utah.....	Nov. 8, 1872	H. W. Henshaw .....	.....	.....	.....	.....
1047	♀ ad.	Camp Apache, Ariz....	Oct. 21, 1874	..... do	16.50	9.75	2.63	2.65

CORVUS CRYPTOLEUCUS, Couch.

White-necked Crow.

Corvus cryptoleucus, COUCH, Proc. Acad. Nat. Sci. Phila., vii, April, 1854, 66 (Tamaulipas, Mexico).—BD., Birds N. A., 1858, 565.—KENNERLY, P. R. R. Rep., Whipple's Route, x, 1859, 31 (Llano Estacado, Texas).—BD., U. S. & Mex. Bound. Surv., ii, pt. ii, 1859, Birds, 20.—COOPER, Birds Cal., i, 1870, 284.—COUES, Key N. A. Birds, 1872, 162.—AIKEN, Proc. Bost. Soc. Nat. Hist., 1872, 203 (Colorado, base of mountains).—*Id.*, Am. Nat., ii, 1873, 16 (Cheyenne, Wyo.).—BD., BREW., & RIDG., N. A. Birds, ii, 1874, 242.—AIKEN, Am. Nat., vii, 1873, 16.—HENSHAW, Rep. Orn. Specs., 1873, Wheeler's Exped., 1874, 122.—COUES, Birds Northwest, 1874, 206.

Mr. Aiken communicates the following:

"It seems to me not a little singular that I should have been the first to detect the presence of this bird in Colorado; for it outnumbers all the other *Corvi* in certain localities. It had previously been considered a bird of the southeast, and was supposed to be confined mainly to the Staked Plains of Texas; but I now know it to be common along the eastern base of the Rocky Mountains, throughout the entire extent of Colorado, and it even winters as far north as Cheyenne. It has also been found at Tucson, Ariz., by Captain Bendire, who includes it among the resident birds of that locality, so that it has quite an extended range. I first saw them in October, 1871, about twenty-five miles south of Cheyenne, on the line of the Denver Pacific Railroad, where a large flock was hovering over the plain. In the city of Denver, I have often seen them searching for food in the less frequented streets, and about one hundred miles farther south, on the Fontaine Qui Bouille, I have seen immense numbers. At the latter place, a flock of probably one thousand individuals was resident during the winter of 1871-72. Although so abundant in winter, very few are to be seen in summer; the greater number either pass to the northward or

become so distributed over the country as not to attract attention. Being seldom disturbed, these birds have little of the shyness which the common crow of the East exhibits, though it is not always easy to get within gunshot of them. I have on one occasion ridden along within twenty feet of a fence, on which sat thirteen of these 'imps of darkness,' only one of which flew away, the others contenting themselves with keeping a watchful eye on my demeanor, and an instant's halt on my part, or a suspicious motion, would have started them off instantly. *C. cryptoleucus* is mainly a bird of the plains, being replaced in the mountains by the common raven. The two birds resemble each other so closely both in notes and habits that it is difficult to distinguish between them at a distance; the greatest apparent discrepancy being in size, though the croak of *carnivorus* is somewhat deeper and louder than that of the other. I have sometimes found them both associated in the same flock. Each succeeding year since I first saw these birds I have noticed a marked decrease in their numbers in El Paso County, Col. The cause of this I do not know unless it is because as the country becomes more thickly settled the solitude they love so well is denied them."

CORVUS AMERICANUS, Aud.

Common Crow.

Corvus americanus, AUD., Orn. Biog., ii, 1834, 317, v, 447, pl. clvi.—WOODH., Sitgreave's Exp. Zuñi & Col. Riv., 1854, 78.—NEWB., P. R. R. Rep., vi, 1857, 82.—BD., Birds N. A., 1858, 566.—HEERM., P. R. R. Rep., x, pt. iv, 1859, 55.—HENRY, Proc. Acad. Nat. Sci. Phila., 1859, 108 (New Mexico).—COOP. & SUCKL., P. R. R. Rep., xii, pt. ii, 1860, 211, pl. xxiii.—HAYD., Trans. Am. Phil. Soc., xii, 1862, 171.—STEV., U. S. Geol. Surv. Terr., 1870, 465.—ALLEN, Bull. Mus. Comp. Zoöl., 1872, 178 (Kansas; Utah).—COUES, Key N. A. Birds, 1872, 162.—SNOW, Birds Kan., 1872, 12.—HOLD., Proc. Bost. Soc. Nat. Hist., 1872, 203.—BD., BREW., & RIDG., N. A. Birds, ii, 1874, 243, pl. xxxvii, f. 5.—YARROW & HENSHAW, Rep. Orn. Specs., 1872, Wheeler's Exped., 1874, 20.—HENSHAW, An. Lyc. Nat. Hist. N. Y., xi, 1874, 7.—*Id.*, An. List Birds Utah, 1872, Wheeler's Exped., 1874, 46.—ALLEN, Proc. Bost. Soc. Nat. Hist., June, 1874, 16, 31.—COUES, Birds Northwest, 1874, 206.

Comparatively rare in Utah; met with only at Provo, where a number were seen at different times. Said by the settlers to have appeared within a few years.

At Camp Apache, Ariz., in November of past season, I was somewhat

surprised at hearing the familiar *caw, caw*, of these birds; and subsequent investigation revealed the fact that they were quite numerous, associating freely with, and apparently the boon companions of, the ravens. Yet, even here, I found that they had lost little of their traditional shyness, and it was some time ere I procured a specimen. Gun in hand, I found no difficulty in approaching the trees where sat the ravens, looking down upon me with a comical glance of wonder, tinged with a slight suspicion that all was not just as it should be. But the crows had long before taken the alarm, and made themselves scarce, and from some secure perch sent back their warning *caws*, given, as it appeared to me, with more than the usual earnestness, as though deprecating the stupidity of their big cousins. When I did succeed in obtaining a shot, the ravens appeared thunderstruck at the unusual sight of a disabled comrade, and, sallying from their perches, came flocking about the body of their fallen friend, evincing their sympathy in dismal croakings. In the neighboring mountains I saw several at this season at an elevation of 10,000 feet, and was told by a settler that they were found here through the summer, and that the Indians knew them as Rain Crows in distinction from the raven, believing that they foretold the coming of rain by their notes. Mr. C. E. Aiken also obtained a young bird in New Mexico; and its occurrence throughout the Middle and Southern Region in greater or less numbers is probable.

No.	Sex.	Locality.	Date.	Collector.	Wing.	Tail.	Bill.	Tarsus.
221	Jun.	Mouth of Navajo Creek, N. Mex.	Sept. 11, 1874	C. E. Aiken .....	.....	.....	.....	.....
1046	♀ ad.	Camp Apache, Ariz....	Oct. 21, 1874	H. W. Henshaw.....	.....	.....	.....	.....
1055	♀ ad.	..... do	Oct. 29, 1874	.....do .....	.....	.....	.....	.....

PICICORVUS COLUMBIANUS (Wils.).

Clarke's Crow.

Corvus columbianus, WILS., Am. Orn., iii, 1811, ii, 29, pl. xx.

Picicorvus columbianus, NEWB., P. R. R. Rep., vi, 1857, 83.—*Picicorvus columbranus* (sic), BD., Ives' Col. Exped., 1857-58, pt. iv, 6.—*Id.*, Birds N. A., 1858, 573, 925.—XANTUS, Proc. Acad. Nat. Sci. Phila., 1859, 192 (Fort Tejon, Cal.).—

KENNERLY, P. R. R. Rep., Whipple's Route, x, 1859, 32.—HENRY, Proc. Acad. Nat. Sci. Phila., 1859, 108 (New Mexico).—COOP. & SUCKL., P. R. R. Rep., xii, pt. ii, 1860, 212.—HAYD., Trans. Am. Phil. Soc., xii, 1862, 171.—COUES, Proc. Acad. Nat. Sci. Phila., 1866, 91 (Fort Whipple, Ariz.).—COOPER, Birds Cal., i, 1870, 289.—STEV., U. S. Geol. Surv. Terr., 1870, 465.—ALLEN, Bull. Mus. Comp. Zoöl., 1872, 178.—COUES, Key N. A. Birds, 1872, 162, f. 104.—HOLD. *apud* AIKEN, Proc. Bost. Soc. Nat. Hist., 1872, 203.—BD., BREW., & RIDG., N. A. Birds, ii, 1874, 255, pl. xxxviii.—YARROW, Rep. Orn. Specs., 1871, Wheeler's Exped., 1874, 35.—YARROW & HENSHAW, Rep. Orn. Specs., 1872, Wheeler's Exped., 1874, 20.—HENSHAW, An. Lyc. Nat. Hist. N. Y., xi, 1874, 7.—*Id.*, An. List Birds Utah, 1872, Wheeler's Exped., 1874, 46.—*Id.*, Rep. Orn. Specs., 1873, Wheeler's Exped., 1874, 83, 122.—COUES, B. Northw., 1874, 207.—COUES, Ibis, 1872, 52 (biography).

At all seasons, Clarke's Crow is an inhabitant of the high mountainous districts of the West; it being found, it is said, never lower than 3,000 feet, and its home extending upward, according to the season, to at least 12,000 feet, at which altitude it has been noted by our parties in summer on several occasions. Between these extremes, it is everywhere to be met with; and though showing, so far as I have noticed, no special preference for locality, it appears to shun the interior of the dense pine forests, and to be most numerous in the more open, broken, and rugged tracts, less heavily timbered, on the mountain sides. Its habits vary very much according to the nature of its surroundings, and the character of the food it may chance to be in search of when under observation. Dr. Coues mentions its habit of hammering on the dead limbs precisely like a woodpecker, "the loud rattling being audible at a great distance." This has not been, I believe, the experience of any other observer, though I can confirm it in part, as I have several times been misled by the sound of a vigorous hammering on a dry branch, and on looking for the supposed woodpecker have found Clarke's Crow busily at work, hammering to fragments one of the seeds of the conifers, of which they are so fond. If in habits they resemble the crows, jays, and woodpeckers, possessing in part certain peculiarities of each, their notes are their own, and the succession of hoarse rattling notes which the bird utters as it moves about is mistakable for that of no other bird.

In 1872, not observed until September 8, when a pair were noticed at Otter Creek, Middle Utah. From this time until the middle of October, it was seen almost daily, singly and in flocks. It was invariably on the wing,

flying from side to side of the mountains, generally to the numerous cedars, and uttering its peculiar notes. Its flight is undulatory, and bears much resemblance to that of the woodpecker tribe.

During the latter part of May, 1873, I met with this species once or twice in the neighborhood of Baldy Peak, ten miles from Fort Garland. They appeared very uneasy, flying about and alighting on the high pine stubs; but their extreme shyness rendered it impossible to approach within satisfactory observing distance. As the previous year in Utah, where this was an abundant species, their shyness and habit of constantly moving from place to place made all attempts to even procure a specimen fruitless, my surprise may be imagined when, on visiting the summer cavalry camp established on the Rio Grande, I found these birds regular daily visitors about camp, exhibiting the same confiding familiarity as does the well known Canada Jay or Whisky Jack (*Perisoreus canadensis*) of the North in the lumberman's camp. Early in the morning, their well known hoarse, rattling cries proclaimed their presence, as they flew down from the tops of the high pine clothed ridges, where at night they always retired to roost. So tame had they become that they would frequently alight on the ground, or the low branch of a tree, but a few feet distant from the lookers-on; and on one occasion a fearless individual was seen to enter a tent. On the ground, their motions appeared somewhat awkward, and they were only perfectly at home when among the pine trees, in a small grove of which the tents were pitched. They eagerly seized upon any of the refuse thrown away by the cook, and scraps of meat were readily taken; these, if too large to be swallowed, were carried up to the nearest horizontal limb, and vigorously hammered till reduced to proper fragments. The corn and grain scattered about by the horses when feeding were also special objects of attention. They were rather quarrelsome; and, when a contented croak betrayed the finder of some tidbit, a number instantly made a rush for the fortunate possessor, and both pursuers and pursued would disappear among the pines. I have little doubt that they nest in the cavities of trees, as one was seen to enter a hole, which contained apparently the remains of an old nest. Young birds taken in June are easily distinguished from the old by the general hoariness of the plumage. In these, the bluish ash is replaced to a

great extent by a plumbeous white, becoming almost pure white about the throat.

No.	Sex.	Locality.	Date.	Collector.	Wing.	Tail.	Bill.	Tarsus.
.....	Ad.	Nevada	July —, 1871	F. Bischoff .....	.....	.....	.....	.....
190	♂ ad.	Near Fort Garland, Colo	May 29, 1873	H. W. Henshaw	7. 25	4. 92	1. 66	1. 38
309	♂ ad.	Rio Grande, Colo	June 10, 1873	..... do	7. 75	4. 81	1. 65	1. 40
310	♂ ad.	..... do .....	..... do .....	..... do	7. 37	4. 87	1. 32	1. 40
314	♂ jun.	..... do	June 11, 1873	..... do	7. 18	4. 68	1. 30	1. 35
315	♂ jun.	..... do .....	..... do .....	..... do	7. 33	4. 49	1. 58	1. 30
316	♀ ad.	..... do .....	..... do .....	..... do	7. 60	4. 65	1. 25	1. 35
317	♂ jun.	..... do .....	..... do .....	..... do	7. 70	4. 70	1. 60	1. 33
343	♀ jun.	..... do	June 14, 1873	..... do	7. 10	4. 52	1. 28	1. 40
344	♀ jun.	..... do .....	..... do .....	..... do	7. 20	4. 50	1. 24	1. 43
54	♂ ad.	White Mountains, Ariz.	Aug. 20, 1873	Dr. C. G. Newberry...	7. 38	4. 60	1. 57	1. 43
216	♂	Rio Blanco, Colo	Sept. 9, 1874	C. E. Aiken .....	.....	.....	.....	.....
327	♀	Huerfano River, Colo..	Oct. 7, 1874	..... do .....	.....	.....	.....	.....

GYMNOKITTA CYANOCEPHALA, Maxim.

Maximillian's Jay.

Gymnorhinus cyanocephalus, MAXIM., Reise in das innere Nord-Amer., ii, 1841, 21.
Gymnokitta cyanocephala, CASS., Birds Cal. & Texas, i, 1854, 165, pl. 28.—NEWB., P. R. R. Rep., vi, 1857, 83.—BD., Birds N. A., 1858, 574.—KENNERLY, P. R. R. Rep., Whipple's Route, x, 1859, 32.—HENRY, Proc. Acad. Nat. Sci. Phila., 1859, 108 (New Mexico).—COUES, Proc. Acad. Nat. Sci. Phila., 1866, 91 (Fort Whipple, Ariz.).—COOPER, Birds Cal., i, 1870, 292.—COUES, Key N. A. Birds, 1872, 163.—AIKEN, Proc. Bost. Soc. Nat. Hist., 1872, 204.—BD., BREW., & RIDG., N. A. Birds, ii, 1874, 260, pl. xxxviii, f. 2.—YARROW, Rep. Orn. Specs., 1871, Wheeler's Exped., 1874, 35.—YARROW & HENSHAW, Rep. Orn. Specs., 1872, Wheeler's Exped., 1874, 21.—HENSHAW, An. Lyc. Nat. Hist. N. Y., xi, 1874, 7.—*Id.*, An. List Birds Utah, 1872, Wheeler's Exped., 1874, 46.—*Id.*, Rep. Orn. Specs., 1873, Wheeler's Exped., 1874, 84, 122.—COUES, Birds Northwest, 1874, 209.—COUES, Ibis, 1872, 152 (biography).
Cyanocorax cassini, MCCALL, Proc. Acad. Nat. Sci. Phila., 1851, 216.

Common in mountains and foot hills of Nevada and Utah in the vicinity of cedars, the gum of which was found adhering to the feathers. At the season when taken, September until December, strictly gregarious.

This curious jay seems to be as eminently gregarious during the summer months as later in the fall and winter. I frequently saw them flying from place to place in search for food, always keeping up their harsh, quer-

ulous notes, which, though somewhat jay-like, are yet peculiar to this bird. They seem to shun the dense pine forests, and keep in the open, hilly country, where they always are found among the piñons and cedars.

A large flock of these birds were seen near Silver City, N. Mex., October, busily engaged on the ground feeding upon grass seeds. Those in the rear kept flying up and alighting in the front rank, the whole flock thus keeping in continual motion. Near Tulerosa, late in November, I found the species an abundant one, and chiefly frequenting the pinicoline trees. Their habits here, however, seemed to imply a scarcity of their favorite food, which is the various seeds of the coniferous trees, for I saw a large flock engaged in catching insects on the wing, and in this novel occupation they displayed no little dexterity. From the tops of the pine trees, they ascended to a considerable height, when, hovering for an instant, they would snap up an insect and return to near the former position, remain for a moment, and again make an essay.

The following account is from the pen of Mr. Aiken: "A curious bird, bearing little resemblance to the jays proper, except in color, and in some of its notes, but being closely allied to the crows in its actions and many of its habits. Upon the ground, every motion is corvine, its stately gait particularly; but its flight is much like that of the robin, and when on the trees engaged in extracting the pine cones, it mimics the Crossbill, leaning far over and sometimes hanging feet upward in its efforts to reach its food. They are at all times gregarious, but particularly so in autumn, when several hundreds sometimes congregate together. To find these jays in the larger forests would be as remarkable as to see them on the open plains; the piñon and cedar hills are the only places where they seem to be at home, and one seldom finds them elsewhere. In fall and winter, the nuts of the piñon and black pine form their principal food; and, in summer, they subsist upon insects and various seeds. I have also known them when very hungry to eat scraps of meat with great gusto. In early autumn, before the frost has released the pine seeds from the cones, the birds are obliged to extract them; but, later in the season, the birds feed almost entirely upon the ground. In the latter case, they are very noisy and restless; the rear birds in the flock continually rising and flying over the others to the front,

and in this manner the whole flock, which is often scattered along the ground for fifty or seventy-five yards, moves as fast as a man can walk. An attempt to shoot specimens from one of these feeding flocks by approaching from the rear is generally unsuccessful, owing to the shyness of the birds, and the rapidity with which they move. I prefer rather to come upon them from the side, or, better still, to run to the front, and lie in wait for them, in which case I usually get in two or three shots before they can retreat. The report of a gun creates a great commotion in the flock, and sends every member of it with a wild scream to the tallest trees, whence they will all rise, and fly together to some distant retreat. This way of flying in a compact flock is always practiced if a long flight is to be taken; but if merely passing from one hill, or from one grove, to another, they straggle along, two or three or a dozen at a time.

"At Fort Garland, Colo., in October, 1874, I saw probably a hundred of these birds in a dense, rounded mass, performing evolutions high in the air, which I had never before known them to do; sweeping in wide circles, shooting straight ahead, and wildly diving and whirling about, in precisely the same manner that our common wild pigeons do when pursued by a hawk. This singular performance, with intervals of rest in the piñons behind the fort, was kept up for about two hours, apparently for no other purpose than exercise."

No.	Sex.	Locality.	Date.	Collector.	Wing.	Tail.	Bill.	Tarsus.
...	Jun.	Nevada	Sept. 8, 1871	F. Bischoff .....	.....	.....	.....	.....
285	♀ ad.	Beaver, Utah	Sept. 24, 1872	Dr. H. C. Yarrow and H. W. Henshaw.	.....	.....	.....	.....
86	♀ ad.	..... do .....	..... do .....	..... do .....	.....	.....	.....	.....
87	♂ ad.	..... do .....	..... do .....	..... do .....	.....	.....	.....	.....
88	♂ ad.	..... do .....	..... do .....	..... do .....	.....	.....	.....	.....
376	♂ ad.	..... do	Oct. 31, 1872	..... do .....	.....	.....	.....	.....
77	♂ ad.	..... do .....	..... do .....	..... do .....	.....	.....	.....	.....
78	♀ ad.	..... do .....	..... do .....	..... do .....	.....	.....	.....	.....
79	♂ ad.	..... do	Nov. 3, 1872	..... do .....	.....	.....	.....	.....
147	♀ ad.	Fort Garland, Colo.	May 26, 1873	H. W. Henshaw	5.63	4.33	1.25	1.35
32	♀ jun.	Fort Wingate, N. Mex.	July 16, 1873	Dr. C. G. Newberry...	5.80	4.46	1.28	1.40
249	♂ ad.	Tierra Amarilla, N. Mex	Sept. 5, 1874	C. E. Aiken	6.31	4.88	1.50	1.52
250	♀ ad.	..... do .....	..... do .....	..... do	6.52	4.72	1.39	1.40

PICA MELANOLEUCA, Vieill., var. HUDSONICA, (Sab).

Magpie.

Corvus hudsonica, SAB., App. Narr. Franklin's Journey, 1823, 25, 671.

Pica hudsonica, WOODH., Sitgreave's Exp. Zuñi & Col. Riv., 1854, 77.—NEWB., P. R. R. Rep., vi, 1857, 84.—BD., P. R. R. Rep., Beckwith's Route, 3, 1857, 14.—BD., Birds N. A., 1858, 576.—KENNERLY, P. R. R. Rep. Whipple's Route, 1859, 32.—COOP. & SUCKL., P. R. R. Rep., xii, pt. ii, 1860, 213, pl. xxv.—HAYD., Trans. Am. Phil. Soc., xii, 1862, 171.—COUES, Proc. Acad. Nat. Sci. Phila., 1866, 93.—COOPER, Birds Cal., i, 1870, 296.—STEV., U. S. Geol. Surv. Terr., 1870, 465.—SNOW, Birds Kan., 1872, 12.—MERRIAM, U. S. Geol. Surv. Terr., 1872, 687 (Idaho).—HOLD. *apud* AIKEN, Proc. Bost. Soc. Nat. Hist., 1872, 204.

Pica melanoleuca var. *hudsonica*, COUES, Key N. A. Birds, 1872, 164, f. 106.—YARROW & HENSHAW, Rep. Orn. Specs., 1872, Wheeler's Exped., 1874, 20.—HENSHAW, An. Lyc. Nat. Hist. N. Y., xi, 1874, 7.—*Id.*, An. List Birds Utah, 1872, Wheeler's Exped., 1874, 46.—*Id.*, Rep. Orn. Specs., 1873, Wheeler's Exped., 1874, 65, 84, 123.—COUES, Birds Northwest, 1874, 211.

Pica caudata var. *hudsonica*, ALLEN, Bul. Mus. Comp. Zoöl., 1872, 178 (Western Kansas, etc.).—BD., BREW., & RIDG., N. A. Birds, ii, 1874, 266, pl. xxxviii, f. 1.—ALLEN, Proc. Bost. Soc. Nat. Hist., June, 1874, 31.

The Magpie is a common resident of Utah and Colorado, where it inhabits the lower portions of the mountains, the valleys, and the plains, where the streams issue out upon them, and afford in the brush and thickets of their banks an attractive home. Like most of the birds of this family, their insatiable appetite renders almost everything that falls in their way a tempting morsel. Insects, seeds, acorns, and offal form their diet; chance more than anything else determining its nature. About the slaughter house, they may always be found, and occasionally they become the veriest sort of camp thieves, penetrating to the innermost part of the camp in search of scraps of meat. Its voice is singularly flexible, and capable of producing a variety of sounds, from the guttural chuckle to the softest whistle.

On the Huerfano River, Colorado, May 22, this species was very common, and many of their nests were seen among the thick branches of the small trees, usually about twenty feet from the ground. These are clumsy, dome-like structures, made of coarse sticks; the bottom of the nest being lined with mud. The birds enter through a small hole left in the side, which is scarcely to be seen from the ground. One nest contained seven nearly fledged young, and as I was climbing up to examine the structure,

alarmed, they clambered out, and after clinging to the sides of the nest till I had nearly reached them, they one after another launched themselves out, and soon tumbled to the ground. Meantime the parent birds made their appearance, and their cries of rage soon brought at least a dozen birds to their assistance. The whole colony kept flying around my head, screaming and scolding, and exhibiting the utmost rage; nor did they cease their outcries and efforts to distract my attention till they had accompanied me well away from the neighborhood.

A single Magpie in nesting plumage was shot by Dr. Newberry at the Rio Puerco, sixty miles west of Fort Wingate, N. Mex. Farther south than this the species was not met with; and, if occurring in Eastern and South-eastern Arizona, it must, I think, be rare.

No.	Sex.	Locality.	Date.	Collector.	Wing.	Tail.	Bill.	Tarsus.
112	♂ jun.	Fountain Green, Utah.	Aug. 20, 1872	H. W. Henshaw.....	.....	.....	.....	.....
302	♀ jun.	North Creek, Utah....	Sept. 26, 1872	H. W. Henshaw and Dr. H. C. Yarrow.	.....	.....	.....	.....
411	♀ jun.	Fillmore, Utah.....	Nov. 16, 1872	..... do .....	.....	.....	.....	.....
37	Jun.	Pueblo, Colo	July 27, 1874	C. E. Aiken .....	.....	.....	.....	.....
137	Jun.	Fort Garland, Colo....	Aug. 11, 1874	..... do .....	.....	.....	.....	.....

CYANURUS STELLERI (Gm.), var. MACROLOPHA, Bd.

Long-crested Jay.

Cyanura macrolopha, BD., Proc. Acad. Nat. Sci. Phila., vii, June, 1854, 118 (Albuquerque).—*Id.*, Birds N. A., 1858, 582.—HENRY, Proc. Acad. Nat. Sci. Phila., 1859, 108 (New Mexico).—HAYD., Trans. Am. Phil. Soc., xiii, 1862, 171.—KENNERLY, P. R. R. Rep., Whipple's Route, 1859, 132.—COOPER, Birds Cal., i, 1870, 300.—COUES, Proc. Acad. Nat. Sci. Phila., 1866, 92 (Fort Whipple, Ariz.).—STEV., U. S. Geol. Surv. Terr., 1870, 465.—AIKEN, Proc. Bost. Soc. Nat. Hist., 1872, 205.—MERRIAM, Proc. Bost. Soc. Nat. Hist., 1872, 688.—YARROW, Rep. Orn. Specs., 1871, Wheeler's Exped., 1874, 35.

Cyanura stelleri var. *macrolophus*, ALLEN, Bull. Mus. Comp. Zoöl., 1872, 178 (Colorado; Wyoming; Utah).—COUES, Key N. A. Birds, 1872, 165, 107.—YARROW & HENSHAW, Rep. Orn. Specs., 1872, Wheeler's Exped., 1874, 20.—HENSHAW, An. Lyc. Nat. Hist. N. Y., xi, 1874, 7.—*Id.*, An. List Birds Utah, 1872, Wheeler's Exped., 1874, 46.—*Id.*, Rep. Orn. Specs., 1873, Wheeler's Exped., 1874, 123.—BD., BREW., & RIDG., N. A. Birds, ii, 1874, 281, pl. xxi, f. 3.—COUES, Birds Northwest, 1874, 214.

This bird has been met with by our parties in all portions of Utah and Colorado, in which Territories it is more abundant than in the lower

portions of Arizona and New Mexico, though by no means wanting in these districts.

It is one of the characteristic birds of the western woods, conspicuous for its beautiful plumage and its loud, peculiar notes. In habits, it is largely, though not exclusively, pinicoline, being found throughout the heavy pine timber of the mountainous districts. It was observed to be numerous in such localities, both in Arizona and New Mexico. Like others of the family, it is gifted with considerable curiosity, which is rarely sufficient to overcome its naturally suspicious disposition. During the fall, they move about in small parties of six or eight, and spend considerable time on the ground, hunting after seeds, acorns, and berries, which supplement at this season their usual fare, consisting of the seeds of coniferous trees. I have often come suddenly upon a party when thus silently and busily engaged, not less to my own than to their surprise. A single note was sufficient to alarm the flock, when they would fly to the nearest tree, and watch every motion with evident interest, keeping up a constant chattering and screaming. Their natural distrust, however, would soon induce them to place a wider interval between us, and to approach a second time would have been no easy matter.

On the Rio Grande, Colorado, they daily visited our camp in numbers, contending with Clarke's Crows for the scraps of refuse food.

No.	Sex.	Locality.	Date.	Collector.	Wing.	Tail.	Bill	Tarsus.
....	♂ ad.	Arizona.....	Nov. 20, 1871	F. Bischoff.....	.....	.....	.....	.....
....	♂ ad.	..... do .....	..... do .....	..... do .....	.....	.....	.....	.....
5	♀ jun.	Provo Cañon, Utah....	July 31, 1872	H. W. Henshaw.....	.....	.....	.....	.....
462	♂ ad.	..... do	Nov. 30, 1872	H. W. Henshaw and Dr. H. C. Yarrow.	.....	.....	.....	.....
200	♂	Near Fort Garland, Colo	May 31, 1873	H. W. Henshaw.....	5.62	5.54	1.13	1.65
261	♂ ad.	..... do	June 5, 1873	..... do	5.86	5.58	1.17	1.65
33	♂ ad.	Georgetown, Colo.....	June —, 1873	Dr. J. T. Rothrock....	6.05	5.72	1.14	1.71
33A	♂ ad.	N. Fork of Platte, Colo.	July —, 1873	..... do	5.53	5.25	1.04	1.54
689	♂	Apache Mountains, Ariz	Sept. 1, 1873	H. W. Henshaw.....	5.73	5.41	1.17	1.55
753	♀ jun.	South of Camp Apache, Ariz.	Sept. 11, 1873	..... do	5.51	5.37	1.12	1.65
4	.....	..... do .....	..... do	M. N. Maguet.....	5.64	5.40	1.16	1.72
940	♂	Gila River, Ariz	Oct. 17, 1873	H. W. Henshaw.....	5.93	4.43	1.17	1.68
337	♀ ad.	Fort Garland, Colo....	Oct. 12, 1874	C. E. Aiken .....	.....	.....	.....	.....

CYANOCITTA FLORIDANA (Bartr.), var. WOODHOUSEI, Bd.

Woodhouse's Jay.

Cyanocitta woodhousii, BD., Birds N. A., 1858, 585, pl. 59.—*Id.*, Ives' Col. Exped., 1857-58, pt. iv, 6.—*Id.*, U. S. & Mex. Bound. Surv., ii, pt. ii, 1859, Birds, 20.—HENRY, Proc. Acad. Nat. Sci. Phila., 1859, 108 (New Mexico).—COUES, Proc. Acad. Nat. Sci. Phila., 1866, 92 (Fort Whipple, Ariz.).—COOPER, Birds Cal., i, 1870, 304.—STEV., U. S. Geol. Surv. Terr., 1870, 465.—MERRIAM, U. S. Geol. Surv. Terr., 1872, 688 (Ogden, Utah).—AIKEN, Proc. Bost. Soc. Nat. Hist., 1872, 205.—YARROW, Rep. Orn. Specs., 1871, Wheeler's Exped., 1874, 35.

Aphelocoma floridana var. *woodhousei*, ALLEN, Bull. Mus. Comp. Zoöl., 1872, 179 (Colorado; Utah).—COUES, Key N. A. Birds, 1872, 166.—YARROW & HENSHAW, Rep. Orn. Specs., 1872, Wheeler's Exped., 1874, 21.—HENSHAW, An. Lyc. Nat. Hist. N. Y., xi, 1874, 7.—*Id.*, An. List Birds Utah, 1872, Wheeler's Exped., 1874, 46.—*Id.*, Rep. Orn. Specs., 1873, Wheeler's Exped., 1874, 123.—COUES, Birds Northwest, 1874, 219.

Cyanocitta californica var. *woodhousei*, BD., BREW., & RIDG., N. A. Birds, ii, 1874, 291, pl. 40, f. 3.

Cyanocorax californica, WOODH., Sitgreave's Exp. Zuñi & Col. Riv., 1854, 77.

Woodhouse's Jay is a common species through the Middle Region, and to the southward appears to extend beyond the limits of our territory; yet, in Southeastern Arizona and Southwestern New Mexico, it seems in part to be replaced by another species, the Ultramarine Jay (*ultramarina* var. *arizonæ*), the habitats of the two overlapping each other. Like the Florida Jay, which it so much resembles, it is a bird of the thickets, and never chooses its home in the recesses of the deep woods, but lives in the more open regions which are broken up into ravines and clothed with a scrubby vegetation. In fall, it finds an abundance of favorite food among the piñons, moving about among them in small, silent companies. It shares to a much greater extent than usual the terrestrial habits, which are common, to a greater or less degree, among all the members of this family, and, when undisturbed, appears to spend nearly the whole time in searching on the ground, among the roots and under the trees, for such bits as will satisfy its omnivorous appetite. Its natural disposition seems very petulant, and its anger is easily excited. When it finds that its domestic concerns are being pried into it resents the incivility with a great variety of harsh notes, which it expresses as it stands on the top of some commanding position near at hand, and moves from side to side, nodding its head and jerking its long tail, as if to emphasize its vehement scoldings. Mr. Aiken describes the

nest as "composed outwardly of dead twigs, then of fine roots, and lined with fine rootlets and horse hair." The eggs are of a light bluish-green, marked with reddish-brown spots, most numerous at the larger end.

No.	Sex.	Locality.	Date.	Collector.	Wing.	Tail.	Bill.	Tarsus.
260	♂	Fillmore, Utah	Sept. 4, 1872	Dr. H. C. Yarrow .....	.....	.....	.....	.....
147	♂	Gunnison, Utah	Sept. 7, 1872	H. W. Henshaw .....	.....	.....	.....	.....
293	.....	Beaver, Utah	Sept. 25, 1872	Dr. H. C. Yarrow and H. W. Henshaw.	.....	.....	.....	.....
248	♂	Iron City, Utah	Oct. 5, 1872	H. W. Henshaw .....	.....	.....	.....	.....
250	♂	..... do	Oct. 6, 1872	..... do .....	.....	.....	.....	.....
398	♂	Pine Creek, Utah	Nov. 12, 1872	Dr. H. C. Yarrow and H. W. Henshaw.	.....	.....	.....	.....
399	♂	..... do .....	..... do .....	..... do .....	.....	.....	.....	.....
400	♀	..... do .....	..... do .....	..... do .....	.....	.....	.....	.....
401	♂	..... do .....	..... do .....	..... do .....	.....	.....	.....	.....
464	♂	Provo, Utah	Nov. 25, 1872	..... do .....	.....	.....	.....	.....
589	♂ jun.	Camp Apache, Ariz.	Sept. 21, 1873	H. W. Henshaw	4.93	5.71	1.06	1.55
868	♂	Camp Grant, Ariz.	Sept. 24, 1873	..... do	5.35	5.98	1.15	1.60
114	♀	Arizona	Sept. 28, 1873	Dr. C. G. Newberry ..	5.04	5.68	1.11	1.40
351	♂ jun.	Camp Bowie, Ariz.	Aug. 11, 1874	Dr. J. T. Rothrock ..	.....	.....	.....	.....
962	♂	Black River, Ariz. ....	..... do	H. W. Henshaw .....	.....	.....	.....	.....
993	.....	Camp Apache, Ariz. ....	..... do	Dr. J. T. Rothrock ..	.....	.....	.....	.....
1009	♀	..... do .....	..... do	H. W. Henshaw .....	.....	.....	.....	.....
1091	♂	..... do	Aug. 20, 1874	..... do .....	.....	.....	.....	.....
338	♂	Fort Garland, Colo.	Oct. 12, 1874	C. E. Aiken .....	.....	.....	.....	.....
341	♂	Pueblo, Colo .....	..... do .....	..... do .....	.....	.....	.....	.....

CYANOCITTA ULTRAMARINA (Bon.), var. ARIZONAE, Ridg.

Arizona Jay.

PLATE XII.

Cyanocitta sordida, BD., U. S. & Mex. Bound. Surv., ii, pt. ii, 1859, Birds, 21.—COUES, Proc. Acad. Nat. Sci. Phila., 1866, 92 (Fort Buchanan, Dr. Irwin; Copper Mines, J. H. Clark).

Cyanocitta sordida var. *arizonæ*, RIDG., Rep. U. S. Geol. Exp. 40th Par. (in press).—COUES, Key N. A. Birds, 1872, 129.

Cyanocitta ultramarina var. *arizonæ*, BD., BREW., & RIDG., N. A. Birds, ii, 1874, 292, pl. xli, f. 2.

I first saw this species when encamped in a narrow, rocky cañon, thirty miles south of Camp Apache, Ariz. The sides of the cañon and the neighboring heights were well covered with a small species of oak, which were habitually frequented by these birds, the fruit of which doubtless forms a part of their food. They were not very numerous, but appeared to keep in small flocks of from six to twelve. Occasionally they were seen upon the

ground, hunting for seeds, berries, and insects; but the species seems to be rather more arboreal in its habits than any others of the genus with which I am acquainted. The notes are essentially garruline in character, but are surprisingly weak for the size of the bird, which is far less noisy than others of the family. At Camp Grant, they were rather more common, frequenting about the same localities. They were quite shy, showing little or no curiosity, but, on discovering my presence, would immediately make a hasty retreat through the trees, and it was only when thus disturbed that their cries were heard. In New Mexico, I observed the species as far north as Camp Bayard. Hitherto known but from two localities in New Mexico, viz, Fort Buchanan and the Copper Mines. In summer, its northward range is probably limited to about latitude 34° . An immature bird, just moulting the nesting plumage, has the blue of the upper parts mixed with dull-ash. The lower mandible is flesh-colored; the upper mandible flesh-colored at tip.

Bill of adult black; of immature birds black, varied with flesh-color. In this variety, I believe the adult birds always possess the black unicolored bill, while in the young it is variegated.

No.	Sex.	Locality.	Date.	Collector.	Wing.	Tail.	Bill.	Tarsus.
733	♀ jun.	Thirty miles south of Camp Apache, Ariz.	Sept. 11, 1873	H. W. Henshaw.....	6.30	5.91	1.12	1.68
734	♂ jun.	..... do .....	..... do .....	..... do	6.47	6.13	1.23	1.65
757	♂ jun.	..... do	Sept. 12, 1873	..... do	6.72	6.31	1.16	1.62
845	♂ ad.	Camp Grant, Ariz.....	Sept. 24, 1873	..... do	6.82	6.44	1.25	1.56
896	♂ jun.	..... do	Sept. 30, 1873	..... do	6.32	5.88	1.22	1.68
897	♂ jun.	..... do .....	..... do .....	..... do	6.44	5.92	1.25	1.63
185	♂ jun.	Rock Cañon, Ariz.....	July 21, 1874	..... do .....	.....	.....	.....	.....
186	♂ juv.	..... do .....	..... do .....	..... do .....	.....	.....	.....	.....

PERISOREUS CANADENSIS (Linn.), var. CAPITALIS, Bd.

Rocky Mountain Gray Jay.

PLATE XIII.

Perisoreus canadensis, BD., P. R. B. Rep., Beckwith's Route, x, 1857, 14.—HAYD., Rep., 1862, 171.—STEV., U. S. Geol. Surv. Terr., 1870, 463.—ALLEN, Bul. Mus. Comp. Zoöl., 1872, 179 (Colorado; Utah).—MERRIAM, Bul. Mus. Comp. Zoöl., 1872, 689 (Idaho and Wyoming).

Perisoreus canadensis var. *capitalis*, RIDG., Bul. Essex Inst., v, 1874, 199.—BD., BREW., & RIDG., N. A. Birds, ii, 1874, 302, pl. 41, f. 4.—HENSHAW, An. Lyc. Nat. Hist. N. Y., xi, 7.—*Id.*, Añ. List Birds Utah, 1872, Wheeler's Exped., 1874, 46.—COUES, Birds Northwest, 1874, 221.—*Id.*, Check-List, 1874, app. No. 239a.

Common in the pine region near Fort Garland, and also in South Park, where specimens were obtained by Dr. Rothrock. I found old birds feeding their fully fledged young the middle of June. These quite likely were second broods. The habits of this bird seem to correspond closely with those of the eastern ally, *canadensis*. It is very tame, and seems to have no feeling regarding man other than curiosity. It has a great variety of notes, and one which I often heard is a perfect imitation of the Red-tailed Hawk. Mr. Aiken informs me that during the past winter he has seen several of these birds in the streets of Colorado City. They no doubt, impelled by hunger, have been thus led to leave the mountains, and thus seek a subsistence within the busy haunts of man. It is a well known hanger on about the mining towns, and the tent of the prospector and explorer is never pitched in the mountain regions without soon being spied out by the prying eyes of these jays, who immediately place themselves on the most intimate terms with the owner, and careful indeed must he be if he escape without toll being levied upon him in the shape of provisions, which these audacious thieves are always on the alert to bear away the moment occasion offers. It appears to be a resident in the White Mountains of Arizona, where only was it seen by our parties.

No.	Sex.	Locality.	Date.	Collector.	Wing.	Tail.	Bill.	Tarsus.
40	Ad.	Snake River, Colo	June —, 1873	Dr. J. T. Rothrock..	6.09	5.73	0.85	1.43
40 A	.....	..... do	June —, 1873	..... do	5.65	5.58	0.93	1.39
202	♂ ad.	Fort Garland, Colo....	May 30, 1873	H. W. Henshaw	6.10	5.93	0.83	1.36
223	♂ ad.	..... do	June 3, 1873	..... do	5.95	6.06	0.90	1.37
387	♂ jun.	..... do	June 20, 1873	..... do	6.04	5.97	0.83	1.34
65	♀ jun.	South Park, Colo	June 27, 1873	Dr. J. T. Rothrock ..	5.60	5.65	0.88	1.28
65 A	Jun.	..... do .....	..... do .....	..... do	5.90	5.94	0.87	1.43
78	♂ ad.	White Mountains, Ariz	Aug. 27, 1873	Dr. C. G. Newberry.	6.23	5.98	0.90	1.35
110	♀	Sangre de Cristo Pass, Colo.	Aug. 9, 1874	C. E. Aiken .....	.....	.....	.....	.....
111	♂	..... do .....	..... do .....	..... do .....	.....	.....	.....	.....
185	♀	Alamosa Creek, Colo ..	..... do .....	..... do .....	.....	.....	.....	.....
186	♂	..... do .....	..... do .....	..... do .....	.....	.....	.....	.....
187	♀	..... do .....	..... do .....	..... do .....	.....	.....	.....	.....
1012	♀	White Mountains, Ariz	Oct. 17, 1874	J. M. Rutter.....	.....	.....	.....	.....
1023	♀	..... do .....	..... do .....	..... do .....	.....	.....	.....	.....
1024	♂	..... do .....	..... do .....	..... do .....	.....	.....	.....	.....

FAM. TYRANNIDAE: FLYCATCHERS.

TYRANNUS CAROLINENSIS (Linn.).

Kingbird.

Tyrannus carolinensis, TEMM., Tab. Meth., 24.—BD., Birds N. A., 1858, 171.—COOP. & SUCKL., P. R. R. Rep., xii, pt. ii, 1860, 167.—HAYD., Trans. Am. Phil. Soc., xii, 1862, 157.—COOPER, Birds Cal., i, 1870, 311.—STEV., U. S. Geol. Surv. Terr., 1870, 463.—ALLEN, Bul. Mus. Comp. Zoöl., 1872, 179 (Kansas; Colorado; Utah).—COUES, Key N. A. Birds, 1872, 169, pl. 2, figs. 1, 2.—SNOW, Birds Kan., 1872, 6.—HOLD. *apud* AIKEN, Proc. Bost. Soc. Nat. Hist., 1872, 205.—MERRIAM, U. S. Geol. Surv. Terr., 1872, 689 (Idaho).—BD., BREW., & RIDG., N. A. Birds, iii, 1874, 316, pl. 43, f. 4.—YARROW & HENSHAW, Rep. Orn. Specs., 1872, Wheeler's Exped., 1874, 21.—HENSHAW, An. Lyc. Nat. Hist. N. Y., xi, 1874, 7.—*Id.*, An. List Birds Utah, 1872, Wheeler's Exped., 1874, 46.—*Id.*, Rep. Orn. Specs., 1873, Wheeler's Exped., 1874, 65.—ALLEN, Proc. Bost. Soc. Nat. Hist., June, 1874, 16, 17, 31.—COUES, Birds Northwest, 1874, 235.

Tyrannus intrepidus, WOODH., Sitgreave's Exp. Zuñi & Col. Riv., 1854, 73.

The Kingbird has until recently been considered as a characteristic bird only of the Eastern Region. It is now known, however, as shown by the above citations, to occur at many points in the Middle Province, and, indeed, at certain localities it occupies almost as conspicuous a place in the bird fauna as in the Eastern States. Throughout Utah generally, it can scarcely be considered common; yet, at Provo, in July, individuals were nearly if not quite as numerous as the kindred species, the Arkansas Flycatcher; and Mr. Ridgway speaks of it as being nearly or quite as common as that bird in Great Salt Lake Valley and the Wahsatch Mountains. He likewise found it common and breeding on the extreme western edge of the Great Basin in the Truckee Valley, Nevada.

Near Denver, Colo., the species made its appearance May 7, and I noticed that, while the Arkansas Flycatcher resorted to the trees and wooded districts generally, the Kingbird seemed to frequent the more open plain, making its sallies after insects from the tops of the tall weeds. It has not been detected in Arizona or New Mexico, either by our parties or by other observers. It thus probably reaches its western limits by passing northward

up the Mississippi Valley, and availing itself of the Missouri and its tributaries, following them up toward their sources.

No.	Sex.	Locality.	Date.	Collector.	Wing.	Tail.	Bill.	Tarsus.
48	♀ ad.	Provo, Utah.....	July 25, 1872	Dr. H. C. Yarrow and H. W. Henshaw.	.....	.....	.....	.....

TYRANNUS VERTICALIS, Say.

Arkansas Flycatcher.

Tyrannus verticalis, SAY, Long's Exped. Rocky Mts., ii, 1823, 60.—BD., Birds N. A., 1858, 173.—HEERM., P. R. R. Rep., x, pt. iv, 1859, 37.—XANTUS, Proc. Acad. Nat. Sci. Phila., 1859, 190 (Fort Tejon, Cal.).—HENRY, Proc. Acad. Nat. Sci. Phila., 1859, 106 (New Mexico).—COOP. & SUCKL., P. R. R. Rep., xii, pt. ii, 1860, 168.—HAYD., Trans. Am. Phil. Soc., xii, 1862, 157.—COOPER, Birds Cal., i, 1870, 312.—STEV., U. S. Geol. Surv. Terr., 1870, 463.—ALLEN, Bull. Mus. Comp. Zool., 1872, 179 (Kansas, etc.).—COUES, Key N. A. Birds, 1872, 170, figs. 110^a, 112.—AIKEN, Proc. Bost. Soc. Nat. Hist., 1872, 205.—SNOW, Birds Kan., 1872, 6.—MERRIAM, U. S. Geol. Surv. Terr., 1872, 690 (Utah; Idaho).—COUES, Am. Nat., viii, 1874, 599 (Upper Missouri).—YARROW, Rep. Orn. Specs., 1871, Wheeler's Exped., 1874, 35.—YARROW & HENSHAW, Rep. Orn. Specs., 1872, Wheeler's Exped., 1874, 21.—HENSHAW, Rep. Orn. Specs., 1873, Wheeler's Exped., 1874, 65, 101.—*Id.*, An. Lyc. Nat. Hist. N. Y., xi, 1874, 7.—*Id.*, An. List Birds Utah, 1872, Wheeler's Exped., 1874, 46.—BD., BREW., & RIDG., Birds N. A., ii, 1874, 324, pl. 43, f. 2.—ALLEN, Proc. Bost. Soc. Nat. Hist., June, 1874, 17, 31.—COUES, Birds Northwest, 1874, 236.

The numerous citations above show the general distribution of this bird throughout the Middle Region, where it seems to be an abundant species. Entering the Southern Region of New Mexico and Arizona, it begins to be less frequently met with, though at Fort Wingate, in the former Territory, it was by no means uncommon. At Camp Apache, Ariz., it was present in small numbers in September; and, during the past season, I secured, at Camp Grant, a female with a young bird, which indicates that at this, the extreme southern, point of its range, it is a summer resident. It is a bird that compels attention; possessing all the force of action and pugnacity of the Kingbird, while its notes are louder and harsher. In the neighborhood of Denver, Colo., it appears about May 5; and the males at once begin an

incessant warfare, which is carried on with apparently no other object than amusement. Their nests are bulky affairs; resembling those of the Kingbird. One found at Provo was placed on the end of a cottonwood limb overhanging the river, and composed of cottonwood down and grasses, lined with a few hairs. The eggs are indistinguishable from those of the common Kingbird. By the latter part of July, the young are generally able to fly.

No.	Sex.	Locality.	Date.	Collector.	Wing.	Tail.	Bill.	Tarsus.
....	♀ ad.	Nevada	May 25, 1871	F. Bischoff .....	.....	.....	.....	.....
....	Ad.	do	do	do .....	.....	.....	.....	.....
57	♂ ad.	California	July 26, 1871	do .....	.....	.....	.....	.....
70	♀ ad.	do	do	do .....	.....	.....	.....	.....
103	♂ ad.	do	July 27, 1871	do .....	.....	.....	.....	.....
104	do	do	do	do .....	.....	.....	.....	.....
....	♂ ad.	do	Aug. 16, 1871	do .....	.....	.....	.....	.....
....	Jun.	Nevada	Sept. 14, 1871	do .....	.....	.....	.....	.....
58	♂ ad.	Denver, Colo.	May 12, 1873	H. W. Henshaw	5.27	4.00	0.75	0.77
63	♂ ad.	do	do	do	5.23	4.20	0.78	0.75
76	♂ ad.	do	do	do	5.30	4.11	.....	0.77
77	♂ ad.	do	May 13, 1873	do	5.20	4.07	0.80	0.75
78	♀ ad.	do	do	do	4.83	4.90	0.70	0.70
79	♂ ad.	do	do	do	5.07	4.88	0.76	0.75
4	.....	do	June —, 1873	Dr. J. T. Rothrock	5.09	4.21	0.75	0.74
4 A	♂	do	do	do	4.98	3.90	0.73	0.68
702	♀ jun.	Camp Apache, Ariz....	Sept. 6, 1873	H. W. Henshaw	4.55	3.68	0.76	0.76
708	♂ jun.	do	Sept. 7, 1873	do	4.95	3.85	0.78	0.70
217	♂ ad.	Camp Grant, Ariz....	July 29, 1874	do .....	.....	.....	.....	.....
218	♀ jun.	do	do	do .....	.....	.....	.....	.....

TYRANNUS VOCIFERANS, Swains.

Cassin's Flycatcher.

Tyrannus vociferans, SWAINS., Mon. Tyrant Shrikes in Quar. Jour. Sci., xx, Jan., 1826, 273.—BD., Birds N. A., 1858, 174.—*Id.*, U. S. & Mex. Bound. Surv., ii, pt. ii, 1859, Birds, 8.—HENRY, Proc. Acad. Nat. Sci. Phila., 1859, 106 (New Mexico).—COUES, Proc. Acad. Nat. Sci. Phila., 1866, 59 (Fort Whipple, Ariz.).—COOPER, Birds Cal., i, 1870, 314.—COUES, Key N. A. Birds, 1872, 170, f. 110^d.—AIKEN, Proc. Bost. Soc. Nat. Hist., 1872, 205 (El Paso County, Col.).—MERRIAM, U. S. Geol. Surv. Terr., 1872, 690 (Cheyenne, Wyo.).—HENSHAW, Rep. Orn. Specs., 1873, Wheeler's Exped., 1874, 125.—BD., BREW., & RIDG., Birds N. A., ii, 1874, 327, pl. 43, f. 5.—COUES, Birds Northwest, 1874, 238.

Tyrannus cassinii, LAWRE., An. Lyc. Nat. Hist. N. Y., v, 1852, 39, pl. 3, f. 2 (Texas).

The range of this species seems to be in general complementary to that of the preceding bird, occupying its place to the southward, in New Mexico

and Arizona, yet the habitats of the two largely overlap each other. Thus, this flycatcher is given by Mr. C. E. Aiken as a bird of El Paso County, Colorado; this record presenting the most northern locality where it has been taken. Dr. Coues's quotation of Southeast Wyoming, as afforded by Mr. Aiken's notes, is erroneously given, as will be seen on referring to his paper.

I have noted nothing in its habits which is specially different from the manners in general of the Arkansas Flycatcher. It may, perhaps, frequent rather more regularly the open country, as I have seen it much on the sage brush plains, though never very far from the vicinity of timber; and the sides of open, brushy ravines seem to suit its nature well. The breeding habits, nests, and eggs are said to correspond closely with those of *verticalis*. Though found in the same locality, individuals of the two species never meet without displaying their natural enmity. At Camp Grant, my attention being called by the loud outcries of several of these birds, I found that a female and several young of the Arkansas Flycatcher were the objects of a savage assault by a pair of the present species. The mother bird most gallantly stood up and fought for her offspring, repelling each attack with a brave front, and retaliating to the best of her ability. I watched them until I saw that the assailants, having fairly got worsted, were glad to retire, and leave the family to gather together in peace.

Mr. Aiken furnishes the following from his Colorado notes: "This flycatcher arrives in Colorado about the 10th or 12th of May, a week later than its congener, *T. verticalis*. Although these two birds resemble each other so closely in the skin, in life there are marked differences in notes and actions that even a novice cannot fail to notice. *Verticalis* is a nervous, fickle creature, seldom remaining long in one place, and flying with a quick fluttering motion of the wings. It is also exceedingly noisy, its notes being a high pitched clatter. *Vociferans*, on the other hand, is a more matter of fact bird, often sitting quietly for a long time in the same place, and its notes are harsher and less frequently uttered. Its appearance, too, when alive conveys the impression of a heavier, stouter built bird. When migrating, and indeed at other times, it appears to be restricted to the parks of the foothills, alighting upon weed stalks and low bushes, from which it sallies forth occasionally to seize some passing insect. At this season, it is

not often seen among the trees, but later it selects an open piece of woods, and builds its nest in one of the taller pines. This does not differ materially from those of either *T. carolinensis* or *T. verticalis*, but it is a little more neatly and compactly made, and the eggs, I think, are usually larger than those of the other species. All three of these flycatchers may sometimes be found nesting within a short distance of each other, and it is interesting to note the different locations which each selects for its domicile: *carolinensis* usually builds in a crotch, or where a branch springs from the main trunk of the tree; *verticalis* almost invariably builds midway on a horizontal limb; while *vociferans* selects a fork at the extremity of the branch. I have never found but three eggs in the nest of the latter, while the full clutch of the others is four."

No.	Sex.	Locality.	Date.	Collector.	Wing.	Tail.	Bill.	Tarsus.
28	♂ ad.	Fort Wingate, N. Mex.	July 15, 1873	Dr. C. G. Newberry...	5.25	3.91	0.86	0.78
457	♂ ad.	Neutria, N. Mex.	July 19, 1873	H. W. Henshaw.....	5.25	4.01	0.80	0.71
465	♀ jun.	Inscription Rock, N. Mex.	July 23, 1873	..... do	5.13	3.95	0.75	0.75
497	♀ ad.	..... do	July 24, 1873	..... do	5.16	3.90	0.91	0.78
778	♀ jun.	Gila River, Ariz.	Sept. 15, 1873	..... do	4.93	3.96	0.79	0.76
793	♀ ad.	..... do	Sept. 16, 1873	..... do	4.92	3.81	0.79	0.75
8 A	♂	Mount Turnbull, Ariz..	Sept. 20, 1873	M. N. Maguet.....	5.14	3.85	0.87	0.78
609	♀	..... do	Sept. 21, 1873	H. W. Henshaw.....	5.15	3.95	0.83	0.75
600	.....	Camp Crittenden, Ariz.	July 4, 1874	Dr. J. T. Rothrock....	.....	.....	.....	.....
601	.....	..... do .....	..... do .....	..... do .....	.....	.....	.....	.....
644	♀ ad.	..... do	July 10, 1874	..... do .....	.....	.....	.....	.....
89	♂ ad.	Willow Spring, Ariz....	July 12, 1874	H. W. Henshaw.....	.....	.....	.....	.....
153	♀ ad.	Tanks, Ariz.	July 19, 1874	..... do .....	.....	.....	.....	.....
154	♂ jun.	..... do .....	..... do .....	..... do .....	.....	.....	.....	.....
201	♂	Arkansas Creek, Ariz..	July 22, 1874	..... do .....	.....	.....	.....	.....
219	♀ ad.	Camp Grant, Ariz.	July 29, 1874	Dr. J. T. Rothrock....	.....	.....	.....	.....

MYIARCHUS CRINITUS (Linn.), var. CINERASCENS, Lawr.

Ash-throated Flycatcher.

- Tyrannula cinerascens*, LAWRE., An. Lyc. Nat. Hist. N. Y., v, Sept., 1851, 109.—NEWB., P. R. R. Rep., vi, 1857, 81.
- Myiarchus cinerascens*, COUES, Key N. A. Birds, 1872, 171.—*Id.*, Birds Northwest, 1874, 239.—*Id.*, Proc. Acad. Nat. Sci. Phila., 1872, 69 (monographic).
- Myiarchus crinitus* var. *cinerascens*, BD., BREW., & RIDG., N. A. Birds, ii, 1874, 337, pl. 43, f. 6.—HENSHAW, An. Lyc. Nat. Hist. N. Y., xi, 1874, 7.—*Id.*, An. List Birds Utah, 1872, Wheeler's Exped., 1874, 46.—*Id.*, Rep. Orn. Specs., 1873, Wheeler's Exped., 1874, 125.

Myiarchus mexicanus, BD., Ives' Col. Exped., 1857-58, pt. iv, 5.—BD., Birds N. A., 1858, 179 (*nec* Kaup.; *nec* Lawr., An. Lyc., ix, 1869, 202).—HEERM., P. R. R. Rep., x, pt. iv, 1859, 37, pl. v.—XANTUS, Proc. Acad. Nat. Sci. Phila., 1859, 190 (Fort Tejon, Cal.).—BD., U. S. & Mex. Bound. Surv., ii, pt. ii, 1859, Birds, 8.—COUES, Proc. Acad. Nat. Sci. Phila., 1866, 59 (Fort Whipple, Ariz.).—*Id.*, *ib.*, 1868, 82.—COOPER, Birds Cal., i, 1870, 316.—AIKEN, Proc. Bost. Soc. Nat. Hist., 1872, 205 (El Paso County, Colo.).

Myiarchus mexicanus var. *pertinax*, BD., Proc. Acad. Nat. Sci. Phila., 1859 303 (Cape Saint Lucas).

Having a distribution nearly coincident with that of the preceding species, though extending somewhat farther to the north into Utah, Nevada, and Colorado. It is less abundant than the preceding, and inhabits much the same style of country, affecting rough, rocky country sparsely wooded, or the brushy creek bottoms, even extending its range out to a considerable distance on the dry plains.

No.	Sex.	Locality.	Date.	Collector.	Wing.	Tail.	Bill.	Tarsus.
438	♂ ad.	Fort Wingate, N. Mex.	July 15, 1873	H. W. Henshaw.....	4.00	3.94	0.75	0.88
33	♀ ad.	Fort Wingate, N. Mex.	July 16, 1873	Dr. C. G. Newberry ..	3.73	3.62	0.73	0.89
447	♀ ad.	..... do .....	..... do	H. W. Henshaw.....	3.75	3.69	0.77	0.85
475	♀ jun.	Inscription Rock, N. Mex.	July 23, 1873	..... do	3.67	3.64	0.70	0.87
147	♀ jun.	Camp Apache, Ariz.	July 17, 1874	..... do .....	.....	.....	.....	.....
148	♂ jun.	..... do .....	..... do .....	..... do .....	.....	.....	.....	.....
346	♂	Camp Bowie, Ariz.	Aug. 10, 1874	Dr. J. T. Rothrock....	.....	.....	.....	.....
554	.....	Camp Crittenden, Ariz.	Aug. 30, 1874	H. W. Henshaw.....	.....	.....	.....	.....

MYIODYNASTES LUTEIVENTRIS, Bon.

Yellow-bellied Flycatcher.

PLATE XIV.

Tyrannus audax, SCLAT., Proc. Zoöl. Soc., 1856, 297.

Myiodynastes luteiventer, BON., Compt. Rend., xxviii, 659.—SCLAT., Proc. Zoöl. Soc., 1859, 43, 45, 56, 366, 383.—*Id.*, Ibis, 1859, 438.—SCLAT. & SALV., Ibis, 1859, 120.—CARAN. & HEINE, Mus. Hein., ii, 75.—SCLAT., Cat. A. B., 1861, 223.

Above dull ash-gray, becoming white on the forehead; each feather with a median streak of black; crown with a central concealed patch of gamboge-yellow; wings dusky, the coverts and secondaries being edged with whitish, the primaries more narrow, with yellowish olive; upper tail-coverts and tail brick-rufous, each feather with a median stripe of clear dusky, those of the tail-feathers widest. Throat white; rest of lower parts sulphur-yellow; sides of the throat, across the whole breast, and along the sides, longitudinally streaked with dusky-black, these widest across the breast, and coalesced into a broad, nearly uniform stripe alongside of throat. Ear-coverts and lores dusky, bordered above by an indistinct superciliary and below by a wider and

better defined supramaxillary stripe of dull white. Bill and feet black, the base of the lower mandible paler. Wing, 4.50; tail, 3.80; culmen, 0.90; tarsus, 0.75; tarsus, 0.70.

HAB.—Mexico to Costa Rica; Arizona (Henshaw).

This peculiar flycatcher appears to be a summer resident of the Chiricahua Mountains, Southern Arizona, where I obtained a pair of old birds, together with three young, August 24. These, though indistinguishable in size and perfection of plumage from the adult pair, were still the objects of their solicitous care, and were dependent upon them for food. Indeed, their presence might have remained unnoticed by me, had I not been greeted, as I entered the mouth of one of the deep, narrow cañons intersecting the mountains in every direction, by the shrill notes and angry cries of the old birds, who hovered in the air at a short distance, or flew restlessly from tree to tree, endeavoring to distract my attention from the young, till taking the alarm, they flew over into an adjoining ravine, where soon after I found the whole family assembled, the old birds having immediately rejoined their charges. The following day, Dr. Rothrock, while out botanizing, saw what he supposed to be a second family of six or seven of these birds, so that the occurrence of the species here is probably to be regarded as by no means accidental. This region may form its northern limit.

No.	Sex.	Locality.	Date.	Collector.	Wing.	Tail.	Bill.	Tarsus.
476	♂ ad.	Chiricahua Mts., Ariz..	Aug. 24, 1874	H. W. Henshaw	4.54	3.58	0.95	0.78
477	♀ ad.	..... do .....	..... do .....	..... do	4.50	3.48	0.92	0.80
488	♂ jun.	..... do .....	..... do .....	..... do	4.43	3.45	0.80	0.82
489	♂ jun.	..... do .....	..... do .....	..... do	4.39	3.43	0.87	0.77

SAYORNIS NIGRICANS (Swains.).

Black Flycatcher.

Tyrannula nigricans, SWAINS., Syn. Birds Mex., Taylor's Phil. Mag., i, 1827, 367.—NEWB., P. R. R. Rep., vi, 1857, 81.

Sayornis nigricans, BD., U. S. & Mex. Bound. Surv., ii, pt. ii, 1859, Birds, 8.—KENNERLY, P. R. R. Rep., Whipple's Route, x, 1859, 23.—HEERM., P. R. R. Rep., x, pt. iv, 1859, 38.—XANTUS, Proc. Acad. Nat. Sci. Phila., 1859, 190 (Fort Tejon, Cal.).—BD., Proc. Acad. Nat. Sci. Phila., 1859, 303 (Cape Saint Lucas).—HENRY, Proc. Acad. Nat. Sci. Phila., 1859, 106 (New Mexico).—COUES, Proc. Acad. Nat. Sci. Phila., 1866, 60 (not at Whipple).—HENSHAW, Rep. Orn. Specs., 1873, Wheeler's Exped., 1874, 125.

The habitat of this flycatcher upon the West Coast appears to extend much farther to the north than in the Interior; it there seeming to scarcely reach the Middle Region at all, while it is cited by a number of observers as common in California, and as even occurring in Oregon. In Southern Arizona and New Mexico it is rather numerous, probably occurring in as great abundance there as anywhere. No one acquainted with the appearance and habits of the Pewee of the Eastern States, familiar as its presence is about the barns and outbuildings of the farms, building beneath the eaves, and pursuing its prey with broad sweeps and rapid circlings to the very doors of the houses, could fail to recognize in this bird the close relationship of the two species. In the settled districts, it quickly learns to modify its primitive habits, and to take advantage of the conditions which it finds surrounding man. In the region, however, where I have most observed it, civilization has as yet made few encroachments, and the habits of the bird are here unchanged. It seems to have a constant predilection for the neighborhood of water, being found both on the running streams and about stagnant pools. Here it finds an abundance of insects, and in pursuit of these the bird is constantly engaged, oftentimes just skimming the surface as it moves from point to point, now ascending, now descending the current as it sees the object of its search. I have never seen the nest, but, noticing how often the bird is found where the creeks, cutting deep into the soil, are confined by steep banks, have thought that, other situations failing, the natural shelves and crevices in these form the resting places for their domiciles. It is by no means a noisy bird, and the sharp clicking of the bill, as it closes on some unlucky insect, with a few faint twittering notes, uttered often in flying, or just as it resumes its perch, alone betray its presence.

No.	Sex.	Locality.	Date.	Collector.	Wing.	Tail.	Bill.	Tarsus.
522	♂ jun.	Camp Apache, Ariz....	Aug. 5, 1873	H. W. Henshaw.....	3.28	2.86	0.61	0.65
118	♀ jun.	Camp Bowie, Ariz	Sept. 6, 1873	Dr. C. G. Newberry ..	3.25	3.25	0.58	0.66
844	♀	Camp Grant, Ariz.....	Sept. 24, 1873	H. W. Henshaw.....	3.46	3.36	0.57	0.70
855	♀	..... do .....	..... do .....	..... do	3.32	2.07	0.57	0.68
241	♂ jun.	..... do	July 31, 1874	..... do .....	.....	.....	.....	.....
653	♂ jun.	Camp Lowell, Ariz....	Sept. 7, 1874	Dr. J. T. Rothrock....	.....	.....	.....	.....

SAYORNIS SAYUS (Bon.).

Say's Flycatcher.

Muscicapa saya, BONAP., Am. Orn., i, 1825, 20, pl. xi, f. 3.

Tyrannula saya, WOODH., Sitgreave's Exp. Zuni & Col. Riv., 1854, 74.—NEWB., P. R. R. Rep., vi, 1857, 81.

Sayornis sayus, BD., Birds N. A., 1858, 185.—*Id.*, Ives' Col. Exped., 1857-58, pt. iv, 5.—KENNERLY, P. R. R. Rep., Whipple's Route, x, 1859, 24.—BD., U. S. & Mex. Bound. Surv., ii, pt. ii, 1859, Birds, 9.—HEERM., P. R. R. Rep., x, pt. iv, 1859, 37.—HENRY, Proc. Acad. Nat. Sci. Phila., 1859, 106 (New Mexico).—HAYD., Trans. Am. Phil. Soc., xii, 1862, 158.—COUES, Proc. Acad. Nat. Sci. Phila., 1866, 60.—*Id.*, *ib.*, 1868, 82.—STEV., U. S. Geol. Surv. Terr., 1870, 463.—ALLEN, Bul. Mus. Comp. Zool., 1872, 179.—COUES, Key N. A. Birds, 1872, 172.—AIKEN, Proc. Bost. Soc. Nat. Hist., 1872, 205.—MERRIAM, U. S. Geol. Surv. Terr., 1872, 690 (Utah).—BD., BREW., & RIDG., Birds N. A., ii, 1874, 347, pl. 45, f. 3.—HENSHAW, An. Lyc. Nat. Hist. N. Y., xi, 1874, 7.—*Id.*, An. List Birds Utah, 1872, Wheeler's Exped., 1874, 46.—HENSHAW, Rep. Orn. Specs., 1873, Wheeler's Exped., 1874, 66, 85, 125.—ALLEN, Proc. Bost. Soc. Nat. Hist., June, 1874, 17, 31.—COUES, Birds Northwest, 1874, 240.

Found in abundance throughout the Middle Region, extending southward beyond our borders into Mexico, though perhaps less numerous in the southern part of its range than the Black Flycatcher, or than it is in the north. About Fort Garland, Southern Colorado, it was rather common, being found here within the precincts of civilization and in the wilder districts.

Its manner of nesting, habits, and the general character of the notes much resemble those of the Eastern Pewee (*S. fuscus*). A nest found June 27 beneath the eaves of one of the outbuildings of the post was composed of bits of twine, shreds of cloth, and other like substances, cemented together with mud. The cavity was quite shallow, and lined thickly with horse hair and sheeps' wool. Eggs, four in number, pale yellowish-white, without spots.

In the neighborhood of Fort Wingate, N. Mex., in July, both the old and young of this species were abundant. For the most part, they were found inhabiting the open sage brush, or the open and rocky hillsides scantily clothed with brush and a few scattering piñon trees.

No.	Sex.	Locality.	Date.	Collector.	Wing.	Tail.	Bill.	Tarsus.
25	♀ ad.	Denver, Colo	May 9, 1873	H. W. Henshaw	3.90	3.27	0.60	0.71
98	♀ ad.	..... do	May 17, 1873	..... do	3.95	3.23	0.57	0.79
1	♂ ad.	Santa Fé, N. Mex.	June 10, 1873	Dr. C. G. Newberry . . .	3.72	3.32	0.60	0.42
440	♂ jun.	Fort Wingate, N. Mex. .	July 15, 1873	H. W. Henshaw	4.24	3.52	0.68	0.80
441	♀ jun.	..... do . . . . .	..... do . . . . .	..... do	3.97	3.28	0.62	0.75
442	♀ jun.	..... do . . . . .	..... do . . . . .	..... do	3.95	3.15	0.65	0.73
794	♂ ad.	Gila River, Ariz	Sept. 17, 1873	..... do	4.17	3.45	0.59	0.77
103	♀ jun.	Badito, Colo	Aug. 9, 1874	C. E. Aiken . . . . .	.....	.....	.....	.....
909	♂	Camp Goodwin, Ariz . .	Oct. 1, 1874	H. W. Henshaw . . . . .	.....	.....	.....	.....
928	♀	Gila River, Ariz	Oct. 4, 1874	..... do . . . . .	.....	.....	.....	.....

CONTOPUS BOREALIS (Swains.).

Olive-sided Flycatcher.

Tyrannus borealis, SWAINS. & RICH., Fn. Bor.-Am., ii, 1831, 141, pl. 35.

Contopus borealis, BD., Birds N. A., 1858, 188.—XANTUS, Proc. Acad. Nat. Sci. Phila., 1859, 190 (Fort Tejon, Cal.).—HEERM., P. R. R. Rep., x, pt. iv, 1859, 37.—COOP. & SUCKL., P. R. R. Rep., xii, pt. ii, 1860, 169.—COOPER, Birds Cal., i, 1870, 323.—ALLEN, Bull. Mus. Comp. Zool., 1872, 179.—COUES, Key N. A. Birds, 1872, 173.—SNOW, Birds Kan., 1872, 6.—AIKEN, Proc. Bost. Soc. Nat. Hist., 1872, 206 (Wyoming).—MERRIAM, U. S. Geol. Surv. Terr., 1872, 691 (Utah; Idaho).—BD., BREW., & RIDG., N. A. Birds, ii, 1874, 353, pl. 44, f. 1.—YARROW, Rep. Orn. Specs., 1871, Wheeler's Exped., 1874, 35.—YARROW & HENSHAW, Rep. Orn. Specs., 1872, Wheeler's Exped., 1874, 22.—HENSHAW, An. Lyc. Nat. Hist. N. Y., xi, 1874, 7.—*Id.*, An. List Birds Utah, 1872, Wheeler's Exped., 1874, 46.—*Id.*, Rep. Orn. Specs., 1874, Wheeler's Exped., 1874, 85.—COUES, Birds Northwest, 1874, 243.

The Olive-sided Flycatcher appears to be much more abundant through the West generally than at the East, and in parts of Utah and Colorado has been found by our parties in considerable numbers. It is a highly characteristic bird of the pine region, ranging from about 7,000 feet up to timber line.

Its favorite perching places are the tops of the high pine stubs. From these stations, it makes frequent sallies after passing insects, and seems rarely to miss its prey. When thus engaged, the clicking noise of its bill may be heard quite a distance. About the first of June, in Southern Colorado, they had all mated, and each pair maintained a most jealous watch over the neighborhood chosen as its summer residence, never allowing the intrusion of the larger birds to pass unnoticed. The loud call notes of the male are at this season almost incessantly repeated. After watching

the actions of several pairs, I felt sure that certain thick, tall fir trees had been selected as the sites of their nests, but these I was not able to detect, and I do not think that the nest is finished and the eggs deposited much, if any, before the latter part of June.

We found it almost as numerous in Eastern Arizona, quite far to the south, as in Colorado; but I had supposed that it was only thus present during the migrations. The past season, however, specimens were taken near Camp Apache in July, which doubtless were breeding, and later, about the middle of August, young and old were secured near Camp Bowie, within one hundred miles of Mexico. Its replacement, therefore, in this region by *Contopus pertinax* would appear to be only partial, and the two breed in the same districts.

No.	Sex.	Locality.	Date.	Collector.	Wing.	Tail.	Bill.	Tarsus.
.....	♂ jun.	Nevada	Aug. 16, 1871	F. Bischoff .....	.....	.....	.....	.....
140	♂ ad.	Near Ft. Garland, Colo	May 26, 1873	H. W. Henshaw	4. 18	3. 05	0. 75	0. 54
149	.....	..... do .....	..... do .....	..... do	4. 17	3. 00	0. 76	0. 60
273	♂ ad.	..... do	June 6, 1873	..... do	4. 49	3. 15	0. 72	0. 57
274	♂ ad.	..... do .....	..... do .....	..... do	4. 38	3. 15	0. 73	0. 58
285	♂ ad.	..... do .....	..... do .....	..... do	4. 30	3. 00	0. 77	0. 60
323	♀ ad.	Rio Grande, Colo	June 12, 1873	..... do	4. 04	3. 08	0. 71	0. 58
340	♀ ad.	..... do	June 14, 1873	..... do	4. 00	2. 98	0. 78	0. 57
584	♀ ad.	Camp Apache, Ariz....	Aug. 2, 1873	..... do	4. 15	2. 93	0. 70	0. 60
597	♂ ad.	..... do	Aug. 23, 1873	..... do	4. 30	2. 18	0. 75	0. 64
64	♂ ad.	Willow Spring, Ariz....	July 11, 1874	..... do .....	.....	.....	.....	.....
162	♀ ad.	Indian Valley, Colo....	Aug. 15, 1874	C. E. Aiken .....	.....	.....	.....	.....
414	♂ jun.	Bowie Agency, Ariz....	Aug. 16, 1874	H. W. Henshaw .....	.....	.....	.....	.....
417	♂ ad.	..... do .....	..... do .....	..... do .....	.....	.....	.....	.....
163	♂ ad.	Trinchera Creek, Colo .	Aug. 19, 1874	..... do .....	.....	.....	.....	.....
181	♂ ad.	Conejos River, Colo....	Aug. 25, 1874	..... do .....	.....	.....	.....	.....
775	♂ ad.	Mount Graham, Ariz..	Sept. 21, 1874	..... do .....	.....	.....	.....	.....
847	♂ jun.	..... do	Sept. 24, 1874	..... do .....	.....	.....	.....	.....
977	♂ ad.	Black River, Ariz.....	Oct. 9, 1874	..... do .....	.....	.....	.....	.....

CONTOPUS PERTINAX, Cab.

Coues' Flycatcher; Mexican Olive-sided Flycatcher.

Contopus pertinax, CAB. et HEIN., Mus. Hein., ii, 72.—COUES, Proc. Acad. Nat. Sci. Phila., 1866, 60 (Fort Whipple, Ariz.).—COOPER, Birds Cal., 1870, 324.—COUES, Key N. A. Birds, 1872, 173.—BD., BREW., & RIDG., N. A. Birds, ii, 1874, 356, pl. 44, f. 2.—COUES, Birds Northwest, 1874, 259.

This has generally been regarded as a Mexican species; its only claim

to a place in our fauna being the capture of a single specimen by Dr. Coues at Fort Whipple. In 1873, I obtained a pair of old birds, which were accompanied by several young, in the White Mountains, near Camp Apache, and, not meeting with it elsewhere, supposed it to be rare. Such, however, proves not to be the case, as the past season it was found to be one of the most numerous and characteristic of the flycatcher tribe, being seen everywhere in the mountainous districts from Camp Apache to the border line. In general appearance, as well as habits, it is quite similar to the Olive-sided Flycatcher, and shows the same proclivities for inhabiting the pineries, often on the edge of an opening, or where the country is diversified and cut up by rocky ravines, and the pines are interspersed with oak woods. In such places, the species is sure to be present, and may be seen circling about the high pine stubs, or descending to the lower trees, as the oaks, and launching itself out from the branches in vigorous pursuit of flies and beetles, which it hunts with the greatest energy and perseverance. The notes are loud and very forcibly given, possessing the same character as the call of the Olive-sided Flycatcher, but are readily distinguishable. They resemble the syllables *pe*, *wee*, *ee*, great emphasis being laid on the middle syllable, while the last is quite prolonged and in a slightly raised key. Each pair apparently takes possession of a large area, and allows no intrusion of their kind within the limits. Having spent a few moments in one spot, the bird makes a hurried dash, and in a few moments its voice can be just distinguished, as it is sent back from afar in answer to the mate near by. A short interval elapsing, it will suddenly re-appear from among the trees, and, with an exultant whistle, settle firmly down on some perching place, giving short, nervous jerks of its long tail, and turning its head quickly here and there, every motion betraying the nervous activity of its nature. These sudden erratic flights from point to point are quite characteristic of the bird. By the middle of July I found the young well fledged and quite numerous. Thus the eggs are probably deposited in the first part of June. By the latter part of September, many individuals had passed to the southward; but, at Mount Graham, at this time the species was still present. I noticed them on several occasions on the outskirts of the flocks of Warblers and Nuthatches, which were moving slowly onward. They appeared to be migrating in their

company, forming, as it seemed to me, a very incongruous element in these sociable gatherings. Their call notes at this time were given almost as incessantly as during the summer. In this species, the feathers of the occiput are much lengthened, these forming quite a conspicuous crest.

Young birds have the throat, belly, and under tail coverts warmly washed with light sulphury yellow; the ends of greater and middle wing coverts tipped with ferruginous, making two distinct bars.

Iris brown; bill above black, below bright-yellow; legs and feet black.

No.	Sex.	Locality.	Date.	Collector.	Wing.	Tail.	Bill.	Tarsus.
549	♂ ad.	White Mountains, Ariz.	Aug. 10, 1873	H. W. Henshaw.....	4.30	3.72	0.75	0.65
550	♀ ad.	..... do .....	..... do .....	..... do	3.80	3.25	0.75	0.65
167	♀ ad.	Rock Cañon, near Camp Apache, Ariz.	July 20, 1874	..... do	3.88	3.39	0.77	0.64
168	♂ ad.	..... do .....	..... do .....	..... do	4.38	3.82	0.72	0.67
181	♀ ad.	..... do	July 21, 1874	..... do	3.85	3.33	0.73	0.72
182	♂ ad.	..... do .....	..... do .....	..... do	4.08	3.64	0.77	0.67
184	♂ jun.	..... do .....	..... do .....	..... do	3.92	3.37	0.63	0.68
185	♂ ad.	..... do .....	..... do .....	..... do	4.13	3.59	0.79	0.67
252	♀ ad.	Mount Graham, Ariz..	Aug. 1, 1874	..... do	3.92	3.40	0.67	0.65
253	♂ ad.	..... do .....	..... do .....	..... do	4.35	3.68	0.77	0.68
288	♂ jun.	..... do	Aug. 3, 1874	..... do	4.34	3.63	0.63	0.67
412	♂ jun.	Bowie Agency, Ariz...	Aug. 16, 1874	..... do	3.87	3.40	0.70	0.66
773	♂ jun.	Mount Graham, Ariz..	Sept. 19, 1874	..... do	4.08	3.45	0.63	0.65
774	♀ jun.	..... do .....	..... do .....	..... do	3.85	3.34	0.67	0.65
846	♂ jun.	..... do	Sept. 24, 1874	..... do	3.93	3.48	0.63	0.65
868	♂ jun.	..... do .....	..... do .....	..... do	4.12	3.70	0.77	0.68
869	Jun.	..... do .....	..... do .....	..... do	4.12	3.68	0.70	0.68

CONTOPUS VIRENS (Linn.), var. RICHARDSONI, Swains.

Short-legged Pewee.

Tyrannula richardsonii, SWAINS., Fn. Bor.-Am., ii, 1831, 146, pl. 46 lower fig.

Contopus richardsonii, XANTUS, Proc. Acad. Nat. Sci. Phila., 1859, 190 (Fort Tejon, Cal.).—BD., U. S. & Mex. Bound. Surv., ii, pt. ii, 1859, Birds, 9.—COUES, Proc. Acad. Nat. Sci. Phila., 1866, 61 (Fort Whipple, Ariz.).—COOPER, Am. Nat., iii, 1869, 31 (Montana).—HENRY, Proc. Acad. Nat. Sci. Phila., 1859, 106 (New Mexico).—MERRIAM, U. S. Geol. Surv. Terr., 1872, 691.—COOPER, Birds Cal., i, 1870, 325.—STEV., U. S. Geol. Surv. Terr., 1870, 463.—SNOW, Birds Kan., 1872, 6.—AIKEN, Proc. Bost. Soc. Nat. Hist., 1872, 206 (Colorado).

Contopus virens var. *richardsonii*, ALLEN, Bul. Mus. Comp. Zoöl., 1872, 79 (replacing *virens* at western edge of plains).—COUES, Key N. A. Birds, 1872, 174.—BD., BREW., & RIDG., N. A. Birds, ii, 1874, 360, pl. 44, f. 4.—YARROW & HENSHAW, Rep. Orn. Specs., 1872, Wheeler's Exped., 1874, 22.—HENSHAW, An. Lyc. Nat. Hist. N. Y., xi, 1874, 7.—*Id.*, An. List Birds Utah, 1872, Wheeler's Exped., 1874, 46.—*Id.*, Rep. Orn. Specs., 1873, Wheeler's Exped., 1874, 66, 86, 126.—ALLEN, Proc. Bost. Soc. Nat. Hist., June, 1874, 32.

Contopus (*virens* var. ?) *richardsonii*, COUES, Birds Northwest, 1874, 247.

Found by our parties in New Mexico and Arizona as well as throughout Utah and Colorado.

The most abundant representative of the family. Inhabits the dark recesses of the pine woods as well as the edges of clearings and ravines. Unlike the preceding species, which stations itself on the loftiest stubs, this flycatcher pursues its prey among the lower branches of the trees, and often descends almost to the ground to snap up a fly or moth. Its song bears but a slight resemblance to that of the Eastern Pewee (*C. virens*), being shorter, harsher, and much more emphatic. The call note is entirely different. A nest kindly presented by Mr. Aiken, found by him near Fountain, Colo., shows but little difference in style and structure when compared with eastern examples. It is composed mostly of sheeps' wool, externally covered with bits of bark and leaves, and lined with fine grasses. Its depth, of an inch and a half, is greater than in any I have ever seen in the East, but possibly this may have been rendered necessary for the preservation of the eggs, on account of the prevalence of high winds in this locality.

In further confirmation of the similarity in the breeding habits of the eastern and western Wood Pewees, I present the following observations from Mr. Aiken: "How such accurate observers as Messrs. Allen and Trippe should have been led into making the statement that the nest of *Contopus richardsoni* is placed in the 'forks of a small branch instead of being saddled on a horizontal limb,' I cannot understand. My observations at least have proved the reverse to be the case. I have found probably twenty of these nests in the mountains of Colorado, and in not a single instance was there any similarity in which they were placed to those of *Empidonax minimus*. On the contrary, I find them positively *saddled* upon the limb, generally upon the terminal fork of a *horizontal* branch. I have also found several settled in the angle formed by the trunk of the tree and

a horizontal branch ; and, in one instance, where a large limb had been torn from the tree by the wind, a nest was placed flatly upon a broad board-like splinter. The usual situation, however, was, as I have said, the terminal fork of a horizontal limb ; precisely the place chosen by *C. virens*. There is considerable difference between the nests of the two Wood Pewees ; but the same style of architecture is apparent in both, and the differences can all be accounted for by local causes. The greater depth in the case of *richardsoni* is rendered necessary by the prevailing high winds in the West, and the difference in composition is doubtless owing largely to the lack of some materials in the West which the eastern birds employ. Both birds appear to rely more upon artifice than concealment for the safety of their nests. They place them in plain sight, but fasten them neatly to the limb, covering the outside with materials that resemble the bark of the tree. Then, should the discovery of their home seem imminent from some chance passer-by, the owner of the nest retires to a short distance and seems to say ‘ that is not my nest but merely an excrescence of the tree ’ ; oftentimes, however, the energy with which the assertion is made leads to his betrayal. In the vicinity of Chicago, where I have observed the breeding habits of *virens*, their nests were shallow, and studded outwardly with lichens, like a Hummingbird’s nest. In Colorado, the nest of *richardsoni* is more bulky and a third deeper than that of *virens*, and no lichens at all are used in its construction, but instead the gray dead leaves of a minute plant that grows abundantly in the mountains is often found upon the outside. The chief basis of the nest is dead grasses, gray and crumbling with age ; but the inside is lined with fine, yellow, wiry grass tops. The whole structure is firmly bound together with strong silken fibers, so fine as only to be seen on close examination. *Contopus richardsoni* breeds abundantly along the streams of the plains at the base of the mountains, and also extends up to timber line. It seems to be indifferent as to the kind of tree on which its nest shall be placed, as I have found them on almost every tree that attains any size in Colorado—oak, cottonwood, aspen, cedar, spruce, and pines. They also occupy both dead and live branches.”

No.	Sex.	Locality.	Date.	Collector.	Wing.	Tail.	Bill.	Tarsus.
72	♂ ad.	Wahsatch Mts., Utah..	Aug. 12, 1872	H. W. Henshaw.....	.....	.....	.....	.....
133	♂ ad.	..... do	Aug. 25, 1872	..... do .....	.....	.....	.....	.....
95	♂ ad.	..... do	May 17, 1873	..... do	3.41	2.69	0.54	0.51
276	♂ ad.	..... do	—, 1873	..... do .....	.....	.....	.....	.....
263	♂ ad.	Fort Garland, Colo....	June 5, 1873	H. W. Henshaw.....	2.66	2.95	0.54	0.51
275	♂ ad.	..... do	June 6, 1873	..... do	2.38	2.68	0.53	0.54
276	♂ ad.	..... do .....	..... do .....	..... do	2.66	2.95	0.54	0.51
318	♀ ad.	Rio Grande, Colo.....	June 17, 1873	..... do	3.25	2.66	0.54	0.51
583	♂ jun.	Camp Apache, Ariz....	Aug. 21, 1873	..... do	3.40	2.70	0.49	0.49
594	♀ jun.	..... do	Aug. 22, 1873	..... do	3.27	2.61	0.47	0.51
714	♂	..... do	Sept. 7, 1873	..... do	3.30	2.66	0.53	0.51
783	Jun.	Gila River, Ariz.....	Sept. 15, 1873	..... do	3.09	2.63	0.52	0.52
66	♀ ad.	Willow Spring, Ariz...	July 11, 1874	..... do .....	.....	.....	.....	.....
32	♂ jun.	Pueblo, Colo.....	July 16, 1874	C. E. Aiken.....	.....	.....	.....	.....
16	♀ ad.	..... do	July 24, 1874	..... do .....	.....	.....	.....	.....
29	♀ ad.	..... do	July 25, 1874	..... do .....	.....	.....	.....	.....
30	♂ ad.	..... do .....	..... do .....	..... do .....	.....	.....	.....	.....
31	♂ ad.	..... do .....	..... do .....	..... do .....	.....	.....	.....	.....
33	♂ ad.	..... do	July 27, 1874	..... do .....	.....	.....	.....	.....
56	♀ ad.	..... do	July 28, 1874	..... do .....	.....	.....	.....	.....
61	♂ ad.	..... do	July 29, 1874	..... do .....	.....	.....	.....	.....
242	♀ jun.	Camp Grant, Ariz....	July 31, 1874	H. W. Henshaw.....	.....	.....	.....	.....
89	.....	Pueblo, Colo.....	Aug. 1, 1874	C. E. Aiken.....	.....	.....	.....	.....
892	♂ jun.	Cottonwood, Ariz.....	Sept. 29, 1874	H. W. Henshaw.....	.....	.....	.....	.....

EMPIDONAX TRAILI (Aud.), var. PUSILLUS Swains.

Little Flycatcher.

? *Platyrhynchus pusillus*, SWAINS., Phil. Mag., i, May, 1827, 366.

Empidonax pusillus, BD., U. S. & Mex. Bound. Surv., ii, pt. ii, 1859, Birds, 9.—XANTUS, Proc. Acad. Nat. Sci. Phila., 1859, 190 (Fort Tejon, Cal.).—BD., Birds N. A., 1858, 194.—COOP. & SUCKL., P. R. R. Rep., xii, pt. ii, 1860, 170.—COUES, Proc. Acad. Nat. Sci. Phila., 1866, 61 (Fort Whipple, Ariz.).—SNOW, Birds Kan., 1872, 6.—AIKEN, Proc. Bost. Soc. Nat. Hist., 1872, 206 (Wyoming).—MERRIAM, U. S. Geol. Surv. Terr., 1872, 691.—BD., BREW., & RIDG., N. A. Birds, ii, 1874, 366, pl. 44, f. 9.—YARROW, Rep. Orn. Specs., 1871, Wheeler's Exped., 1874, 35.—YARROW & HENSHAW, Rep. Orn. Specs., 1872, Wheeler's Exped., 1874, 21.—HENSHAW, An. Lyc. Nat. Hist. N. Y., xi, 1874, 8.—*Id.*, An. List Birds Utah, 1872, Wheeler's Exped., 1874, 47.—*Id.*, Rep. Orn. Specs., 1873, Wheeler's Exped., 1874, 86, 126.

Empidonax trailii var. *pusillus*, COUES, Key N. A. Birds, 1872, 175.—*Id.*, Birds Northwest, 1874, 252.

Tyrannula trailii, HEERM., P. R. R. Rep., x, pt. iv, 1859, 38.—COOPER, Birds Cal., i, 1870, 327.

Exceedingly numerous near Provo River in willow thickets; sparingly

so in Eastern Nevada. Very quick and nervous in its movements, constantly crossing and recrossing the river and catching insects. The single "whit", which is often repeated, is strongly suggestive of the note of the Least Flycatcher (*E. minimus*), while the song may be compared as approaching somewhat to that of the eastern Phoebe (*Sayornis fuscus*). A nest found July 27, in a small willow, three feet from the ground, was a rather loose structure, composed of grasses, with a lining of a few hairs. This contained newly hatched young. Eggs white, sprinkled with reddish-brown. A comparison of the large series taken shows considerable variation in size, especially as regards the bills.

Colorado, New Mexico, and Arizona are all included in the range of this flycatcher; its abundance being dependent upon the presence or absence of its favorite grounds.

Wherever willows are found growing in small clumps or fringing the streams, this flycatcher is almost certain to be found common, and it is rarely seen in the summer in other situations. Its habits and notes appear to be identical with those of its eastern analogue, from which it differs mainly in its paler coloration. The nest is placed in the upright fork of a bush or sapling a few feet from the ground, and is composed of grasses and fibrous material, rather loosely woven together, and lined with fine grasses. Its general appearance is much like that of the nest of the Yellow Warbler, *D. aestiva*, but it is not nearly so compact nor artistic.

No.	Sex.	Locality.	Date.	Collector.	Wing.	Tail.	Bill.	Tarsus.
.....	♀ ad.	Humboldt River, Nev.	May 31, 1871	F. Bischoff.....	.....	.....	.....	.....
35	♀ ad.	Provo, Utah.....	July 25, 1872	Dr. H. C. Yarrow and H. W. Henshaw.	.....	.....	.....	.....
36	♀ ad.	..... do .....	..... do .....	..... do .....	.....	.....	.....	.....
37	♂ ad.	..... do .....	..... do .....	..... do .....	.....	.....	.....	.....
38	♂ ad.	..... do .....	..... do .....	..... do .....	.....	.....	.....	.....
39	♂ ad.	..... do .....	..... do .....	..... do .....	.....	.....	.....	.....
40	♂ ad.	..... do .....	..... do .....	..... do .....	.....	.....	.....	.....
41	♂ ad.	..... do .....	..... do .....	..... do .....	.....	.....	.....	.....
42	♀	..... do .....	..... do .....	..... do .....	.....	.....	.....	.....
44	♀ ad.	..... do .....	..... do	H. W. Henshaw and Dr. H. C. Yarrow.	.....	.....	.....	.....
43A	♂ ad.	..... do .....	..... do .....	..... do .....	.....	.....	.....	.....
73	♀ ad.	..... do	July 26, 1872	..... do .....	.....	.....	.....	.....

No.	Sex.	Locality.	Date.	Collector.	Wing.	Tail.	Bill.	Tarsus.
74	♂ ad.	Provo, Utah.....	July 26, 1872	H. W. Henshaw and Dr. H. C. Yarrow.	.....	.....	.....	.....
75	♂ ad.	..... do .....	..... do .....	..... do .....	.....	.....	.....	.....
75A	♂ ad.	..... do .....	..... do .....	..... do .....	.....	.....	.....	.....
98	♂ ad.	..... do	July 27, 1872	..... do .....	.....	.....	.....	.....
48	♂ ad.	..... do	July 29, 1872	..... do .....	.....	.....	.....	.....
85	♀ ad.	..... do .....	..... do .....	..... do .....	.....	.....	.....	.....
120	♀ ad.	..... do .....	..... do .....	..... do .....	.....	.....	.....	.....
151	♂ ad.	..... do	July 30, 1872	..... do .....	.....	.....	.....	.....
27	♂ ad.	..... do	Aug. 1, 1872	H. W. Henshaw.....	.....	.....	.....	.....
43	♀ ad.	..... do	Aug. 2, 1872	..... do .....	.....	.....	.....	.....
49	♂ ad.	..... do	Aug. 3, 1872	..... do .....	.....	.....	.....	.....
28	♀ ad.	..... do .....	..... do .....	..... do .....	.....	.....	.....	.....
96	♀ jun.	Wahsatch Mts., Utah..	Aug. 16, 1872	..... do .....	.....	.....	.....	.....
131	♂ ad.	Fort Garland, Colo....	May 25, 1873	..... do	2.81	2.64	0.55	0.67
164	♂ ad.	..... do	May 27, 1873	..... do	2.83	2.65	0.52	0.68
165	♂ ad.	..... do	May 28, 1873	..... do	2.75	2.49	0.55	0.68
166	♂ ad.	..... do .....	..... do .....	..... do	2.82	2.53	0.58	0.68
174	♂ ad.	..... do	May 29, 1873	..... do	3.00	2.60	0.51	0.65
560	♀ ad.	White Mountains, Ariz.	Aug. 11, 1873	..... do	2.65	2.45	0.51	0.60
622	♂ jun.	Camp Apache, Ariz....	Aug. 26, 1873	..... do	2.56	2.33	0.46	0.59
665	♂ jun.	Near Camp Apache, Ariz	Sept. 8, 1873	..... do	2.63	2.55	0.52	0.60
703	♀ jun.	..... do .....	..... do .....	..... do	2.60	2.38	0.52	0.67
8	♂ ad.	Pueblo, Colo	July 23, 1874	C. E. Aiken.....	.....	.....	.....	.....
300	.....	Camp Bowie, Ariz....	Aug. 7, 1874	H. W. Henshaw.....	.....	.....	.....	.....
303	♀ ad.	..... do .....	..... do .....	..... do .....	.....	.....	.....	.....
336	Ad.	..... do	Aug. 10, 1874	Dr. J. T. Rothrock....	.....	.....	.....	.....
350	♂ ad.	..... do .....	..... do .....	..... do .....	.....	.....	.....	.....
132	♀ ad.	Fort Garland, Colo....	Aug. 11, 1874	C. E. Aiken.....	.....	.....	.....	.....
570	♂ ad.	Camp Crittenden, Ariz.	Sept. 1, 1874	H. W. Henshaw .....	.....	.....	.....	.....
290	.....	Pagosa, Colo	Sept. 19, 1874	C. E. Aiken .....	.....	.....	.....	.....

EMPIDONAX MINIMUS, Bd.

Least Flycatcher.

Tyrannula minima, WM. M. & S. F. BAIRD, Proc. Acad. Nat. Sci. Phila., i, July, 1843, 284.
Empidonax minimus, BD., Birds N. A., 1858, 195.—ALLEN, Bull. Mus. Comp. Zoöl., 1872, 179 (Eastern Kansas, May).—COUES, Key N. A. Birds, 1872, 175.—SNOW, Birds Kan., 1872, 6.—BD., BREW., & RIDG., N. A. Birds, ii, 1874, 372, pl. 44, f. 10.—HENSHAW, Rep. Orn. Specs., 1873, Wheeler's Exped., 1874, 66.—ALLEN, Proc. Bost. Soc. Nat. Hist., June, 1874, 16, 32.—COUES, Birds Northwest, 1874, 254.

The Least Flycatcher is a bird decidedly eastern in its habitat, occurring as a migrant from the Atlantic across to the Missouri Plains, and passing

the summer in the region generally north of the fortieth parallel. It has, however, recently been ascertained to be a component of the Middle Fauna, being given by Mr. Snow as a bird of Kansas, and as probably breeding there. Its occurrence west of the Great Plains rests, so far as I am aware, upon the observations of Mr. Aiken, and my own detection of the species in May about Denver, Colo., where it made its appearance on the 12th, and subsequently was noticed in a few instances only; all the individuals apparently being migrants. Mr. Aiken has taken this flycatcher in spring in El Paso County, Colorado, and thinks that a few pass the summer in that locality, though the evidence of its breeding does not appear quite as positive as could be desired.

No.	Sex.	Locality.	Date.	Collector.	Wing.	Tail.	Bill.	Tarsus.
97	♂ ad.	Denver, Colo.....	May 17, 1873	H. W. Henshaw.....	2.58	2.43	0.40	0.41

EMPIDONAX FLAVIVENTRIS, Bd., var. DIFFICILIS, Bd.

Western Yellow-bellied Flycatcher.

Empidonax difficilis, Bd., Birds N. A., 1858, 198 (in text).—XANTUS, Proc. Acad. Nat. Sci. Phila., 1859, 190 (Fort Tejon, Cal.).—COUES, Proc. Acad. Nat. Sci. Phila., 1866, 62 (Fort Whipple, Ariz.).

Empidonax flaviventris var. *difficilis*, ALLEN, Bul. Mus. Comp. Zool., 1872, 179 (Ogden, Utah).—COUES, Key N. A. Birds, 1872, 176 (in text).—BD., BREW., & RIDG., N. A. Birds, ii, 1874, 380.—HENSHAW, An. Lyc. Nat. Hist. N. Y., xi, 1874, 8.—*Id.*, An. List Birds Utah, 1872, Wheeler's Exped., 1874, 47.—*Id.*, Rep. Orn. Specs., 1873, Wheeler's Exped., 1874, 87, 127.—COUES, Birds Northwest, 1874, 256.

Distributed in all favorable localities throughout Utah, Colorado, and in Eastern Arizona. During the breeding season, they are most often found in the narrow cañons and the deep shady glens of the pine woods, almost invariably near a stream of water, or among the trees that border the open, meadowy tracts. It is a rather energetic insect hunter, continually swooping down after passing insects, and when waiting for its prey moving its tail with nervous and excited jerks. The note is a long drawn plaintive *pea*, agreeing perfectly with that described by Messrs. Maynard and Brewster as belonging to the Yellow-bellied Flycatcher of the East

(*flaviventris*). This latter bird I have often seen in the spring in Massachusetts, and can speak with certainty of the exact similarity of their habits and motions, a similarity still further borne out in the close resemblance of the two birds. If distinguishable as a race, the western variety appears not to have undergone a very marked differentiation, and the characters assigned to it seem not to be very trenchant.

No.	Sex.	Locality.	Date.	Collector.	Wing.	Tail.	Bill.	Tarsus.
342	♀ ad.	Rio Grande, Colo	June 14, 1873	H. W. Henshaw.....	2.57	2.37	0.43	0.62
454	♂ ad.	Fort Wingate, N. Mex.	July 18, 1873	..... do	2.95	2.63	0.53	0.66
467	♂ jun.	Inscription Rock, N. Mex.	July 23, 1873	..... do	2.54	2.35	0.48	0.64
722	♀	South Apache, N. Mex.	Sept. 8, 1873	..... do	2.60	2.40	0.53	0.71
112	♂ ad.	Willow Spring, Ariz..	July 13, 1874	..... do	2.93	2.74	0.48	0.68
113	♂ ad.	..... do .....	..... do .....	..... do	2.95	2.75	0.47	0.63
289	♂ ad.	Mount Graham, Ariz ..	Aug. 3, 1874	..... do	2.76	2.54	0.52	0.71
312	♀ jun.	Camp Bowie, Ariz	Aug. 8, 1874	J. M. Rutter	2.58	2.43	0.47	0.61

EMPIDONAX OBSCURUS (Swains.).

Wright's Flycatcher.

Empidonax obscurus, BD., Ives' Col. Exped., 1857-58, pt. iv, 5.—*Id.*, Birds N. A., 1858, 200.—*Id.*, U. S. & Mex. Bound. Surv., ii, pt. ii, 1859, Birds, 9, pl. xi, f. 3.—*Id.*, Proc. Acad. Nat. Sci. Phila., 1859, 303 (Cape Saint Lucas).—COUES, Proc. Acad. Nat. Sci. Phila., 1866, 62 (Fort Whipple, Ariz.).—COOPER, Birds Cal., i, 1870, 329.

Empidonax obscurus, ALLEN, Bul. Mus. Comp. Zool., 1872, 179 (Montana; Colorado; Ogden, Utah).—COUES, Key N. A. Birds, 1872, 176.—AIKEN, Proc. Bost. Soc. Nat. Hist., 1872, 206 (Colorado).—YARROW, Rep. Orn. Specs., 1871, Wheeler's Exped., 1874, 35.—BD., BREW., & RIDG., N. A. Birds, ii, 1874, 381, pl. 44, f. 6.—YARROW & HENSHAW, Rep. Orn. Specs., 1872, Wheeler's Exped., 1874, 22.—HENSHAW, An. Lyc. Nat. Hist. N. Y., xi, 1874, 8.—*Id.*, An. List Birds Utah, 1872, Wheeler's Exped., 1874, 47.—*Id.*, Rep. Orn. Specs., 1873, Wheeler's Exped., 1874, 66, 87.—COUES, Birds Northwest, 1874, 258.

This species is found in both the Middle and Southern Regions, and in many localities is an abundant summer resident, while in others it appears to be almost entirely wanting. In Utah, we obtained but a single specimen; in Eastern Nevada, two. In the Wahsatch and Uintah Mountains, however, Mr. Ridgway found it a numerous species, and I have had a similar

experience in Colorado and Arizona. In the summer, it appears to be a bird of the mountains, almost exclusively finding its favorite resort among the deciduous trees and bushes of the streams, or, as in Arizona, being found among the oak openings. Quite a marked exception to this general rule appeared in the vicinity of Santa Fé, where it was found on the barren piñon clad hills, where no deciduous vegetation was found at all. Its common note is a *whit*, similar to the call of *pusillus*, but less emphatic, and more subdued in tone. In the fall, it forsakes in a measure the higher ground, and in its journey south may be expected to present itself anywhere, wherever the shelter of trees and bushes affords a good hunting ground for food. In its quick and energetic actions, it presents marked features of dissimilarity from the succeeding species, with which it is generally compared. However difficult it may be to distinguish between dried skins of the two species, there is not the slightest difficulty in identifying either when met with in the field; the actions and notes telling in each case their own story; while the colors, too, of the freshly killed bird are very different from those presented a month later in the dried cabinet specimen.

No.	Sex.	Locality.	Date.	Collector.	Wing.	Tail.	Bill.	Tarsus.
.....	♀ ad.	Bull Run, Nev.....	May 25, 1871	Dr. W. J. Hoffman .....	.....	.....	.....	.....
.....	Ad.	Nevada	— —, 1871	F. Bischoff .....	.....	.....	.....	.....
62	.....	Provo, Utah.....	Aug. 9, 1872	H. W. Henshaw.....	.....	.....	.....	.....
E	.....	Snake Creek, Nev.....	do	Dr. H. C. Yarrow.....	.....	.....	.....	.....
56	♂ ad.	Denver, Colo.....	May 12, 1873	H. W. Henshaw	2.79	2.75	0.47	0.69
94	♀ ad.	do	May 17, 1873	do	2.84	2.75	0.48	0.71
447	.....	Fort Wingate N. Mex..	July 15, 1873	do	2.70	2.55	0.52	0.68
479	.....	Inscription Rock, N. Mex.	July 23, 1873	do	2.80	2.58	0.50	0.65
518	.....	Camp Apache, Ariz' ..	Aug. 14, 1873	do	2.70	2.60	.....	0.70
666	.....	do	Sept. 1, 1873	do	2.55	2.54	0.47	0.65
696	.....	do	Sept. 4, 1873	do	2.80	2.55	0.50	0.68
721	.....	South of Camp Apache, Ariz.	Sept. 10, 1873	do	2.60	2.46	0.50	0.70
726	.....	do	do	do	2.85	2.60	0.53	0.70
5	♂ ad.	Santa Fé, N. Mex	July 16, 1874	do .....	.....	.....	.....	.....
6	♂ ad.	do	do	do .....	.....	.....	.....	.....
294	♂ ad.	Camp Bowie, Ariz	Aug. 5, 1874	do .....	.....	.....	.....	.....
121	.....	Fort Garland, Colo....	Aug. 9, 1874	C. E. Aiken .....	.....	.....	.....	.....
133	♂ jun.	do	Aug. 11, 1874	do .....	.....	.....	.....	.....
357	♂ jun.	Camp Bowie, Ariz	do	J. M. Rutter.....	.....	.....	.....	.....
141	♀ jun	Fort Garland, Colo....	Aug. 12, 1874	C. E. Aiken .....	.....	.....	.....	.....

EMPIDONAX HAMMONDI, (Xant.).

Hammond's Flycatcher.

Tyrannula hammondi, XANTUS, Proc. Acad. Nat. Sci. Phila., May, 1858, 117.

Empidonax hammondi, BD., Birds N. A., 1858, 199, pl. 76, f. 1.—XANTUS, Proc. Acad. Nat. Sci. Phila., 1859, 190 (Fort Tejon, Cal.).—COUES, Proc. Acad. Nat. Sci. Phila., 1866, 52 (Fort Whipple, Ariz.).—COOPER, Birds Cal., i, 1870, 330.—ALLEN, Bull. Mus. Comp. Zool., 1872, 179 (Wyoming; Ogden, Utah).—COUES, Key N. A. Birds, 1872, 176.—BD., BREW., & RIDG., N. A. Birds, ii, 1874, 383, pl. 44, f. 7.—YARROW & HENSHAW, Rep. Orn. Specs., 1872, Wheeler's Exped., 1874, 22.—HENSHAW, An. Lyc. Nat. Hist. N. Y., xi, 1874, 8.—*Id.*, An. List Birds Utah, 1872, Wheeler's Exped., 1874, 47.—*Id.*, Rep. Orn. Specs., 1873, Wheeler's Exped., 1874, 87, 127.—COUES, Birds Northwest, 1874, 257.

The affinities of this little bird are certainly with the Least Flycatcher of the East (*minimus*), and not at all with the bird just mentioned. Of its perfect distinctness from the former bird I feel well assured, though I do not find myself able to express in a very cogent manner the differences that certainly do exist between the two birds,—differences in notes and habits, as well as a general dissimilarity in the particular localities affected by either species. In the East, the Least Flycatcher is a bird of the orchards and gardens; which wanting, it frequents the open country and is found on the edges of the woodland tracts, never, I think, selecting the depths of the forest as its home. In motions, it is one of the quickest and most energetic of the small flycatchers, while its notes are so constant and given with such stress that, in Massachusetts at least, in the spring one is scarcely ever out of the sound of its voice. In the West, Hammond's Flycatcher is one of the most silent and retiring of birds; leaving the low country entirely in summer, and finding in the glens and recesses of the pine woods of the mountains or the alpine streams with their fringes of alders, its chosen retreats. As I have there noticed them, nearly all of the dash and spirit characterizing this group is wanting, though, of course, the difference is merely one of degree. After snapping up a passing insect, it resumes its perch upon some low limb, and remains nearly motionless for a time, giving an occasional listless jerk of the tail. The notes are very feeble, the most so of any flycatcher I am acquainted with, and consist of a soft *pit*, varied with a low, lisping whistle. This latter note, which I have

only heard in the breeding season, is never possessed by the Least Flycatcher, whose corresponding utterance,—for it can hardly be said to be a song, though it is probably intended as such,—is *che-bec, che-bec*; the two efforts having not the slightest resemblance.

Hammond's Flycatcher was seen by us on several occasions in Utah, though only in fall. About Denver, Colo., I did not find it; but in the mountains of Southern Colorado it is perhaps as numerous as any of the *Empidonaces*, while in Arizona it appears to be the most so, particularly in fall, when in migrating it extends over much of the country, showing a special predilection for the oak groves. Its habits are essentially the same as in summer, though it is now almost silent.

No.	Sex.	Locality.	Date.	Collector.	Wing.	Tail.	Bill.	Tarsus.
270	♂	Beaver, Utah.....	Sept. 22, 1872	Dr. H. C. Yarrow and H. W. Henshaw.	.....	.....	.....	.....
D	.....	Cedar, Utah.....	Oct. —, 1872	Lieut. R. L. Hoxie .....	.....	.....	.....	.....
341	♀ ad.	Rio Grande, N. Mex..	June 14, 1873	H. W. Henshaw	2.64	2.13	0.41	0.61
681	♂	Camp Apache, Ariz....	Sept. 2, 1873	..... do	2.54	2.33	0.40	0.60
710	♂	..... do	Sept. 7, 1873	..... do	2.75	2.52	0.42	0.64
711	♀	..... do .....	..... do .....	..... do	2.61	2.56	0.42	0.62
729	♂	..... do	Sept. 10, 1873	..... do	2.64	2.63	0.42	0.69
728	♀	..... do .....	..... do .....	..... do	2.64	2.43	0.40	0.60
730	♂	Gila River, Ariz .....	..... do .....	..... do	2.73	2.45	0.40	0.60
759	♀	..... do .....	..... do .....	..... do	2.75	2.43	0.41	0.65
772	♂	..... do	Sept. 15, 1873	..... do	2.80	2.58	0.40	0.60
788	♀	..... do .....	..... do .....	..... do	2.50	2.12	0.42	0.59
948	♀	Fort Bayard, N. Mex..	Sept. 19, 1873	..... do	2.69	2.48	0.40	0.61
261	♀	Navajo Creek, N. Mex..	Sept. 16, 1874	C. E. Aiken .....	.....	.....	.....	.....
741	♂	Mount Graham, Ariz..	Sept. 19, 1874	Dr. J. T. Rothrock.....	.....	.....	.....	.....
753	♂	..... do	Sept. 20, 1874	H. W. Henshaw.....	.....	.....	.....	.....
771	.....	..... do	Sept. 21, 1874	..... do .....	.....	.....	.....	.....
794	♀	..... do	Sept. 22, 1874	..... do .....	.....	.....	.....	.....
795	♀	..... do .....	..... do .....	..... do .....	.....	.....	.....	.....
799	♀	..... do .....	..... do .....	..... do .....	.....	.....	.....	.....
926	♂	Gila River, Ariz.....	Oct. 3, 1874	..... do .....	.....	.....	.....	.....

MITREPHORUS FULVIFRONS (Giraud), var. PALLESCENS, Coues.

Buff-breasted Least Flycatcher.

Muscicapa fulvifrons, GIRAUD, 16 Sp. Texas Birds, 1841, pl. 2 (probably Mexico).

Mitrephorus pallescens, COUES, Proc. Acad. Nat. Sci. Phila., 1866, 63 (Fort Whipple, Ariz.).—COOPER, Birds Cal., i, 1870, 386.

Mitrephorus fulvifrons var. *pallescens*, COUES, Key N. A. Birds, 1872, 176.—BD., BREW. & RIDG., N. A. Birds, ii, 1874, 386, pl. 44, f. 13.—HENSHAW, Rep. Orn. Specs., 1873, Wheeler's Exped., 1874, 128.—COUES, Birds Northwest, 1874, 259.

Apparently a very rare species, as it was met with but on two occasions. At Inscription Rock, N. Mex., July 24, I observed a pair of old birds feeding the young. These latter were nearly full fledged, and had evidently been raised in the immediate vicinity. In September, a single immature bird was taken near Camp Apache, Ariz., on a small brush lined stream in a heavy pine forest. Judging from the individuals seen, their habits differ in no noteworthy respect from those of the small flycatchers generally. The species was first described and introduced into our fauna by Dr. Coues, who gives it as a rare summer resident at Fort Whipple, Ariz.

During the past season, I saw several individuals of this species, but not till well down into the southern part of Arizona. I am inclined to think that it will not be found to occur much, if any, north of the thirty-fourth parallel, and that south of this it is a regular summer resident, though certainly very far from common. In all its motions, it is a perfect *Empidonax*.

The plumage of the young differs from the adult in the paler fulvous of the under parts. There are two bands of strong fulvous across the wings; the tertiaries are edged externally with same, and also, with the secondaries, conspicuously tipped with ashy white.

No.	Sex.	Locality.	Date.	Collector.	Wing.	Tail.	Bill.	Tarsus.
480	♂ ad.	Inscription Rock, N. Mex.	July 24, 1873	H. W. Henshaw	2.40	2.16	0.42	0.54
481	♀ ad.	..... do .....	..... do .....	..... do	2.28	2.09	0.38	0.53
482	♀ o .	..... do .....	..... do .....	..... do	2.25	1.71	0.31	0.54
483	♀ o	..... do .....	..... do .....	..... do	2.28	2.09	0.38	0.53
679	♀ jun.	Camp Apache, Ariz....	..... do .....	..... do	2.20	2.00	0.39	0.61
413	♂ jun.	Bowie Agency, Ariz...	Aug. 16, 1874	..... do	2.43	2.14	0.36	0.58

PYROCEPHALUS RUBINEUS (Bodd.), var. MEXICANUS, Selat.

Red Flycatcher.

Pyrocephalus rubineus, LAWR., An. Lyc. Nat. Hist. N. Y., v, May, 1851, 115.—BD., Ives' Col. Exped., 1857-58, pt. iv, 5.—*Id.*, U. S. & Mex. Bound. Surv., ii, pt. ii, 1859, Birds, 9.—HEERM., P. R. R. Rep., x, pt. iv, 1859, 38.—HENRY, Proc. Acad. Nat. Sci. Phila., 1859, 106 (New Mexico).

Pyrocephalus mexicanus, BD., Birds N. A., 1858, 201.—COUES, Proc. Acad. Nat. Sci. Phila., 1866, 64 (Fort Whipple, Ariz.).—*Id.*, *ib.*, 1868, 82.—COOPER, Birds Cal., 1870, 333.

Pyrocephalus rubineus var. *mexicanus*, COUES, Key N. A. Birds, 1872, 177.—BENDIRE, Am. Nat., vii, 1873, 170.—BD., BREW., & RIDG., N. A. Birds, ii, 1875, 387, pl. xlv, f. 5.—HENSHAW, Rep. Orn. Specs., 1873, Wheeler's Exped., 1874, 128.

Pyrocephalus nanus, WOODH., Sitgreave's Exp. Zuñi & Col. Riv., 1854, 75.

This beautiful species was found to be not very uncommon in the valley of the Gila late in September. A specimen was secured here September 25 by Dr. C. G. Newberry, who observed quite a number of others, which, owing to their shyness, could not be obtained. They were seen perching upon the mesquite bushes, whence they darted constantly forth after insects.

It appears to be confined to the warmer valleys of Southern Arizona. The past season we found it occurring quite commonly in the Sonoita Valley, frequenting the bushes along the streams and in narrow rocky cañons. From settlers I learned that along the Gila River it was in some places very numerous; their description of the bird, with its bright plumage and flycatching habits, making me feel sure that this was the species to which their remarks applied.

No.	Sex.	Locality.	Date.	Collector.	Wing.	Tail.	Bill.	Tarsus.
A	.....	Pueblo Viejo, Ariz ...	Sept. 25, 1873	Dr. C. G. Newberry...	3.22	2.58	0.51	0.62
593	♂ ad.	Sonoita Valley, Ariz...	Sept. 2, 1874	H. W. Henshaw.....	3.05	2.43	0.48	0.65
594	♂ ad.	..... do	Sept. 3, 1874	..... do	3.12	.....	0.52	0.63
595	♂ ad.	..... do .....	..... do .....	..... do	3.12	2.45	0.52	0.62
621	♂ ad.	Camp Lowell, Ariz....	Sept. 7, 1874	..... do	3.17	2.48	0.48	0.62
637	♂ ad.	..... do	Sept. 9, 1874	..... do	3.48	2.57	0.50	0.63
671	♀ ad.	..... do	Sept. 10, 1874	Dr. J. T. Rothrock....	3.20	2.52	0.52	0.63
691	♂ jun.	..... do .....	..... do .....	..... do	3.22	2.62	0.45	0.68
958	♀ ad.	Gila River, Ariz.....	Oct. 5, 1874	H. W. Henshaw.....	3.02	2.54	0.50	0.64

ORDER PICARIAE: PICARIAN BIRDS.

FAM. ALCEDINIDAE: KINGFISHERS.

CERYLE ALCYON (Linn.).

Belted Kingfisher.

Alcedo alcyon, LINN., Syst. Nat., i, 1766, 180.—WOODH., Sitgreave's Exp. Zuñi & Col. Riv., 1854, 65.

Ceryle alcyon, NEWB., P. R. R. Rep., vi, 1857, 79.—BD., Birds N. A., 1858, 158.—HEERM., P. R. R. Rep., x, pt. iv, 1859, 57.—BD., U. S. & Mex. Bound. Surv., ii, pt. ii, 1859, Birds, 7.—COOP. & SUCKL., P. R. R. Rep., xii, pt. ii, 1860, 167.—HAYD., Trans. Am. Phil. Soc., xii, 1862, 157.—COUES, Proc. Acad. Nat. Sci. Phila., 1866, 59.—COOPER, Birds Cal., i, 1870, 336.—STEV., U. S. Geol. Surv. Terr., 1870, 463 (Wyoming).—ALLEN, Bull. Mus. Comp. Zoöl., 1872, 179.—COUES, Key N. A. Birds, 1872, 188.—SNOW, Birds Kan., 1872, 6.—AIKEN, Proc. Bost. Soc. Nat. Hist., xv, 1872, 206 (Colorado).—MERRIAM, U. S. Geol. Surv. Terr., 1872, 692 (Wyoming).—BD., BREW., & RIDG., N. A. Birds, ii, 1874, 392, pl. 45, f. 6.—YARROW & HENSHAW, Rep. Orn. Specs., 1872, Wheeler's Exped., 1874, 23.—HENSHAW, An. Lyc. Nat. Hist. N. Y., xi, 1874, 8.—*Id.*, An. List Birds Utah, 1872, Wheeler's Exped., 1874, 47.—*Id.*, Rep. Orn. Specs., 1873, Wheeler's Exped., 1874, 87, 128.—ALLEN, Proc. Bost. Soc. Nat. Hist., June, 1874, 32.—COUES, Birds Northwest, 1874, 273.

Quite common on the streams of Utah and Colorado, and an occasional resident of the creeks and rivers in New Mexico and Arizona, when, as is usually the case, these abound in the smaller species of fish. It follows the streams up into the mountains, as I have occasionally seen it at an altitude of about 8,000 feet, higher than which it probably rarely goes.

No.	Sex.	Locality.	Date.	Collector.	Wing.	Tail.	Bill.	Tarsus.
87	♂ ad.	Provo, Utah.....	July 26, 1872	Dr. H. C. Yarrow and H. W. Henshaw.	.....	.....	.....	.....
143	.....	Fort Garland, Colo....	Aug. 12, 1874	C. E. Aiken .....	.....	.....	.....	.....

FAM. CAPRIMULGIDAE: GOATSUCKERS.

CHORDEILES POPETUE (Vieill.), var. HENRYI, Cass.

Western Nighthawk.

Chordeiles henryi, CASS., Illust. Birds of Cal. & Texas, i, 1855, 233.—BD., P. R. R. Rep., Beckwith's Route, x, 1857, 13, pl. xvii.—*Id.*, Birds N. A., 1858, 153, 922.—*Id.*, U. S. & Mex. Bound. Surv., ii, pt. ii, 1859, Birds, 7.—HENRY, Proc. Acad. Nat. Sci. Phila., 1859, 106 (New Mexico).—COOP. & SUCKL., P. R. R. Rep., xii, pt. ii, 1860, 166.—COOPER, Birds Cal., i, 1870, 344.—STEV., U. S. Geol. Surv. Terr., 1870, 463.—SNOW, Birds Kan., 1872, 6.—MERRIAM, U. S. Geol. Surv. Terr., 1872, 692 (Idaho; Wyoming).—YARROW, Rep. Orn. Specs., 1871, Wheeler's Exped., 1874, 35.

Chordeiles popetue var. *henryi*, ALLEN, Bul. Mus. Comp. Zool., 1872, 179 (Middle Kansas, west to Utah).—BD., BREW., & RIDG., N. A. Birds, ii, 1874, 404, pl. 46, f. 4.—YARROW & HENSHAW, Rep. Orn. Specs., 1872, Wheeler's Exped., 1874, 23.—HENSHAW, An. Lyc. Nat. Hist. N. Y., xi, 1874, 8.—*Id.*, An. List Birds Utah, 1872, Wheeler's Exped., 1874, 47.—*Id.*, Rep. Orn. Specs., 1873, Wheeler's Exped., 1874, 88, 128.—ALLEN, Proc. Bost. Soc. Nat. Hist., June, 1874, 16, 18, 32.

Chordeiles virginianus var. *henryi*, COUES, Key N. A. Birds, 1872, 181.—*Id.*, Birds Northwest, 1874, 264.

Chordeiles virginianus (?), NEWB., P. R. R. Rep., vi, 1857, 78.

Chordeiles popetue (?), HEERM., P. R. R. Rep., x, pt. ii, 1859, 35.

In the Middle and Southern Region, the Nighthawk is very abundant throughout the open country; the number of individuals in a given locality being usually much greater than in any section where I have ever seen it in the East. It prefers the plains and lowlands generally, and in the vicinity of water, whether in the shape of stagnant pools or of the larger streams and rivers, is never absent. Mr. Allen gives it a vertical range in the mountains up to 12,000 feet. So numerous were they in Colorado on the Rio Grande in June, that their numbers, as they flew up and down in the open spaces along the banks, made it seem as though one continuous flock was streaming along. Numerous as they were, they all probably were residents of the neighborhood, and in tramping about the woods in the daytime I frequently startled them off the ground, when in some shady secluded spot they were resting through the day. Its activity on the wing is best displayed in the early hours of morning and just as dusk is fairly settling down upon the earth, and its powers of vision are probably then at their best, as it doubles and turns in pursuit of insects with marvelous speed and rapidity of movement. It by no means, however, spends

the whole day in secluded retirement, but often, especially in June, may be seen by hundreds flying over some marshy spot on the prairies, and seem to find no difficulty in reaping a rich repast, even in the brightest hours of noonday. They continue on the wing after nightfall, at least till the outlines of their forms can no longer be discerned in the gathering gloom. Their habits during the nesting season appear everywhere the same.

No.	Sex.	Locality.	Date.	Collector.	Wing.	Tail.	Bill.	Tarsus.
.....	♀ ad.	Nevada	Aug. 9, 1871	F. Bischoff .....	.....	.....	.....	.....
774	♂ jun.	Gila River, Ariz	Sept. 14, 1873	H. W. Henshaw	7.36	4.18	0.37	0.63
98	♂	Greenhorn River, Colo.	Aug. 5, 1874	C. E. Aiken .....	.....	.....	.....	.....
156	♂	Fort Garland, Colo....	Aug. 13, 1874	..... do .....	.....	.....	.....	.....

CHORDEILES ACUTIPENNIS (Bodd.), var. TEXENSIS, Lawr.

Texas Nighthawk.

Chordeiles texensis, LAWRE., AN. Lyc. Nat. Hist. N. Y., vi, Dec., 1856, 167.—BD., Birds N. A., 1858, 154, pl. 44.—*Id.*, Proc. Acad. Nat. Sci. Phila., 1859, 3 (Cape Saint Lucas).—*Id.*, U. S. & Mex. Bound. Surv. Terr., ii, pt. ii, 1859, Birds, 7, pl. vi.—COUES, Proc. Acad. Nat. Sci. Phila., 1866, 58 (Fort Whipple, Ariz.).—*Id.*, *ib.*, 1868, 82 (Arizona).—COOPER, Birds Cal., i, 1870, 345.—COUES, Key N. A. Birds, 1872, 181.—COUES, Birds Northwest, 1874, 263.
Chordeiles sapiti var. *texensis*, BD., BREW., & RIDG., N. A. Birds, ii, 1874, 406, pl. 46, f. 5.
Chordeiles acutipennis var. *texensis*, HENSHAW, Rep. Orn. Specs., 1873, Wheeler's Exped., 1874, 129.

Specimens obtained on the Gila River September 14, where it was abundant. Made its appearance perhaps half an hour before dusk, keeping over the river, where, in pursuit of insects, it flew swiftly in irregular circles. The common nighthawk was also present and associating freely with it, though the present species was the most abundant.

This was the only occasion the species has been noted by our parties, though it doubtless occurs in summer in many of the warm river valleys in Southern Arizona, leaving our Territory soon after the close of the breeding season.

No.	Sex.	Locality.	Date.	Collector.	Wing.	Tail.	Bill.	Tarsus.
775	♂ jun.	Gila River, Ariz	Sept. 14, 1873	H. W. Henshaw	6.33	3.86	0.25	0.50
776	♀ jun.	..... do .....	..... do .....	..... do	6.76	4.22	0.26	0.50

ANTROSTOMUS NUTTALLI (Aud.).

Poorwill.

- Caprimulgus nuttalli*, AUD., B. Am., vii, 1843, pl. cccxcv, app.—WOODH., Sitgreave's Exp. Zuñi & Col. Riv., 1854, 63.
- Antrostomus nuttalli*, BD., Birds N. A., 1858, 149.—NEWB., P. R. R. Rep., vi, 1857, 77.—HEERM., P. R. R. Rep., x, pt. iv, 1859, 35.—BD., U. S. & Mex. Bound. Surv., ii, pt. ii, 1859, Birds, 6.—KENNERLY, P. R. R. Rep., Whipple's Route, x, 1859, 23.—BD., Ives' Col. Exped., 1857-58, pt. iv, 5.—HENRY, Proc. Acad. Nat. Sci. Phila., 1859, 106 (New Mexico).—COOP. & SUCKL., P. R. R. Rep., xii, pt. ii, 1860, 166.—HAYD., Trans. Am. Phil. Soc., xii, 1862, 157.—COUES, Proc. Acad. Nat. Sci. Phila., 1866, 58 (Fort Whipple, Ariz.).—COOPER, Birds Cal., i, 1870, 340.—ALLEN, Bull. Mus. Comp. Zool., 1872, 179.—COUES, Key N. A. Birds, 1872, 181.—SNOW, Birds Kan., 1872, 6.—AIKEN, Proc. Bost. Soc. Nat. Hist., xv, 1872, 206 (Wyoming).—MERRIAM, U. S. Geol. Surv. Terr., 1872, 692.—COUES, Am. Nat., vii, 1873, 325.—BD., BREW., & RIDG., N. A. Birds, ii, 1874, 417, pl. 46, f. 3.—YARROW & HENSHAW, Rep. Orn. Specs., 1872, Wheeler's Exped., 1874, 23.—HENSHAW, An. Lyc. Nat. Hist. N. Y., xi, 1874, 8.—*Id.*, An. List Birds Utah, 1872, Wheeler's Exped., 1874, 47.—*Id.*, Rep. Orn. Specs., 1873, Wheeler's Exped., 1874, 67, 88, 129.—ALLEN, Proc. Bost. Soc. Nat. Hist., June, 1874, 32.—COUES, Birds Northwest, 1874, 261.

This Whippoorwill is found in varying numbers throughout the entire Middle and Southern Region, but everywhere it is much more numerous than its relative of the Eastern States, which it entirely replaces in the sections it inhabits. It makes its appearance in the deeply shadowed portions of the river bottoms a few minutes before dusk, and, as soon as night settles down, the rather mournful note of *poor-will, poor-will*, may be heard coming from the edges of the woods, and even from the sage brush plains. Their notes are most often noticed in early evening, and again just before dawn, but not infrequently their song is heard through the entire night. When on the wing after insects, their flight consists of rapid, irregular turnings and windings, which are prolonged but a moment or so, when they alight, often on a fallen log, but usually on the bare ground. Occasionally, at dusk, I have seen them alight almost at my feet, without betraying any sense of my presence. When flying, they emit a constantly repeated clucking note, which is, I think, common to both sexes. Their eggs are pure white, without spots, and are deposited on the ground during the latter part of June.

In the whole extent of region traversed by the survey in Eastern Arizona, this Whippoorwill was found common. It was especially numerous near Camp Apache and in the White Mountains, and I have heard them, in the latter part of August, for half a dozen miles, singing soon after dusk within a short distance of each other. It begins to fly but a short time before dark, and on this account is rarely met with and difficult to procure. Should a beaten road chance to pass through the forest, it will be found to be a favorite hunting ground. I have often noticed that they make their first appearance in such a spot just before dusk, and remain in the neighborhood during the early evening. Probably the well known abundance of flies and insects which frequent such places affords an explanation of this habit. The males continue their notes till very late in the season; for I frequently heard them during the first part of October, and even as late as the 17th. Young birds differ from the adult in having a lighter, purer shade of ash above and a suffusion of cinnamon over the back and wings. Below is a general fulvous tint, especially noticeable on the throat patch.

No.	Sex.	Locality.	Date.	Collector.	Wing.	Tail.	Bill.	Tarsus.
90	♂ ad.	Denver, Colo.	May 15, 1873	H. W. Henshaw	5.64	3.61	0.43	0.71
612	♀ jun.	Camp Apache, Ariz.	Aug. 25, 1873	..... do	5.63	3.30	0.40	0.71
737	♀ ad.	Thirty miles south of Camp Apache, Ariz.	Sept. 11, 1873	..... do	5.80	3.80	0.42	0.72
762	♀ ad.	..... do	Sept. 12, 1873	..... do	5.70	3.47	0.43	0.69
763	♀ ad.	..... do .....	..... do .....	..... do	5.87	3.67	0.43	0.73
762A	♀ ad.	..... do .....	..... do .....	..... do	5.59	3.48	0.41	0.73
874	♀ jun.	Camp Grant, Ariz.	Sept. 26, 1873	..... do	5.55	3.66	0.45	0.68
126	♂ jun.	Willow Spring, Ariz.	July 13, 1874	..... do .....	.....	.....	.....	.....
194	♂ ad.	Rock Cañon, Ariz.	July 21, 1874	..... do .....	.....	.....	.....	.....
195	♂ ad.	Camp Bowie, Ariz. ....	..... do .....	..... do .....	.....	.....	.....	.....
307	♀ ad.	..... do	Aug. 7, 1874	Dr. J. T. Rothrock .....	.....	.....	.....	.....
155	♂ jun.	Fort Garland, Colo. ...	Aug. 13, 1874	C. E. Aiken .....	.....	.....	.....	.....
890	♀ ad.	Mount Graham, Ariz. ..	Sept. 27, 1874	H. W. Henshaw .....	.....	.....	.....	.....

FAM. CYPSELIDAE: SWIFTS.

PANYPTILA SAXATILIS (Woodh.).

White-throated Swift.

Acanthylis saxatilis, WOODH., Sitgreave's Exp. Zuñi & Col. Riv., 1854, 64.

Panyptila saxatilis, COUES, Key N. A. Birds, 1872, 182.—HENSHAW, An. Lyc. Nat. Hist. N. Y., xi, 1874, 8.—*Id.*, An. List Birds Utah, 1872, Wheeler's Exped.,

1874, 47.—YARROW & HENSHAW, Rep. Orn. Specs., 1872, Wheeler's Exped., 1874, 23.—HENSHAW, Rep. Orn. Specs., 1873, Wheeler's Exped., 1874, 129.—COUES, Birds Northwest, 1874, 265.

Panyptila melanoleuca, BD., Birds N. A., 1858, 141.—HEERM., P. R. R. Rep., Parke's Route, x, 1859, 10.—KENNERLY, P. R. R. Rep., Whipple's Route, x, 1859, 23, pl. xviii, f. 1.—HEERM., P. R. R. Rep., x, pt. ii, 1859, 35.—COOPER, Proc. Cal. Acad., 1861, 122 (Southern California).—COUES, Proc. Acad. Nat. Sci. Phila., 1866, 57.—COOPER, Birds Cal., i, 1870, 347.—ALLEN, Bul. Mus. Comp. Zoöl., 1872, 180 (Colorado).—AIKEN, Proc. Bost. Soc. Nat. Hist., xv, 1872, 206.—BD., BREW., & RIDG., N. A. Birds, ii, 1874, 424, pl. 45, f. 5.

As remarked by Dr. Coues, there can be no reasonable doubt that in this swift we have the bird described by Dr. Woodhouse from individuals seen by him at Inscription Rock, N. Mex., in 1854. Visiting this place in 1873, I still found that the faces of the cliffs, broken and seamed in every direction, afforded shelter for many pairs of these birds, who were flying backward and forward, and at short intervals entering into the rifts, and in a moment re-appearing, having borne to their young, whose faint cries were now and then audible, the insects, in quest of which they were skimming the air. To understand the mistake made by Dr. Woodhouse in describing the bird as possessed of a white rump, one need only place himself at an elevation where he can look down upon the bird as it courses the air below, or nearly on a level with himself, when he will instantly perceive what appears to be a continuous white patch across the rump, but which in reality is merely due to the apparent overlapping of the conspicuous white flank-tufts, which, as stated by Dr. Coues, "nearly or quite meet across the rump." The bird is an abundant inhabitant of Utah, Colorado, New Mexico, and Arizona, but its persistent adherence to the neighborhood of rocky cliffs, where it alone finds nesting sites, renders it extremely local, while its habit of flying high in the air, it very rarely descending into the valleys and cañons, and the extreme velocity of its flight, combine to make it a species of great rarity in museums, despite of its abundance. Though I have on several occasions found colonies breeding in the faces of cliffs, the inaccessibility of the crevices they had chosen for their retreats has always proved an insurmountable obstacle to any attempt to spy out their domestic arrangements.

No.	Sex.	Locality.	Date.	Collector.	Wing.	Tail.	Bill.	Tarsus.
28	♂ ad.	Fort Wingate, N. Mex.	July 13, 1873	Dr. C. G. Newberry....	5.59	2.50	0.22	0.42
430	Ad.	..... do .....	..... do	H. W. Henshaw	5.48	2.75	0.23	0.43

FAM. TROCHILIDAE: HUMMINGBIRDS.

STELLULA CALLIOPE (Gould).

Calliope Hummingbird.

Trochilus calliope, GOULD, Proc. Zool. Soc., 1847, 11 (Mexico).

Selasphorus calliope, XANTUS, Proc. Acad. Nat. Sci. Phila., 1859, 190 (Fort Tejon, Cal.).

Stellula calliope, COOPER, Birds Cal., 1870, 363.—COUES, Key N. A. Birds, 1872, 185.—

MERRIAM, U. S. Geol. Surv. Terr., 1872, 693 (Fort Ellis, Mont.).—BD.,

BREW., & RIDG., N. A. Birds, ii, 1874, 445, pl. xlvii, f. 9.—HENSHAW, Rep.

Orn. Specs, 1873, Wheeler's Exped., 1874, 130.—YARROW, Rep. Orn. Specs.,

1871, Wheeler's Exped., 1874, 35.

Though not nearly so abundant as either the Rufous-backed or Broad-tailed Hummers, this diminutive species was still by no means rare. At Inscription Rock, N. Mex., where it was first seen, perhaps half a dozen were found in a two days' stay. At Camp Apache, during the latter part of August and 1st of September, it was rather common; but, in the higher portions of the White Mountains, it was most abundant, and here, I doubt not, it finds its summer home. At Camp Grant, the 27th of August, it was still present, though in small numbers.

No.	Sex.	Locality.	Date.	Collector.	Wing.	Tail.	Bill.	Tarsus.
.....	♀ ad.	Nevada	May 25, 1871	F. Bischoff .....	.....	.....	.....	.....
470	♀	Inscription Rock, N. Mex.	July 23, 1873	H. W. Henshaw	1.60	1.97	0.60	.....
474	♂ ad.	..... do .....	..... do .....	..... do	1.47	0.98	0.57	.....
488	♀ ad.	..... do	July 24, 1873	..... do	1.64	0.95	0.62	.....
490	♂ ad.	..... do .....	..... do .....	..... do	1.45	0.98	0.54	.....
497	♂ ad.	..... do .....	..... do .....	..... do	1.48	0.98	0.60	.....
538	♀ ad.	Camp Apache, Ariz....	Aug. 8, 1873	..... do	1.63	0.98	0.61	.....
537	♀ ad.	Inscription Rock, N. Mex.	Aug. 9, 1873	..... do	1.63	0.94	0.63	.....
610	♂ jun.	Camp Apache, Ariz ...	Aug. 25, 1873	..... do	1.65	0.98	0.60	.....
647	♂ ad.	..... do	Aug. 28, 1873	..... do	1.50	0.97	0.55	.....
648	♂ jun.	..... do .....	..... do .....	..... do	1.63	0.99	0.55	.....
649	♂ jun.	..... do .....	..... do .....	..... do	1.63	1.00	0.58	.....
551	♀ ad.	White Mountains, Ariz.	—, 1874	..... do	1.60	0.95	0.58	.....
552	♀	..... do	—, 1874	..... do	1.64	0.98	0.61	.....
637	♂ ad.	..... do	—, 1874	..... do	1.47	0.91	0.55	.....
849	♂ jun.	Camp Grant, Ariz....	—, 1874	..... do	1.59	0.91	0.57	.....

TROCHILUS ALEXANDRI, Bourcier & Mulsant.

Black-chinned Hummingbird.

Trochilus alexandri, BOURCIER & MULSANT, Ann. de la Soc. d'Agric. de Lyons, ix, 1846, 380.—BD., Birds N. A., 1858, 133.—*Id.*, U. S. & Mex. Bound. Surv., ii, pt. ii, 1859, Birds, 6, pl. v.—HEERM., P. R. R. Rep., x, pt. ii, 1859, 56.—XANTUS, Proc. Acad. Nat. Sci. Phila., 1859, 190.—COUES, Proc. Acad. Nat. Sci. Phila., 1866, 56 (Colorado Desert).—*Id.*, *ib.*, 1868, 82.—COOPER, Birds Cal., ii, 1870, 353.—COUES, Key N. A. Birds, 1872, 184.—MERRIAM, U. S. Geol. Surv. Terr., 1872, 693 (Ogden, Utah).—BD., BREW., & RIDG., N. A. Birds, ii, 1874, 450, pl. xlvii, f. 1.—YARROW & HENSHAW, Rep. Orn. Specs., 1872, Wheeler's Exped., 1874, 23.—HENSHAW, An. Lyc. Nat. Hist. N. Y., xi, 1874, 8.—*Id.*, An. List Birds Utah, 1872, Wheeler's Exped., 1874, 47.—*Id.*, Rep. Orn. Specs., 1873, Wheeler's Exped., 1874, 130.

This hummingbird, a near ally of the eastern Ruby-throated Hummer (*T. colubris*), appears to take the place of that bird in the far West. In Utah, it is perhaps the most numerous of its tribe, and indeed was the only one detected by our parties. It seems to follow the range of the flowers, and to determine its habitat by their presence, following them from the plains to a high altitude in the mountains, though it is most abundant between the two extremes. Farther West, in the cañons of Nevada, Dr. H. C. Yarrow found it still abundant. In fact, while from Utah it extends to the Pacific, and to the northward follows the Coast range far up, it appears quite restricted to the eastward, not apparently reaching into Colorado, and not, so far as I am aware, having been reported from New Mexico.

In Arizona, we did not meet with this bird till, at Camp Apache, a few were found in August, nor till we reached the neighborhood of Camp Bowie, in the extreme southeastern portion of the Territory, was it observed to be at all common; but here it was present in great numbers, far outnumbering all the others. At this season (August), the rather sterile country about Camp Bowie did not afford blossoms in abundance, and the faded flowers of the *Agave americana* seemed the chief source whence it drew its supply of insects, which the non-decaying blossoms attracted. In a narrow rocky cañon near Camp Crittenden, I noticed large beds of our common Morning Glory, and it seemed as though these little creatures must have assembled from miles around to run riot in the profusion of the bright blue flowers. The buzzing

of their tiny wings was almost incessant, as they darted to and fro, hurrying from flower to flower, and plunging into each their long bill, sipping the nectar, or relieving each of the minute insects which infested them.

The combats between the males were many, and inevitable. Whenever two chanced across each other's path, they closed together instantly with sharp angry notes, and strike at each other with all the force of their little bodies, seemingly bent on warring to the death. Indeed, were their strength and ability to injure commensurate with the anger and animosity which they display, little hope would there be for either contestant in these rough tilts. As it is, little damage is done; though I have seen two males, like wrestlers, fall to the ground in each other's embrace, in a moment the worsted one would be up, and seek safety in flight, while the victor would repair to the nearest perch to arrange his disordered plumes.

A nest of this hummer was secured by Dr. W. J. Hoffman at Big Pine, Cal., where many of the birds were present. The nest was placed on a small twig of cottonwood, which waved a short distance above the surface of a brawling mountain stream.

No.	Sex.	Locality.	Date.	Collector.	Wing.	Tail.	Bill.	Tarsus.
129	♀ ad.	Provo, Utah.....	July 29, 1872	Dr. H. C. Yarrow and H. W. Henshaw.	.....	.....	.....	.....
128	♂ ad.	..... do .....	..... do .....	..... do .....	.....	.....	.....	.....
130	♀ ad.	..... do .....	..... do .....	..... do .....	.....	.....	.....	.....
131	♂ ad.	..... do	July 30, 1872	..... do .....	.....	.....	.....	.....
132	♀ jun.	..... do .....	..... do .....	..... do .....	.....	.....	.....	.....
521	♂ jun.	Camp Apache, Ariz....	Aug. 5, 1873	H. W. Henshaw.....	1. 77	1. 23	0. 80	.....
587	♂ jun.	..... do	Aug. 21, 1873	..... do	1. 68	1. 05	0. 72	.....
844	♂ jun.	Camp Grant, Ariz....	Sept. 24, 1873	..... do	1. 90	1. 17	0. 77	.....
380	♂ jun.	Camp Bowie, Ariz....	Aug. 11, 1874	..... do .....	.....	.....	.....	.....
381	♀ jun.	..... do .....	..... do .....	..... do .....	.....	.....	.....	.....
467	♂ ad.	Sienega, Ariz	Aug. 21, 1874	..... do .....	.....	.....	.....	.....
473	♂ ad.	Camp Crittenden, Ariz.	Aug. 23, 1874	..... do .....	.....	.....	.....	.....
493	♂ ad.	..... do	Aug. 24, 1874	..... do .....	.....	.....	.....	.....
494	♀ ad.	..... do .....	..... do .....	..... do .....	.....	.....	.....	.....
517	♀ ad.	..... do	Aug. 27, 1874	..... do .....	.....	.....	.....	.....
522	♀ ad.	..... do	Aug. 29, 1874	..... do .....	.....	.....	.....	.....
523	♀ ad.	..... do .....	..... do .....	..... do .....	.....	.....	.....	.....

CALYPTE ANNAE (Lesson).

Anna Hummingbird.

Ornisma anna, LESSON, Oiseaux Mouches, 1830, pl. cxxiv.

Trochilus anna, NEWB., P. R. R. Rep., vi, 1857, 79.—HEERM., P. R. R. Rep., x, pt. ii, 1859, 56.

Atthis anna, XANTUS, Proc. Acad. Nat. Sci. Phila., 1859, 190 (Fort Tejon, Cal.).

Calypte anna, BD., Birds N. A., 1858, 137.—COOPER, Birds Cal., 1870, 358.—COUES, Key N. A. Birds, 1872, 185.—BD., BREW., & RIDG., N. A. Birds, ii, 1874, 454, pl. xlvii, f. 7.—HENSHAW, Rep. Orn. Specs., 1873, Wheeler's Exped., 1874, 130.

As this species has been found within our borders only in the coast region of California, its detection at Camp Grant, Ariz., has widely extended its known distribution. It is likely that it inhabits the intermediate region in greater or less numbers. At the point where it was found, it is by no means rare, as I saw nearly twenty during the four days spent in collecting in this vicinity. They were always observed in the immediate vicinity of the creeks, where only at this late season there remained a few of the bright flowers about which they were wont to hover. Their large size rendered them very conspicuous among the other species, and, as if aware of this, they were much the shyest of all.

No.	Sex.	Locality.	Date.	Collector.	Wing.	Tail.	Bill.	Tarsus.
852	♂	Camp Grant, Ariz.	Sept. 24, 1873	H. W. Henshaw.....	2.00	1.16	0.68	.....
853	♂ ad.	..... do .....	..... do .....	..... do	1.94	1.15	0.73	.....
854	.....	..... do .....	..... do .....	..... do	1.90	1.37	0.71	.....
873	♂	..... do	Sept. 27, 1873	..... do	1.93	1.25	0.68	.....
879	♂ jun.	..... do .....	..... do .....	..... do	1.95	1.30	0.70	.....

SELASPHORUS RUFUS (Gmel.).

Rufous-backed Hummingbird.

Trochilus rufus, GMEL., Syst. Nat., i, 1788, 497.

Polytmus rufus, WOODH., Sitgreave's Exp. Zuñi & Col. Riv., 1854, 66.

Selasphorus rufus, NEWB., P. R. R. Rep., vi, 1857, 79.—BD., Birds N. A., 1858, 134.—XANTUS, Proc. Acad. Nat. Sci. Phila., 1859, 190 (Fort Tejon, Cal.).—HEERM., P. R. R. Rep., x, pt. ii, 1859, 57.—BD., U. S. & Mex. Bound. Surv., ii, pt. ii,

1859, Birds, 6.—COOP. & SUCKL., P. R. R. Rep., xii, pt. ii, 1860, 165.—COUES, Proc. Acad. Nat. Sci. Phila., 1866, 57 (Fort Whipple, Ariz.).—COOPER, Birds Cal., 1870, 355.—COUES, Key N. A. Birds, 1872, 185.—BD., BREW., & RIDG., N. A. Birds, ii, 1874, 459, pl. xlvii, f. 4.—HENSHAW, Rep. Orn. Specs., 1873, Wheeler's Exped., 1874, 131.

By far the most abundant of the family in New Mexico and Arizona, as shown in every locality visited by our party. Quite numerous at Inscription Rock. At Camp Apache during the month of August they were seen by hundreds hovering over the beds of brightly tinted flowers, which in the mountains grow in the greatest profusion on the borders of the streams.

This bird seems to affect no particular locality, but is about equally abundant on the high mountains, in the open tracts of pine woods, in the valleys and deep cañons—in fact, wherever flowers are found.

The males are very pugnacious, and wage unceasing warfare on all the other species, as well as among themselves. Even as late as August it was not uncommon to see these birds still in pairs, and established in certain areas, of which they appeared to consider themselves the sole possessors, allowing no intruders. They manifested an especial animosity against the Broad-tailed Hummer, and, on the appearance of one, would instantly dart forth with shrill, angry notes, to attack and drive away the intruder; while the female, sitting on some neighboring tree, would watch the oft repeated contest with evident interest.

At Camp Grant, during the last days of September, they were still numerous, but after leaving this point I did not again see the species. A series of over forty specimens was secured, representing all stages of plumage. If this species breeds in Arizona, it must retire to the depths of the highest mountains to find its summer home. In the pine woods of the White Mountains, at an altitude of 8,000 feet, this species was not present, though the following one occurred there quite numerously. At Mount Graham, at from 9,000 to 10,000 feet high, I searched carefully, August 1 to 4, for evidence of the presence of this bird; but if here, it was very rare, as I only saw one which I could attribute to this species, and even of this I was not able to satisfy myself thoroughly, as it flew past too quickly for sure identification. Mr. C. E. Aiken took several specimens near Fort Garland, Colo., thus adding the species to

the fauna of that Territory. This was in August, when the birds were migrating; in this section it appears wholly absent during summer.

No.	Sex.	Locality.	Date.	Collector.	Wing.	Tail.	Bill.	Tarsus.
491	Inscription Rock, N. Mex.	July 24, 1873	H. W. Henshaw.....	1.80	1.31	0.68	.....
495 do .....	..... do .....	..... do	1.75	1.25	0.72	.....
496 do .....	..... do .....	..... do	1.94	1.50	0.72	.....
536	Mountains near Camp Apache, Ariz.	..... do .....	..... do	1.60	1.30	0.34	.....
38	Deer Spring, N. Mex..	July 25, 1873	Dr. C. G. Newberry ..	1.63	1.33	0.65	.....
537	Mountains near Camp Apache, Ariz.	Aug. 5, 1873	H. W. Henshaw.....	1.63	1.30	0.68	.....
559 do	Aug. 9, 1873	..... do	1.60	1.32	0.65	.....
563 do .....	..... do .....	..... do	1.59	1.27	0.62	.....
564 do .....	..... do .....	..... do	1.58	1.23	0.66	.....
603	Camp Apache, Ariz....	Aug. 11, 1874	..... do	1.73	1.15	0.64	.....
616 do	Aug. 23, 1874	..... do	1.74	1.25	0.71	.....
624 do	Aug. 27, 1874	..... do	1.80	1.28	0.66	.....
888	Camp Grant, Ariz.	Sept. 27, 1874	..... do	1.70	1.26	0.73	.....
150	♀ jun.	Fort Garland, Colo	Aug. 12, 1874	C. E. Aiken .....	.....	.....	.....	.....
153	♀ ad.	..... do .....	..... do .....	..... do .....	.....	.....	.....	.....
157	♀ jun.	..... do .....	..... do .....	..... do .....	.....	.....	.....	.....

SELASPHORUS PLATYCERCUS (Swains.).

Broad-tailed Hummingbird.

Trochilus platycercus, SWAINS., Phil. Mag., i, 1827, 441 (Mexico).
Selasphorus platycercus, BD., Birds N. A., 1858, 135, 922.—*Id.*, U. S. & Mex. Bound. Surv., ii, pt. ii, 1859, Birds, 6, pl. v, figs. 1, 2.—HENRY, Proc. Acad. Nat. Sci. Phila., 1859, 106 (New Mexico).—COUES, Proc. Acad. Nat. Sci. Phila., 1866, 57.—COOPER, Proc. Cal. Acad., 1861, 68.—*Id.*, Birds Cal., i, 1870, 357.—ALLEN, Bul. Mus. Comp. Zoöl., iii, 1872, 180 (western edge of plains, and mountains of Colorado up to timber line; Cheyenne, Wyo.; Ogden, Utah).—COUES, Key N. A. Birds, 1872, 185.—HOLD., Proc. Bost. Soc. Nat. Hist., 1872, 206 (Wyoming).—BD., BREW., & RIDG., N. A. Birds, ii, 1874, 462, pl. 47, f. 5.—HENSHAW, An. Lyc. Nat. Hist. N. Y., xi, 1874, 8.—*Id.*, An. List Birds Utah, 1872, Wheeler's Exped., 1874, 47.—*Id.*, Rep. Orn. Specs., 1873, Wheeler's Exped., 1874, 88, 132.—COUES, Birds Northwest, 1874, 271.

The Broad-tailed Hummer possesses a wide distribution, and in Utah, Colorado, New Mexico, and Arizona is the most common and generally diffused of the family; being found in the breeding season throughout the mountain

districts from the edge of the plains upward. In Southern Colorado, it appears to be the only one of its kind that passes the summer, yet it makes up for the absence of its congeners by its own abundance. Though most common on the creeks, at an altitude of about 7,000 feet, it also reaches well up to timber line.

A nest, found June 14, was saddled on a horizontal limb of a small spruce; a second, taken the 19th, was built on a small, swinging branch of a cottonwood. They are less artistic structures than usual with birds of this family, and are composed of cottony substances from plants, covered externally with bits of bark and moss. Both contained two white eggs, perfectly fresh. During the mating, and perhaps also through the entire breeding season, the flight of the male is always accompanied by a curious, loud, metallic, rattling noise, which he is enabled to produce in some way by means of the attenuation of the outer primaries. This is, I think, intentionally made, and is analogous to the love notes of other birds. Though I saw many of these birds in the fall, it was only very rarely that this whistling noise was heard, and then with greatly diminished force. Though in summer it is of frequent occurrence throughout this wide area, its numbers in certain localities in fall are still greater.

Though there appears to exist an especially hostile feeling between this and the last species yet in the fall, when migrating, they are brought by the similarity of tastes and habits into the same localities, and their combined numbers are in some favored spots in Arizona simply surprising. The beds of bright flowers about Willow Spring, in the White Mountains, Arizona, were alive with them in August; and as they moved swiftly to and fro, now surfeiting themselves on the sweets they here found so abundant, now fighting with each other for possession of some such tempting prize as a cluster of flowers, their rapid motions, and the beauty of their colors, intensified by the bright sunlight—the gorgets of gold and purple contrasting against their emerald and bright red bodies—conspired to an effect not soon to be forgotten.

No.	Sex.	Locality.	Date.	Collector.	Wing.	Tail.	Bill.	Tarsus.
347	♀ ad.	Fort Garland, Colo....	May 14, 1873	H. W. Henshaw.....	1.96	1.48	0.72	.....
126	♂ ad.	..... do	May 25, 1873	..... do	1.97	1.44	0.44	.....
127	♂ ad.	..... do .....	..... do .....	..... do	1.98	1.45	0.65	.....
128	♂ ad.	..... do .....	..... do .....	..... do	1.90	1.50	0.65	.....
128A	♂ ad.	..... do .....	..... do .....	..... do	1.97	1.44	0.65	.....
128B	♂ ad.	..... do	May 27, 1873	..... do	1.93	1.40	0.68	.....
157	♂ ad.	..... do	May 28, 1873	..... do	1.88	1.50	0.72	.....
159	♂ ad.	..... do .....	..... do .....	..... do	1.90	1.36	0.64	.....
492	♀ ad.	Inscription Rock, N. Mex.	July 24, 1873	..... do	2.02	1.38	0.76	.....
543	♂ ad.	White Mountains, Ariz.	Aug. 8, 1874	..... do	1.95	1.33	0.71	.....
539	♂ ad.	..... do	Aug. 9, 1874	..... do	1.90	1.48	0.73	.....
540	♂ ad.	Camp Apache, Ariz....	..... do .....	..... do	1.91	1.38	0.71	.....
568	♂ ad.	White Mountains, Ariz.	Aug. 12, 1874	..... do	1.95	1.38	0.64	.....
649	♂ ad.	..... do	Aug. 28, 1874	..... do	1.90	1.33	0.64	.....
91	♂ ad.	Camp Apache, Ariz ...	Sept. —, 1874	Dr. C. G. Newberry...	1.88	1.36	0.75	.....
873	♂ ad.	Camp Grant, Ariz.....	Sept. 26, 1874	H. W. Henshaw	1.98	1.42	0.67	.....

EUGENES FULGENS (Swains.).

Refulgent Hummingbird.

Eugenes fulgens, HENSHAW, Am. Nat., April, 1874, 241.—*Id.*, Rep. Orn. Specs., 1873, Wheeler's Exped., 1874, 132.—COUES, Check-List, 1874, app., 131.—(?) *Id.*, Birds Northwest, 1874, 271 (in text).

SP. CHAR.—Male: tail rather deeply emarginated; head above violet purple; rest of upper parts bronzed green, becoming pure bronze on the tail; gorget brilliant emerald green, with strong purple reflections; lower portion of breast and abdomen opaque black, more velvety toward the green of throat; sides of body dull green; wing above and below dull purple; upper and lower wing coverts green; crissum pale brownish-gray; bill and feet black. Female: tail double-rounded; above dark metallic-green, each feather edged with ash, below dull white; feathers of throat and fore part of breast with dull grayish-green centers; sides green, edged with ash; wing dull purple; each feather of the tail, except the two central, which are green throughout, with broad purple band; three outer tail-feathers broadly tipped with dull white, which, on the outer, extends slightly farther up on the outer web. Length, 4.61; wing, 2.43; tail, 1.75; bill, 1.09.

HAB.—Mexico; Arizona (Henshaw).

A single female of this large and beautiful species was taken at Camp Grant in 1873, thus giving the bird a place in our fauna; but no information was obtained of its abundance or the regions it affects. Fully expecting to find the species a summer inhabitant of the mountain districts of Southern Arizona, I was not surprised, when, on reaching Mount Graham, I found the supposition verified. During the first three days of August I secured

two adult males and another female. In talking with the lumbermen of the neighborhood, I learned that the "large hummingbirds" had been quite common earlier in the summer, but at that time they had nearly disappeared, though the "smaller birds" (*S. platycercus*) were still quite numerous. I suppose that during the mating season they had made themselves more conspicuous; and, indeed, had probably frequented the little valley in which the cabins of these men were built in considerable numbers, but had retired, each pair to some secluded spot deeper in the mountains, to rear their young.

A very beautiful nest was discovered, which, save in its large size, resembles in its construction the best efforts of the little Eastern Rubythroat. It is composed of mosses nicely woven into an almost circular cup, the interior possessing a lining of the softest and downiest feathers, while the exterior is elaborately covered with lichens, which are securely bound on by a network of the finest silk from spiders' webs. It was saddled on the horizontal limb of an alder, about twenty feet above the bed of a running mountain stream, in a glen which was overarched and shadowed by several huge spruces, making it one of the most shady and retired little nooks that could be imagined. The two young which it contained had just been hatched, and the female was returning to the nest when I caught sight of her, having probably carried away the broken egg shells, fragments of which were still in the nest. The dimensions of the nest are as follows: depth, externally, 1.50; internally, 0.75; greatest external diameter, 2.25; internal diameter, 1.15.

No.	Sex.	Locality.	Date.	Collector.	Wing.	Tail.	Bill.	Tarsus.
265	♂ ad.	Mount Graham, Ariz ..	Aug. 2, 1874	H. W. Henshaw.....	2.77	1.82	1.03	.....
266	♂ ad.	..... do .....	..... do .....	..... do	2.92	1.90	1.11	.....
267	♀ ad.	..... do .....	..... do .....	..... do	2.75	1.75	1.18	.....

CIRCE LATIROSTRIS, Bourc.

Circe Hummingbird.

Circe latirostris, HENSHAW, Am. Sportsman, v, Feb. 20, 1875, 328.

SP. CHAR.—*Male*.—Head, all the upper parts, wing and tail coverts, and under surface of the body shining metallic green; the under parts generally, save the sides, with a tinge of blue; chin and throat sapphire-blue; tail indigo-blue; all the feathers tipped with grayish-brown, the outer pair just perceptibly, but the amount increasing on the inner ones. Under tail coverts dusky-white. Base of upper mandible reddish.

Lower mandible reddish flesh-color; tip black. "The young male is less brilliantly colored, and has the under surface brownish-gray, with a few of the sapphire-blue feathers on the center of the throat."

Female.—Above, like the male. Beneath, of a uniform vinous-gray. Two central tail feathers bronzy-green. Four outer feathers bronze-green at base, succeeded by a broad, median band of indigo-blue; the three outer tipped with white, the outermost one most conspicuously.

A young female has the feathers of upper surface tipped with fulvous.

HAB.—Mexico; Arizona (Henshaw).

For the identification of this and the following species we are indebted to Mr. G. N. Lawrence, who has kindly compared the specimens forwarded to him, and finds them identical with specimens in his collection from Mexico and Guatemala.

Of this curious rather than beautiful hummingbird, three specimens were secured in the Chiricahua Mountains, at a point a few miles distant from old Camp Crittenden. As the breeding season was entirely passed, I was able to note nothing concerning its habits which served to distinguish it from others of the family, save what appeared to be a constant habit of frequenting the agaves; and all the specimens taken were shot as they were flying about these peculiar plants, in the neighborhood of which I am confident I saw several others. Great numbers of this species are found in Mexico; and, as they there inhabit the mountains and table lands, the species doubtless extends in summer through Northern Mexico, and finds in the extreme southern part of Arizona a suitable climate; while an abundance of the agave, to which plants it resorts in its more tropical home for at least a great portion of its subsistence, serves as a further attraction. No doubt these hummers are quite numerous in the locality I have referred to earlier in the season, as well as in other similar places.

No.	Sex.	Locality.	Date.	Collector.	Wing.	Tail.	Bill.	Tarsus.
482	♂ ad.	Chiricahua Mts., Ariz..	Aug. 23, 1874	H. W. Henshaw.....	2.00	1.31	0.80	.....
493	♂ ad.	..... do .....	..... do .....	..... do	2.00	1.33	0.85	.....
					2.02	1.35	0.85	.....

(?)DORICHA ENICURA, Vieill.

Slender Shear-tailed Hummer.

Doricha enicura, HENSHAW, Am. Sportsman, v, Feb. 20, 1875, 328.

SP. CHAR.—*Male*.—Tail excessively lengthened and forked; the outer pair of

feathers more than twice as long as the middle pair; upper parts bronzed bright golden green, duller on the head; chin black, glossed with green; gorget bluish-violet, with purple reflections, below which is a crescentic patch of light buff; sides and abdomen, save a band of white crossing its lower part and a median line of dark gray, bronze-green; under tail coverts greenish; wings purplish-brown, their upper coverts bronzy-green; tail purplish-black. Wing, 1.30; tail, 2.62; bill, 0.75.

Female.—Head, entire upper parts, upper wing coverts, and four middle tail feathers light bronze-green; wings purplish-brown; under portions generally with strong rufous suffusion, fading on the chin and throat into a light bluish ash, darker toward the sides; under tail coverts white; two outer tail feathers light rufous at base, tipped with white, and centrally marked with a band of black. Wing, 1.65; tail, 1.25; bill, 0.90.

HAB.—Guatemala; (?) Arizona (Henshaw).

The claim of this beautiful species to a place in our fauna rests upon the capture of a single female near Camp Bowie, Ariz. Mr. Lawrence writes me that hitherto it has never been known outside the limits of Guatemala, where it is a common bird. I regret that I am unable to give any information respecting either its habits or relative abundance in Arizona. Probably it is rare; for here, as at certain other points in Southeastern Arizona, the attention of the party was especially directed to the hummingbirds, the occurrence of novelties being rendered more probable by the abundance of certain other species, and at Camp Bowie notably by the great numbers of *Trochilus alexandri*. The well known agave plants of this region were here very abundant, and their tall, upright stems, surmounted by the short lateral stems, with their spreading bunches of blossoms, dotted the rocky hillsides in every direction, and gave a strange, weird aspect to the landscape. Around these the hummingbirds congregated, showing an especial liking for the nectar of the flowers, or possibly finding in them rich storehouses of the minute forms of insect life, which is the chief part of their diet. By taking a station near one of these, one could easily watch the motions of these little feathered gems as they darted to and fro; and had any other species been even tolerably numerous, it could scarcely have eluded our attention.

No.	Sex.	Locality.	Date.	Collector.	Wing.	Tail.	Bill.	Tarsus.
314	♀ ad.	Camp Bowie, Ariz	Aug. 8, 1874	H. W. Henshaw.....	1.67	1.27	0.87	.....

FAM. CUCULIDAE: CUCKOOS.

GEOCOCCYX CALIFORNIANUS (Lesson).

Chaparral Cock.

Saurothera californiana, LESSON, Comp. Buff., vi, 1829, 420.

Geococcyx mexicanus, WOODH., Sitgreave's Exp. Zuñi & Col. Riv., 1854, 92.—HEERM., P. R. R. Rep., x, pt. iv, 1859, 59.—BD., U. S. & Mex. Bound. Surv., ii, pt. ii, 1859, Birds, 5.—*Id.*, Proc. Acad. Nat. Sci. Phila., 1859, 303 (Cape Saint Lucas).—KENNERLY, P. R. R. Rep., Whipple's Route, x, 1859, 21.—XANTUS, Proc. Acad. Nat. Sci. Phila., 1859, 190 (Fort Tejon, Cal.).—COUES, Proc. Acad. Nat. Sci. Phila., 1866, 51 (Fort Whipple, Ariz.).—*Id.*, *ib.*, 1868, 82.—*Id.*, Am. Nat., vii, 1873, 324.—YARROW & HENSHAW, Rep. Orn. Specs., 1872, Wheeler's Exped., 1874, 24.—HENSHAW, Rep. Orn. Specs., 1873, Wheeler's Exped., 1874, 132.—COUES, Birds Northwest, 1874, 274.

Geococcyx viaticus, NEWB., P. R. R. Rep., vi, 1857, 91.

This remarkable bird, though southern in its distribution, reaches to the northward into the southern portion of Utah, where we obtained evidence from the settlers of its occurrence; and recently it has been found by Mr. Aiken, as a resident of Colorado, as far up as El Paso County; several specimens from which locality he has examined. In New Mexico and Arizona, it does not begin to be common until the southern part is reached, though my inquiries from the settlers developed the fact of its presence, here and there, in the upper portions of these Territories.

In the Gila Valley and southward, it is of common occurrence; though even here the nature of its habits, which lead it to inhabit the wooded river bottoms, and the chaparral of the hillsides, as well as its shy and suspicious disposition, renders it extremely liable to be overlooked. Its food, so far as I have had opportunities of investigating its nature, consists very largely of grasshoppers; and of quite a number of individuals the contents of whose stomachs I have examined all have contained more or fewer of these insects, to which is added the usual variety of coleopterous insects and bugs found upon the ground or the low marshes. Lizards, and probably also some of the smaller, harmless kinds of snakes, suffer from the attacks of this bird; but that the rattlesnake is ever thus singled out and preyed upon I am scarcely prepared to believe, unless sup-

ported by other than hearsay evidence, upon which the statement, so far as I can learn, now rests.

Though the bird is naturally quite timid, I have passed by within a few feet of one as it crouched low on the stump of a tree; its desire to satisfy its curiosity evidently holding it to the spot, though it was plainly distrustful of my errand. The moment it finds itself the object of attention, the bird moves quickly away, taking advantage of the first covert it meets to hide itself from view; and I have several times been surprised at losing sight of a bird entirely in cover so thin that it seemed impossible for a bird of half its size to conceal itself for a moment; yet the bird had disappeared, as it were, before my eyes, and no amount of beating about availed to discover it again. It runs very swiftly, and its speed has certainly received full justice at the hands of authors, if, indeed, it has not been greatly overestimated. I was told by good authority that the Apache Indians often successfully pursued them on foot, two or three uniting in the chase and surrounding the bird, when they capture it with their hands; and of this statement I have no doubt. The idea that the Chaparral Cock never flies, or that it does so only when suddenly frightened or pressed by pursuers, is entirely erroneous. It flies easily and quite swiftly. Several times I have seen it rise on one side of a broad ravine and fly across to the farther side, and this when undisturbed—it evidently choosing its wings as an easier mode of locomotion than its feet. It loves to meet the first rays of the rising sun, ascending for this purpose to the top of the mesquite trees, and, standing erect on the topmost branch, loosens its feathers, and appears to catch all the grateful warmth possible, remaining in this attitude for many minutes. As though loth to relinquish the enjoyment it thus receives, will allow a person to approach within easy observing distance, provided he do so quietly and without hostile demonstration. Its agility among the trees is quite surprising; the low branches of the mesquites are within an easy jump, and then, having gained them, without a pause it hops from one branch to another so swiftly as to seem to glide almost instantly from the lower to the topmost branches of the tree, where it stands overlooking the country. It may possibly find this ability to climb among the brushy trees of use in obtaining its food;

though I have never seen it engaged in searching for food elsewhere than on the ground, which seems to be its natural resort. The name of Ground Cuckoo is certainly an appropriate one.

It appears to be generally very silent, nor have I ever heard any notes which I was able to trace with certainty to this bird. Yet on quite a number of occasions I have heard a succession of sharp whistling syllables, running into a sort of chuckling note, which I was tolerably confident proceeded from this source. Once, indeed, I was within a dozen yards of one, as it stood on a low mesquite sunning itself, while it seemed to express its satisfaction by thus communing with itself in low whistling tones. As it was turned away from me, I endeavored to place myself in a more favorable position; but the noise alarmed it, and dropping down it was immediately out of sight, the sounds ceasing with its departure.

The only nest I ever found was placed a few feet from the ground, in a labyrinth of grape vines, which, running up a tree, formed an almost impenetrable retreat, favorable alike to the complete concealment of the nest, and its shelter from the hot sun. It was a rather rude circular structure, more than a foot in diameter, with a foundation of coarse sticks, while the interior, or nest proper, was a thick compact mass of coarse twigs and weed stalks, with much of the dirt left clinging to their roots, the whole making an extremely solid, substantial structure, very different from the careless platform of loose twigs which marks the usual architectural efforts of the typical cuckoos. The whole is slightly hollowed, to the depth perhaps of an inch and a half, and has an internal diameter of five inches. This nest was found July 31; it contained two young just hatched, while a few hours more would have seen the appearance of three more young, the shell of one of the three eggs being already chipped, and the bill of the imprisoned chick visible at the aperture. The eggs are pure white, in shape a rounded oval, and measure about 1.62 by 1.27.

No.	Sex.	Locality.	Date.	Collector.	Wing.	Tail.	Bill.	Tarsus.
131	♀ ad.	Camp Bowie, Ariz	Oct. 11, 1873	Dr. C. G. Newberry...	6.60	13.75	2.12	2.48
243	♀ ad.	Camp Grant, Ariz.....	July 31, 1874	H. W. Henshaw.....	6.95	13.50	1.85	2.37
298	♀ ad.	Camp Bowie, Ariz	Aug. 7, 1874	..... do	7.00	13.25	2.05	2.42
651	♂ ad.	Camp Lowell, Ariz....	Sept. 10, 1874	Dr. J. T. Rothrock ...	.....	.....	.....	.....

COC CYGUS AMERICANUS (Linn.).

Yellow-billed Cuckoo.

Cuculus americanus, LINN., Syst. Nat., i, 1766, 170, 10.

Coccygus americanus, WOODH., Sitgreave's Exp. Zuñi & Col. Riv., 1854, 92.—BD., Birds N. A., 1858, 76.—HENRY, Proc. Acad. Nat. Sci. Phila., 1859, 105 (New Mexico).—HAYD., Trans. Am. Phil. Soc., xii, 1862, 154.—COOPER, Birds Cal., i, 1870, 371.—ALLEN, Bul. Mus. Comp. Zool., 1872, 180 (Eastern Kansas).—HENSHAW, An. Lyc. Nat. Hist., N. Y., xi, 1874, 8.—*Id.*, An. List Birds Utah, 1872, Wheeler's Exped., 1874, 47.—COUES, Key N. A. Birds, 1872, 190, f. 126.—SNOW, Birds Kan., 1872, 5.—ALLEN, Proc. Bost. Soc. Nat. Hist., June, 1874, 17, 33.—BD., BREW., & RIDG., N. A. Birds, ii, 1874, 447.

Coccyzus americanus, COUES, Birds Northwest, 1874, 275.

This Cuckoo has been reported from so many portions of the United States that it is now believed to inhabit every portion of our country; its scarcity or abundance being dependent upon the nature of the region where it may occur, according as this is suitable or unsuitable to its habits. In Utah, we found it only at Provo; though its disposition is so shy and retiring that negative evidence is in this case worth very little, and it may be by no means rare in certain sections where it has wholly escaped the notice of the few observers. In Southeastern Arizona, it appeared to be rather numerous late in the summer, coming under our observation several times.

No.	Sex.	Locality.	Date.	Collector.	Wing.	Tail.	Bill.	Tarsus.
453	♀ ad.	Cienega, Ariz.	Aug. 21, 1874	H. W. Henshaw.....	.....	.....	.....	.....

FAM. PICIDAE: WOODPECKERS.

PICUS VILLOSUS (Linn.), var. HARRISI, Aud.

Harris's Woodpecker; Western Hairy Woodpecker.

Picus harrisi, AUD., Orn. Biog., v, 1839, 191, pl. ccccxvii.—BD., Ives' Col. Exped., 1857-58, pt. iv, 5.—*Id.*, Birds N. A., 1858, 87.—NEWB., P. R. R. Rep., vi, 1857, 89.—XANTUS, Proc. Acad. Nat. Sci. Phila., 1859, 190 (Fort Tejon, Cal.).—HEERM., P. R. R. Rep., x, pt. iv, 1859, 57.—KENNERLY, P. R. R. Rep., Whipple's Route, x, 1859, 21.—BD., U. S. & Mex. Bound. Surv., ii, pt. ii, 1859, Birds, 5.—COOP. & SUCKL., P. R. R. Rep., xii, pt. ii, 1860, 159.—COUES, Proc. Acad. Nat. Sci. Phila., 1866, 52.—COOPER, Birds Cal., i, 1870, 375.—STEV., U. S. Geol. Surv. Terr., 1870, 463.—AIKEN, Proc. Bost. Soc. Nat. Hist., 1872, 206.

Picus villosus var. *harrisi*, ALLEN, Bull. Mus. Comp. Zool., 1872, 180 (mountains of Colorado).—COUES, Key N. A. Birds, 1872, 194.—MERRIAM, U. S. Geol. Surv. Terr., 1872, 693.—BD., BREW., & RIDG., N. A. Birds, ii, 1874, 507.—YARROW & HENSHAW, Rep. Orn. Specs., 1872, Wheeler's Exped., 1874, 24.—HENSHAW, An. Lyc. Nat. Hist. N. Y., xi, 1874, 9.—*Id.*, An. List Birds Utah, 1872, Wheeler's Exped., 1874, 48.—COUES, Birds Northwest, 1874, 280.—ALLEN, Proc. Bost. Soc. Nat. Hist., June, 1874, 33.

Trichopicus harrisi, HENRY, Proc. Acad. Nat. Sci. Phila., 1859, 105 (New Mexico).

This, the western form of the Hairy Woodpecker, is the prevailing and most abundant member of its tribe in the Middle Region, as also in all parts of New Mexico and Arizona. In the summer, it retires to the mountainous districts, finding its home chiefly among the pines, where also it is a resident species through the year; though in fall a partial migration takes place, the birds not only in many instances removing to districts somewhat farther south than the ones in which they passed the summer or were reared, but also in fall a more or less general descent from the elevated pine region takes place, and the species may then be observed among the deciduous trees of the low valleys, and of the streams generally.

They have a full share of the restless industry and indefatigable energy so characteristic of the family, and from daylight to dark are busy in their constant and oftentimes laborious quest for insects; the noise made by their vigorous hammering on the dead limbs being a characteristic sound in the pine woods of the West, where the numbers of this as well as of several other species are very great. They are more or less terrestrial in their habits, and, though less often seen moving about on the ground than the Golden-winged Woodpecker, are not infrequently started from among the bushes, where they find seeds, insects, etc.

No.	Sex.	Locality.	Date.	Collector.	Wing.	Tail.	Bill.	Tarsus.
160	♂	Grass Valley, Utah....	Sept. 10, 1872	H. W. Henshaw.....	.....	.....	.....	.....
228	♂ ad.	Mountains near Fort Garland, Colo.	June 4, 1873	..... do	3.98	2.83	0.67	0.65
152	♀ jun.	Tanks, Ariz.....	July 19, 1874	..... do .....	.....	.....	.....	.....
154	Jun.	Fort Garland, Colo....	Aug. 13, 1874	C. E. Aiken .....	.....	.....	.....	.....
281	♂	Pagosa, Colo	Sept. 19, 1874	..... do .....	.....	.....	.....	.....
740	♂	Mount Graham, Ariz..	..... do	Dr. J. T. Rothrock....	.....	.....	.....	.....
784	♂ ad.	..... do	Sept. 21, 1874	H. W. Henshaw .....	.....	.....	.....	.....
844	♂	..... do	Sept. 24, 1874	Dr. J. T. Rothrock....	.....	.....	.....	.....

PICUS PUBESCENS (Linn.), var. GAIRDNERI, Aud.

Gairdner's Woodpecker.

Picus gairdneri, AUD., Orn. Biog., v, 1839, 317.—NEWB., P. R. R. Rep., vi, 1857, 89.—BD., Birds N. A., 1858, 91, pl. 85, figs. 2, 3.—XANTUS, Proc. Acad. Nat. Sci. Phila., 1859, 190 (Fort Tejon, Cal.).—COOP. & SUCKL., P. R. R. Rep., xii, pt. ii, 1860, 159.

Picus pubescens var. *gairdneri*, COUES, Key N. A. Birds, 1872, 194.—BD., BREW., & RIDG., N. A. Birds, ii, 1874, 512.—YARROW & HENSHAW, Rep. Orn. Specs., 1872, Wheeler's Exped., 1874, 24.—HENSHAW, An. Lyc. Nat. Hist. N. Y., xi, 1874, 9.—*Id.*, An. List Birds Utah, 1872, Wheeler's Exped., 1874, 48.—*Id.*, Rep. Orn. Specs., 1873, Wheeler's Exped., 1874, 89, 133.—ALLEN, Proc. Bost. Soc. Nat. Hist., June, 1874, 16, 33.—COUES, Birds Northwest, 1874, 282.

Picus meridionalis, HEERM., P. R. R. Rep., x, pt. ii, 1859, 57.

This bird is distinguished from the eastern Downy Woodpecker by exactly the same points of difference that exist in the cases of the two Hairy Woodpeckers. In respect to the relative abundance of the two species in the East and the West, there is a great difference. While the Hairy Woodpecker is, if anything, more numerous in favorable districts in the West than is ever the case at the East, the present variety is generally of rather rare occurrence, and seems in some regions to be altogether wanting. In Utah, we never detected it save in a single instance, at Provo in fall; while Mr. Ridgway found it "unaccountably rare" in the Wahsatch and Uintah Mountains, as also in the Sierra Nevada. In Southern Colorado, I found it present and breeding, though in small numbers, and in great disproportion to the abundance of var. *harrisi*. During my stay of a week in the mountains near Fort Garland, I secured three; a pair in a grove of cottonwoods, the third in the pines at an elevation of 10,000 feet. One or two were noticed among the cottonwoods along the Gila River, Arizona, in October. Elsewhere in Arizona we have not found it at all.

No.	Sex.	Locality.	Date.	Collector.	Wing.	Tail.	Bill.	Tarsus.
146	♀ ad.	Near Ft. Garland, Colo	May 26, 1873	H. W. Henshaw	4.10	2.84	0.70	0.65
222	♀ ad.	.....do	June 3, 1873	.....do	4.09	3.00	0.67	0.63
238	♂ ad.	.....do	June 4, 1873	.....do	3.95	2.81	0.67	0.60

PICUS STRICKLANDI, Malherbe.

Strickland's Woodpecker.

Picus stricklandii, HENSHAW, Am. Sportsman, v, Feb. 20, 1875, 328 (introduced into United States fauna).

SP. CHAR.—Above smoky-brown, darker on the head. Male with nuchal band of crimson; wanting in female. Quills with a series of small rounded white spots on both their outer and inner webs, which, on the inner webs of the tertiaries, take the form of short bars. A line of white beginning at the anterior corner of the eye above, and extending backward to the nape, meets a similar line which extends from the gape, thus forming a circle, which incloses a patch of brown behind the eye. The under parts generally profusely spotted with blackish-brown spots, gradually becoming smaller on the throat, and, in some specimens, almost wanting here. Under tail coverts barred transversely with same. Tail blackish-brown above, darker below. Two outer tail-feathers barred with white, leaving, however, the inner web of the second immaculate except at tip.

HAB.—Guatemala; Mexico; Arizona (Henshaw).

This rare woodpecker is a common species on the foothills of the Chiricahua Mountains, where it was one of the first birds that met my eye when the section where it abounds was first entered. Whether it extends upward, and finds its home during a portion of the year among the pines that here begin at an altitude of about 1,000 feet, I do not know. So far as I could ascertain, at this season at least, it is confined to the region of the oaks, ranging from about 4,000 to 7,000 feet, thus inhabiting a region about midway between the low valleys and the mountain districts proper. Here they appeared to be perfectly at home, climbing over the trunks of the oaks with the same ease and rapidity of movement that distinguish the motions of the Downy or Hairy Woodpecker; though their habits, in so far as they are at all peculiar, are, perhaps, best comparable to those of the Red-cockaded Woodpecker of the South (*P. borealis*), especially their custom of moving about in small companies of from five to fifteen, though they were occasionally found singly or in pairs.

When in pursuit of food, they almost always alighted near the base of the trees, gradually ascending, and making their way along the smaller limbs, and even out among the foliage, appearing to prefer to secure their food by a careful search rather than by the hard labor of cutting into the wood in the way the Hairy Woodpecker employs its strength.

The structure of bill and the character of the tongue, capable, by means of the prolongation of the hyoid bones, of being greatly extended beyond the tip of the bill, in these two species are identical, and thus, in all probability, the habits of the two, in respect to the manner of obtaining food, are very similar. I found them at all times rather shy, and gifted with very little of that prying curiosity which is seen in some of the better known species of this family; and if by chance I surprised a band feeding among the low trees, a sharp warning note, from some member more watchful than the rest, communicated alarm to the whole assembly, when they took flight immediately, showing great dexterity in dodging behind trunks and limbs, and making good their retreat by short flights from one tree to another till they were out of sight.

No.	Sex.	Locality.	Date.	Collector.	Wing.	Tail.	Bill.	Tarsus.
483	♂ jun.	Chiricahua Mts., Ariz..	Aug. 23, 1874	H. W. Henshaw	4.47	3.12	1.12	0.84
498	Jun.	.....do	Aug. 26, 1874	.....do	4.59	3.34	1.04	0.77
499	♀ ad.	.....do	Aug. 27, 1874	.....do	4.57	3.17	0.92	0.77
500	♂ ad.	.....do .....	.....do .....	.....do	4.50	3.02	1.10	0.76
511	Jun.	.....do .....	.....do .....	.....do	4.35	3.07	0.87	0.77
524	♂ jun.	.....do	Aug. 29, 1874	.....do	4.45	3.09	1.03	0.80

PICUS SCALARIS, Wagl.

Ladder-backed Woodpecker.

Picus scalaris, WAGL., Isis, 1829, v, 511 (Mexico).—WOODH., Sitgreave's Exp. Zuñi & Col. Riv., 1854, 89.—HEERM., P. R. R. Rep., x, pt. iv, 1859, 57.—*Id.*, *ib.*, Parke's Route, x, 1859, 18.—KENNERLY, P. R. R. Rep., Whipple's Route, x, 1859, 22.—BD., U. S. & Mex. Bound. Surv., ii, pt. ii, 1859, Birds, 5.—*Id.*, Ives' Col. Exped., 1857-58, pt. iv, 5.—COUES, Proc. Acad. Nat. Sci. Phila., 1866, 52.—HENSHAW, Rep. Orn. Specs., 1873, Wheeler's Exped., 1874, 133.
Dictiopicus scalaris, HENRY, Proc. Acad. Nat. Sci. Phila., 1859, 105 (New Mexico).

In Arizona, the thirty-fourth parallel appears to form about the northern limit of this species. Dr. Coues reports it as a summer resident at Fort Whipple, which is slightly farther north than it was found by us to extend in the extreme eastern part. It begins to appear not far south of Camp Apache, and in the Gila Valley and southward becomes common; it is numerous, however, only within about one hundred miles of the southern border. It appears in fall to resemble in its manners the Downy Wood-

pecker; and its notes, too, are similar. It is by no means an inhabitant of the mountains, but shuns them, and seeks the warm valleys, in the deciduous trees of which it spends the time actively moving over the branches, spending more time among them than on the main trunks, and now and then descending to the ground. Wherever are found large areas in which is a heavy growth of the mesquite trees, this species may always be looked for with perfect confidence, as these trees of all others attract their attention.

No.	Sex.	Locality.	Date.	Collector.	Wing.	Tail.	Bill.	Tarsus.
736	♀ jun.	Thirty miles south of Camp Apache, Ariz.	Sept. 11, 1873	Dr. C. G. Newberry...	4.00	2.71	0.80	0.70
900	♀	San Pedro, Ariz.	Oct. 3, 1873	H. W. Henshaw.....	3.85	2.62	0.77	0.69
901	♀	..... do .....	..... do	M. N. Maguet.....	3.88	2.63	0.73	0.67
912	♀	Gila River, Ariz.	Oct. 15, 1873	H. W. Henshaw.....	3.86	2.69	0.81	0.68
632	♂ ad.	Camp Lowell, Ariz.	Sept. 9, 1874	..... do	4.06	2.90	0.93	0.68
726	♂ ad.	Sienega, Ariz.	Sept. 13, 1874	..... do	4.10	2.77	0.80	0.65
913	♂ ad.	Gila River, Ariz.	Oct. 3, 1874	..... do	4.14	2.92	0.93	0.67
934	♂ ad.	..... do	Oct. 4, 1874	..... do	4.14	3.20	0.96	0.73
935	♂ ad.	..... do .....	..... do .....	..... do	4.23	2.97	1.00	0.75

PICOIDES AMERICANUS, Brehm, var. DORSALIS, Bd.

Striped-backed Woodpecker.

Picoides dorsalis, Bd., Birds N. A., 1858, 100, pl. 85, f. 1.—HAYD., Trans. Am. Phil. Soc., xii, 1862, 155.

Picoides americanus var. *dorsalis*, COOPER, Birds Cal., i, 1870, 386.—ALLEN, Bull. Mus. Comp. Zool., 1872, 180 (mountains of Colorado).—COUES, Key N. A. Birds, 1872, 194.—MERRIAM, U. S. Geol. Surv. Terr., 1872, 694 (Wyoming).—COUES, Birds Northwest, 1874, 285.

Picoides arcticus var. *dorsalis*, HENSHAW, Rep. Orn. Specs., 1873, Wheeler's Exped., 1874, 89.

This woodpecker appears to be a resident of the high mountains of Colorado, where it is not found in summer below the pines, of which the species appears to be a rather exclusive inhabitant. Mr. Aiken considers it as quite rare; not having met with it till the past season, when he secured several specimens in the southern part of the Territory. In Arizona, we have not seen it in summer, yet I believe it is there, as in Colorado, a resident species. In the White Mountains, in October, we found it of rather frequent occurrence at from 8,000 to 10,000 feet high.

No.	Sex.	Locality.	Date.	Collector.	Wing.	Tail.	Bill.	Tarsus.
221	♀ ad.	Mountains near Fort Garland, Colo.	June 3, 1873	H. W. Henshaw.....	4.72	3.43	1.05	0.77
70	♀ ad.	South Park, Colo.....	June 28, 1873	Dr. J. T. Rothrock....	4.78	3.46	1.05	0.77
282	♂	Pagosa, Colo.....	Sept. 19, 1874	C. E. Aiken.....	.....	.....	.....	.....
283	♀	.....do.....	.....do.....	.....do.....	.....	.....	.....	.....
302	♂	Rio Grande, Colo.....	Sept. 24, 1874	.....do.....	.....	.....	.....	.....
303	♀	.....do.....	Sept. 25, 1874	.....do.....	.....	.....	.....	.....
1020	♂ ad.	White Mountains, Ariz.	Oct. 17, 1874	H. W. Henshaw.....	.....	.....	.....	.....
1221	♀	.....do.....	.....do.....	.....do.....	.....	.....	.....	.....

SPHYRAPICUS VARIUS (Linn.), var. NUCHALIS, Bd.

Red-naped Woodpecker.

- Sphyrapicus nuchalis*, BD., Birds N. A., 1858, 921, pl. 35.—HENRY, Proc. Acad. Nat. Sci. Phila., 1859, 105 (New Mexico).—COUES, Proc. Acad. Nat. Sci. Phila., 1866, 53 (Fort Whipple, Ariz.).—STEV., U. S. Geol. Surv. Terr., 1870, 463.
- Sphyrapicus nuchalis*, COOPER, Birds Cal., i, 1870, 390.—YARROW, Rep. Orn. Specs., 1871, Wheeler's Exped., 1874, 36.
- Sphyrapicus varius* var. *nuchalis*, BD., Birds N. A., 1858, 103 (in text).—ALLEN, Bul. Mus. Comp. Zool., 1872, 180 (mountains of Colorado).—COUES, Key N. A. Birds, 1872, 195.—BD., BREW., & RIDG., N. A. Birds, ii, 1874, 542, pl. 51, figs. 3, 4.—ALLEN, Proc. Bost. Soc. Nat. Hist., June, 1874, 33.—COUES, Birds Northwest, 1874, 286.
- Sphyrapicus varius* var. *nuchalis*, YARROW & HENSHAW, Rep. Orn. Specs., 1872, Wheeler's Exped., 1874, 24.—HENSHAW, Rep. Orn. Specs., 1873, Wheeler's Exped., 1874, 89, 133.
- Picus varius*, BD., Stans. Rep. Exp. Great Salt Lake, 1852, 326.—HEERM., P. R. R. Rep., x, pt. ii, 1859, 58.
- Sphyrapicus varius*, HOLD., Proc. Bost. Soc. Nat. Hist., 1872, 207.

With all the habits and notes of the eastern Yellow-bellied Woodpecker, this variety is found throughout the Rocky Mountains, extending on the west to the Sierra Nevada, where it gives way to the var. *ruber*. It everywhere shows a very marked preference for the deciduous timber, to the avoidance of the pines, and is particularly numerous in the aspens, among which it extends upward on the mountains as high as 12,000 feet, and at which elevation it was observed by Dr. Rothrock in South Park, Colorado.

In Southern Colorado, I found this and the succeeding species inhabiting the same region in June; yet the habits of the two were sufficiently distinct as to draw a sharp line between the areas inhabited by either, and the two apparently never encroached on each other's domain, though I have often

heard the notes of both mingling together; this species from the groves of aspen, as it launched itself from one tree to another; the other, from contiguous tracts of heavy pine forest, where it was equally indefatigable in its search for insects among the conifers.

At this season (summer), I am inclined to think that the food of this species is wholly of an insectivorous nature; but late in the fall, and in early spring, the damage done certain of the deciduous trees by this species is very considerable, while in civilized districts the injury and even destruction of fruit trees, caused by the tearing off of large pieces of bark with the apparent design of reaching the tender inner bark or juices of the tree, placed it on the proscribed list of the farmers. In Southern Utah, I visited peach orchards, which had suffered severely from this cause; though here the farmers assured me that the "sapsuckers" were of two kinds, pointing out this species, and the large Red-shafted Woodpecker (*Colaptes mexicanus*), which was very numerous. That the scars and denuded patches seen on nearly every tree in a large orchard were the work of woodpeckers there could be no doubt, the evidence presented by the character of the marks being alone sufficient proof of their origin; but I am inclined to think the present species should have received the credit for all the mischief, and that no part of it belonged to its larger brethren.

No.	Sex.	Locality.	Date.	Collector.	Wing.	Tail.	Bill.	Tarsus.
...	♂ ad.	Arizona.....	Oct. 31, 1871	F. Bischoff.....	.....	.....	.....	.....
283	♂ jun.	Toquerville, Utah....	Oct. 13, 1872	H. W. Henshaw.....	.....	.....	.....	.....
307	♂ jun.	Virgin City, Utah....	Oct. 14, 1872	Dr. H. C. Yarrow.....	.....	.....	.....	.....
136	♀ ad.	Near Ft. Garland, Colo.	May 25, 1873	H. W. Henshaw.....	5.04	3.42	0.85	0.77
145	♂ ad.	..... do	May 26, 1873	..... do	4.98	3.10	0.86	0.77
153	♂ ad.	..... do	May 27, 1873	..... do	5.07	3.40	0.90	0.82
154	♀ ad.	..... do .....	..... do .....	..... do	4.98	3.15	0.88	0.73
172	♀ ad.	..... do	May 29, 1873	..... do	4.88	3.35	0.88	0.77
226	♂ ad.	..... do	June 2, 1873	..... do	4.92	2.90	0.88	0.77
228	♀ ad.	..... do .....	..... do .....	..... do	4.80	3.15	0.90	0.77
236	♂ ad.	..... do	June 4, 1873	..... do	4.88	2.91	0.93	0.80
267	♂ ad.	..... do	June 5, 1873	..... do	4.80	3.15	0.90	0.77
218	♂ jun.	Navajo Creek, Colo....	Sept. 10, 1874	C. E. Aiken .....	.....	.....	.....	.....
843	♀ ad.	Mount Graham, Ariz..	Sept. 24, 1874	H. W. Henshaw.....	.....	.....	.....	.....
924	♀ ad.	Gila River, Ariz	Oct. 3, 1874	..... do .....	.....	.....	.....	.....

SPHYRAPICUS THYROIDEUS (Cass.).

Black-breasted Woodpecker.

Picus thyroideus, CASS., Proc. Acad. Nat. Sci. Phila., v, 1851, 349 (♀).

Sphyrapicus thyroideus, BD., Birds N. A., 1858, 106.—HENRY, Proc. Acad. Nat. Sci. Phila., 1859, 105 (New Mexico).—HAYD., Trans. Am. Phil. Soc., xii, 1862, 155.—COUES, Proc. Acad. Nat. Sci. Phila., 1866, 54.—COOPER, Birds Cal., i, 1870, 394.—COUES, Key N. A. Birds, 1872, 195.—MERRIAM, U. S. Geol. Surv. Terr., 1872, 694.—HENSHAW, Am. Nat., April, 1874, 242.—*Id.*, An. Lyc. Nat. Hist. N. Y., xi, 1874, 9.—*Id.*, An. List Birds Utah, 1872, Wheeler's Exped., 1874, 48.—*Id.*, Rep. Orn. Specs., 1873, Wheeler's Exped., 1874, 90, 133.—COUES, Birds Northwest, 1874, 288.

Sphyrapicus thyroideus, BD., BREW., & RIDG., N. A. Birds, ii, 1874, 547, pl. 56, f. 6.

Picus thyroideus, HEERM., P. R. R. Rep., x, pt. ii, 1859, 58.

Picus williamsonii, NEWB., P. R. R. Rep., vi, 1857, 89, pl. 34, f. i (♂).

Sphyrapicus williamsonii, BD., Birds N. A., 1858, 105.—HAYD., Rep., 1862, 155.—COUES, Proc. Acad. Nat. Sci. Phila., 1866, 54 (Fort Whipple, Ariz.).—ALLEN, Bull. Mus. Comp. Zool., 1872, 180 (South Park and mountains to eastward).—COOPER, Birds Cal., i, 1870, 393.—MERRIAM, U. S. Geol. Surv. Terr., 1872, 694 (Wyoming).—COUES, Key N. A. Birds, 1872, 195.

This species was first made known to science through a description by Cassin, published in December, 1851, in Proc. Acad. Nat. Sci. Phila. In 1857, Dr. Newberry published a description of Williamson's Woodpecker (*S. williamsonii*) from specimens obtained by Lieutenant Williamson's expedition, since which time the two species have been accepted by ornithologists as perfectly valid; the true relationship of the two being wholly unsuspected. While near Fort Garland, I obtained abundant proof of the specific identity of the two birds in question; *williamsonii* being the male of *thyroideus*. Though led to suspect this, from finding the two birds in suspicious proximity, it was some time before I could procure a pair actually mated. A nest was at length discovered, excavated in the trunk of a live aspen, and both the parent birds were secured as they flew from the hole, having just entered with food for the newly hatched young.

As regards the sexual differences of coloration, the case of *thyroideus* is wholly unique. In this species, the colors of the female are radically different from those of the male. With this single exception, as far as known the differences of color between the sexes in the family of woodpeckers are confined mainly to the absence or less amount of the bright-crimson or red patches about the head. The species is a resident of the pine woods, abundant at an altitude of 10,000 feet, and doubtless is

found at least up to the pine limit. Except in evincing at all times a marked preference for pine timber, rarely indeed alighting on any of the deciduous trees, its habits and notes seem to correspond pretty closely with those of *Sphyrapicus nuchalis*.

The stomachs of all the specimens examined contained nothing but insects and larvæ. As, however, the structure of the tongue is identical with *varius*, the species may possibly, in winter and spring, when other food is scarce, feed upon the inner bark of the deciduous trees, as the common sapsuckers (*S. varius* and varieties) are well known to do. I never noticed anything, however, which would lead me to suppose this. The nest mentioned above was dug to the depth of seven inches, and was one and three-fourths inches in diameter. The egg shells had not been removed; and one which is little damaged shows their similarity with those of *varius*, but appears a trifle larger.

No.	Sex.	Locality.	Date.	Collector.	Wing.	Tail.	Bill.	Tarsus.
198	♂ ad.	Mountains near Fort Garland, Colo.	May 30, 1873	H. W. Henshaw	5.40	3.75	0.95	0.85
217	♀ ad.	..... do	June 2, 1873	..... do	5.08	3.28	0.91	0.77
219	♂ ad.	..... do	June 3, 1873	..... do	5.20	3.75	0.90	0.85
220	♀ ad.	..... do .....	..... do .....	..... do	5.37	3.80	0.95	0.85
234	♂ ad.	..... do	June 4, 1873	..... do	5.28	3.85	1.07	0.84
235	♂ ad.	..... do .....	..... do .....	..... do	5.25	3.70	0.95	0.87
329	♀ ad.	..... do	June 12, 1873	..... do	5.50	3.63	0.95	0.81
334	♂ ad.	..... do	June 13, 1873	..... do	5.45	3.63	1.01	0.80
335	♀ ad.	..... do .....	..... do .....	..... do	5.30	3.60	0.93	0.80
977	♂ ad.	Gila River, N. Mex ...	Nov. —, 1873	..... do	5.29	3.73	0.93	0.86
980	♂ ad.	..... do	Nov. 5, 1873	..... do	5.43	3.70	1.00	0.85
981	♂ ad.	..... do .....	..... do .....	..... do	5.47	3.93	0.90	0.82
217	♂ ad.	Rio Blanco, Colo.....	Sept. 9, 1874	C. E. Aiken .....	.....	.....	.....	.....
789	♀ ad.	Mount Graham, Ariz ..	Sept. 21, 1874	H. W. Henshaw .....	.....	.....	.....	.....
872	♀ ad.	..... do .....	..... do .....	..... do .....	.....	.....	.....	.....
788	♀ ad.	..... do	Sept. 22, 1874	..... do .....	.....	.....	.....	.....

CENTURUS UROPYGIALIS, Bd.

Gila Woodpecker.

Centurus uropygialis, Bd., Proc. Acad. Nat. Sci. Phila., vii, June, 1854, 120 (Bill Williams' River, New Mexico).—*Id.*, Birds N. A., 1858, iii, 108–111, pl. xxxvi.—*Id.*, Ives'

Col. Exped., 1857-58, pt. iv, 5.—KENNERLY, P. R. R. Rep., x, 1859, 58, pl. xxxvi.—HEERM., P. R. R. Rep., x, pt. iv, 1859, 58.—BD., U. S. & Mex. Bound. Surv., ii, pt. ii, 1859, Birds, 6.—*Id.*, Proc. Acad. Nat. Sci. Phila., 1859, 302 (Cape Saint Lucas).—*Id.*, P. R. R. Rep., Parke's Route, x, 1859, 17.—COUES, Proc. Acad. Nat. Sci. Phila., 1866, 54 (Southern Arizona).—*Id.*, Proc. Acad. Nat. Sci. Phila., 1868, 82.—COOPER, Orn. Cal., i, 1870, 399.—HENSHAW, Rep. Orn. Specs., 1873, Wheeler's Exped., 1874, 133.—COUES, Key N. A. Birds, 1872, 196.

Not met with in Arizona farther north than the valley of the Gila. Here, however, and to the southward, it was not uncommon. The Giant Cactus (*Cereus giganteus*), which forms a most striking and characteristic feature in this region, bears, all over its body, marks of the work of these birds; large patches being dug entirely out, as though the pith or sap was sought for. Its trunk, too, appears to afford a favorite nesting site, and the excavations for this purpose are often to be seen. On the San Pedro, this species was found frequenting the mesquite trees. They were everywhere very shy.

In a large area of country about Camp Lowell, Southern Arizona, this woodpecker was found in great numbers; it being there the prevailing bird of the family. Besides the cacti and algarobias, which form the chief places of resort of this species, it also affects the large cottonwoods, in some localities nearly to the exclusion of the others. Here I noticed a resemblance in its manners to those of the California Woodpecker, in that, instead of showing the shy solitary disposition which I had hitherto noticed, they met in small parties, and, when not busy searching among the branches for insects, were engaged in chasing each other in and out of the trees in friendly play, while they kept up a continual chattering and calling; their notes possessing great variety, according to the mood which prompted them.

No.	Sex.	Locality.	Date.	Collector.	Wing.	Tail.	Bill.	Tarsus.
44	♂ ad.	Pueblo Viejo, N. Mex.	Sept. 19, 1873	Dr. C. G. Newberry...	5. 10	3. 52	1. 17	0. 95
103	♂ ad.	.....do.....	Sept. 27, 1873	.....do.....	5. 40	3. 87	1. 28	0. 88
890	♀ ad.	San Pedro, Ariz.....	Oct. 2, 1873	H. W. Henshaw.....	5. 30	3. 83	1. 05	0. 91
454	♂ jun.	Sienega, Ariz.....	Aug. 21, 1874	.....do.....	.....	.....	.....	.....
599	♂ jun.	Camp Crittenden, Ariz.	Sept. 4, 1874	Dr. J. T. Rothrock....	.....	.....	.....	.....
672	♂	Camp Lowell, Ariz....	Sept. 11, 1874	.....do.....	.....	.....	.....	.....

MELANERPES TORQUATUS (Wils.).

Lewis's Woodpecker.

- Picus torquatus*, WILS., Am. Orn., iii, 1811, 31, pl. xx.—BD., Stans. Rep. Exp. Great Salt Lake, 1852, 319.
- Melanerpes torquatus*, HEERM., Jour. Acad. Nat. Sci. Phila., ii, 1853, 270.—NEWB., P. R. R. Rep., vi, 1857, 90.—BD., Birds N. A., 1858, 115.—HEERM., P. R. R. Rep., x, pt. iv, 1859, 58.—XANTUS, P. R. R. Rep., 1859, 190 (Fort Tejon, Cal.).—HENRY, Proc. Acad. Nat. Sci. Phila., 1859, 106 (New Mexico).—COOP. & SUCKL., P. R. R. Rep., xii, pt. ii, 1860, 161.—HAYD., Trans. Am. Phil. Soc., xii, 1862, 156.—COOPER, Birds Cal., i, 1870, 406.—STEV., U. S. Geol. Surv. Terr., 1870, 463.—MERRIAM, U. S. Geol. Surv. Terr., 1872, 695 (Idaho).—ALLEN, Bul. Mus. Comp. Zoöl., 1872, 180 (western edge of plains into mountains).—AIKEN, Proc. Bost. Soc. Nat. Hist., 1872, 207.—BD., BREW., & RIDG., N. A. Birds, ii, 1874, 561, pl. 54, f. 5.—HENSHAW, An. Lyc. Nat. Hist. N. Y., xi, 1874, 9.—*Id.*, An. List Birds Utah, 1872, Wheeler's Exped., 1874, 48.—YARROW & HENSHAW, Rep. Orn. Specs., 1872, Wheeler's Exped., 1874, 24.—HENSHAW, Rep. Orn. Specs., 1873, Wheeler's Exped., 1874, 134.
- Asyndesmus torquatus*, COUES, Proc. Acad. Nat. Sci. Phila., 1866, 56 (Fort Whipple Ariz.).—*Id.*, Key N. A. Birds, 1872, 197.—*Id.*, Birds Northwest, 1874, 291.
- Celeus torquatus*, WOODH., Sitgreave's Exp. Zuñi & Col. Riv., 1854, 90.

In Utah and Colorado, this species is of common occurrence, and in certain restricted localities very abundant. It appears to be also a resident of Arizona and New Mexico; the numbers of individuals inhabiting a locality varying very much, without any special reason appearing for the difference. In summer, it is, I believe, a bird of the mountainous districts alone, and one preferring the solitudes of the primeval forests to the more open diversified regions. As far north as Utah, at least, it is resident; though, with the approach of winter, there appears to be a more or less complete change of abode, the birds making their appearance in the low districts, where they are never seen in summer. In October I have seen them in small companies pursuing a more or less direct course southward; their appearance and actions at such times indicating that they were either migrating, or, perhaps, changing their locality for a spot where food was more abundant. Their extreme restlessness is always a characteristic feature in their habits, while they are among the shyest of their tribe.

In going from Fort Tulerosa, N. Mex., to Fort Craig, I found a very large colony of these woodpeckers in a snug, sheltered little valley, where they

had congregated from the neighboring mountains, choosing this as a winter retreat. The timber of the valley was principally oaks in the shape of extensive groves, with here and there a tall pine interspersed, which bore over its body the marks of the persistent attacks of the woodpeckers, who had, perhaps, resorted hither, season after season, for a long term of years. Within a comparatively small area, there must have been at least a hundred of these birds gathered together, and all combined to make a very happy, noisy family party. Food appeared to be abundant, and obtainable with very little labor, so that there remained plenty of time for play, and they made as joyous a company as one need care to see. They kept up a continual chattering as they chased each other about, which was always good natured in its tone, until they found themselves under an unwonted and unwelcome scrutiny, when they expressed their dissatisfaction by loud cries and angry scoldings, and forsook the low oaks for the high summits of the pines. When I put my gun in use nearly all left the vicinity, to return, however, in a short time, though they were anxious and wary in the extreme.

No.	Sex.	Locality.	Date.	Collector.	Wing.	Tail.	Bill.	Tarsus.
700	♀ jun.	Camp Apache, Ariz.	Sept. 5, 1873	H. W. Henshaw.....	6.55	4.41	1.05	0.93
373	♀ ad.	El Paso County, Colo.	July 7, 1874	C. E. Aiken .....	.....	.....	.....	.....

MELANERPES ERYTHROCEPHALUS (Linn.).

Red-headed Woodpecker.

Picus erythrocephalus, LINN., Syst. Nat., i, 1766, 174.

Melanerpes erythrocephalus, WOODH., Sitgreave's Exp. Zuñi & Col. Riv., 1854, 91.—BD., Birds N. A., 1858, 113.—HENRY, Proc. Acad. Nat. Sci. Phila., 1859, 105 (New Mexico).—HAYD., Trans. Am. Phil. Soc., xii, 1862, 156.—COOPER, Birds Cal., i, 1870, 402.—STEV., U. S. Geol. Surv. Terr., 1870, 463 (Wyoming).—ALLEN, Bull. Mus. Comp. Zoöl., 1872, 180 (Kansas; mountains of Colorado).—COUES, Key N. A. Birds, 1872, 196.—SNOW, Birds Kan., 1872, 5.—HOLD., Proc. Bost. Soc. Nat. Hist., 1872, 207 (Wyoming).—BD., BREW., & RIDG., N. A. Birds, ii, 1874, 564, pl. 54, f. 4.—HENSHAW, An. Lyc. Nat. Hist. N. Y., xi, 1874, 9.—*Id.*, An. List Birds Utah, 1872, Wheeler's Exped., 1874, 48.—*Id.*, Rep. Orn. Specs., 1873, Wheeler's Exped., 1874, 67, 96.—COUES, Birds Northwest, 1874, 290.—ALLEN, Proc. Bost. Soc. Nat. Hist., June, 1874, 16, 33.

In Utah, this woodpecker appears to be rare. It was not observed at all by our parties, and Mr. Ridgway's note of a single bird seen near

Salt Lake City may be quoted in this connection. In Colorado, however, it appears to be generally distributed, and in certain sections very numerous; thus, at Pueblo, Mr. Aiken obtained a large number of specimens, and saw many of the birds about Pueblo. Dr. Rothrock also saw the species in South Park in July at an elevation of 10,000 feet, and again at Twin Lakes at the same height. It appears in Colorado only as a summer visitant, all departing farther south in the fall. Mr. Aiken gives the date of its arrival in El Paso County in spring as May 20. It seems strange that, with so evident a proclivity for a warm climate, it should be wanting in Arizona; yet, so far as I am aware, it has never been detected there; certainly none have been found by our parties during their extended researches in that Territory.

No.	Sex.	Locality.	Date.	Collector,	Wing.	Tail.	Bill.	Tarsus.
.....	♂ ad.	South Park, Colo.....	June 3, 1873	Dr. J. T. Rothrock....	5.66	3.66	1.08	0.90
5	Ad.	Pueblo, Colo.....	July 23, 1874	C. E. Aiken.....	5.92	3.77	1.04	0.91
70	Jun.	..... do.....	..... do.....	..... do.....	5.67	3.50	0.92	0.92
72	Ad.	..... do.....	..... do.....	..... do.....	5.60	3.40	1.08	0.84
27	♂ ad.	..... do.....	July 25, 1874	..... do.....	5.63	3.50	1.12	0.87
28	♀ ad.	..... do.....	..... do.....	..... do.....	5.52	3.38	1.08	0.87
49	Ad.	..... do.....	July 27, 1874	..... do.....	5.85	3.84	1.07	0.88
69	.....	..... do.....	..... do.....	..... do.....	6.00	3.72	1.08	0.90
50	♀ ad.	..... do.....	July 28, 1874	..... do.....	5.58	3.63	1.07	0.82
71	Jun.	..... do.....	..... do.....	..... do.....	.....	.....	.....	.....

MELANERPES FORMICIVORUS (Swains.).

Californian Woodpecker.

- Picus formicivorus*, SWAINS., *Syn. Birds Mex.* in *Phil. Mag.*, i, 1827, 439 (Mexico).—HEERM., *Jour. Acad. Nat. Sci. Phila.*, 2d series, ii, 1853, 270.
- Melanerpes formicivorus*, NEWB., *P. R. R. Rep.*, vi, 1857, 90.—BD., *Birds N. A.*, 1858, 114.—XANTUS, *Proc. Acad. Nat. Sci. Phila.*, 1859, 190 (Fort Tejon, Cal.).—BD., *U. S. & Mex. Bound. Surv.*, ii, pt. ii, 1859, *Birds*, 6.—HEERM., *P. R. R. Rep.*, x, 1859, p. — (nesting).—HENRY, *Proc. Acad. Nat. Sci. Phila.*, 1859, 105 (New Mexico).—COUES, *Proc. Acad. Nat. Sci. Phila.*, 1866, 55 (Fort Whipple, Ariz.).—COOPER, *Birds Cal.*, i, 1870, 403.—YARROW, *Rep. Orn. Specs.*, 1871, *Wheeler's Exped.*, 1874, 36.—HENSHAW, *Rep. Orn. Specs.*, 1873, *Wheeler's Exped.*, 1874, 134.—COUES, *Key N. A. Birds*, 1872, 196.

This woodpecker was first observed when we neared Camp Apache, and, so far as my own observations go, its range in Arizona is coincident

with that of the oaks, the acorns of which appear to constitute a very important item in its bill of fare. We noticed it to the southward in every locality where the oaks were found in sufficiently large groves to afford it at once a place of shelter and an inexhaustible source whence to draw food. Many of the branches of these, as well as less frequently the dead limbs of the pines, bore evidence of having been used by these birds as places of deposit for the over abundant crop of acorns, circular holes being drilled in regular rows for the purpose of receiving the acorns, which are then carried up and inserted tightly in the cavity. With what intention the bird thus puts itself to all this trouble, or whether it has any intention beyond the idea of amusing itself for the passing moment, is not well understood. The fact remains, and it is tolerably certain that they do occasionally, when hard pressed by hunger, resort in winter to these stores, and find in them the needed supply of food. In the fall, they glean from among the foliage much of their food in the shape of various insects. They are sociable in the extreme, and one hearing the notes of a single bird may feel assured that hard by are more or less of his comrades.

No.	Sex.	Locality.	Date.	Collector.	Wing.	Tail.	Bill.	Tarsus.
529	♀ ad.	Camp Apache, Ariz.	Aug. 6, 1873	H. W. Henshaw.....	5.45	3.45	0.93	0.77
592	♂ jun.	..... do	Aug. 22, 1873	..... do	5.60	3.63	0.98	0.77
593	♂ jun.	..... do .....	..... do .....	..... do	5.47	3.54	0.93	0.79
641	♀ ad.	..... do	Aug. 28, 1873	..... do	5.65	3.70	0.90	0.76
86	♀	Oak Orchard, Ariz.	Sept. 1, 1873	Dr. C. G. Newberry...	5.17	3.12	1.10	0.75
672	♂	Camp Apache, Ariz. ....	..... do	H. W. Henshaw.....	5.60	3.45	1.02	0.79
686	♂	..... do	Sept. 2, 1873	..... do	5.45	3.40	1.10	0.81
731	♀ jun.	..... do	Sept. 10, 1873	..... do	5.54	3.30	1.02	0.80
528	♀ ad.	Chiricahua Mts., Ariz.	Aug. 29, 1874	..... do .....	.....	.....	.....	.....
529	♀ ad.	..... do .....	..... do .....	..... do .....	.....	.....	.....	.....
552	Jun.	..... do .....	..... do .....	..... do .....	.....	.....	.....	.....
877	♀ ad.	..... do .....	..... do .....	..... do .....	.....	.....	.....	.....

COLAPTES MEXICANUS (Swains.).

Red-shafted Flicker.

Colaptes mexicanus, SWAINS., Syn. Birds Mex., in Phil. Mag., i, 1827, 440.—NEWB., P. R. R. Rep., vi, 1857, 91.—BD., Ives' Col. Exped., 1857-58, pt. iv, 5.—HEERM., P. R. R. Rep., x, pt. iv, 1859, 59.—XANTUS, Proc. Acad. Nat. Sci. Phila., 1859, 190 (Fort Tejon, Cal.).—BD., U. S. & Mex. Bound. Surv., ii, pt. ii,

1859, Birds, 16.—KENNERLY, P. R. R. Rep., Whipple's Route, x, 1859, 22.—HENRY, Proc. Acad. Nat. Sci. Phila., 1859, 106 (New Mexico).—COOP. & SUCKL., P. R. R. Rep., xii, pt. ii, 1860, 163.—HAYD., Trans. Am. Phil. Soc., xii, 1862, 156.—COUES, Proc. Acad. Nat. Sci. Phila., 1866, 56 (Fort Whipple, Ariz.).—COOPER, Birds Cal., i, 1870, 408.—STEV., U. S. Geol. Surv. Terr., 1870, 463.—ALLEN, Bul. Mus. Com. Zoöl., 1872, 180.—COUES, Key N. A. Birds, 1872, 198.—HOLD., Proc. Bost. Soc. Nat. Hist., 1872, 207.—SNOW, Birds Kan., 1872, 5.—YARROW & HENSHAW, Rep. Orn. Specs., 1872, Wheeler's Exped., 1874, 24.—BD., BREW., & RIDG., N. A. Birds, ii, 1874, 578, pl. 55, figs. 3. 4.—ALLEN, Proc. Bost. Soc. Nat. Hist., June, 1874, 33.—COUES, Birds Northwest, 1874, 294.

Colaptes mexicanoides, WOODH., Sitgreave's Exp. Zuñi & Col. Riv., 1854, 91.

Colaptes auratus var. *mexicanus*, HENSHAW, An. Lyc. Nat. Hist. N. Y., xi, 1874, 9.—*Id.*, An. List Birds Utah, 1872, Wheeler's Exped., 1874, 48.—*Id.*, Rep. Orn. Specs., 1873, Wheeler's Exped., 1874, 67, 91, 134.

In Utah, owing to the general absence of timber, none of the *Picidæ* were common except in some few localities among the mountains. This species is very generally distributed throughout the Territories of Utah and Nevada.

At Provo, in July, but few individuals were seen; but in December at this place they were very common. Nests often seen in holes in banks of streams.

Abundant everywhere in Colorado, frequenting indifferently the deciduous and coniferous trees up to timber line. A natural cavity in a cottonwood tree contained three fresh eggs. This was May 22. A male taken at Fort Garland is noticeable as having distinct black markings in the red maxillary patch.

In Arizona and New Mexico, this woodpecker has perhaps the widest diffusion of any of the family; occupying the country generally, extending from the timbered streams of the plains to the mountain tops. In the wide region which it inhabits, the species seems to vary its habits very little, except in some localities where the absence of trees renders a change in nesting necessary; and, other conditions being favorable, it readily adapts itself to the circumstances, and, like the Kingfisher, excavates its burrow in the horizontal banks of streams. In the mountains of Arizona, however, it can be said to be the exact counterpart of the Yellow Flicker;

its notes even being indistinguishable, and in some sections its shyness is quite as great as is ordinarily the case in the East, while at other points, as at Mount Graham, its only feeling regarding our appearance seemed to be the desire of gratifying a curiosity, and here I could readily enough approach within a few yards of it.

The Cape Saint Lucas Flicker (*C. chrysoides*), which is known to occur in the western portion of Arizona (Fort Mojave, Cooper, Proc. Cal. Acad., 1861, 122; Western Arizona, Coues, Proc. Acad. Nat. Sci. Phila., 1866, 56), does not appear to extend into the eastern part of the Territory; at least, its presence there remained undetected by us, though search was made for it.

Critical discussion of the relationships of this species to *C. auratus* will be found in the works of Baird, Allen, and Coues, as above quoted.

No.	Sex.	Locality.	Date.	Collector.	Wing.	Tail.	Bill.	Tarsus.
45	♂ jun.	Provo, Utah.....	Aug. 3, 1872	H. W. Henshaw .....	.....	.....	.....	.....
360	♀ ad.	Washington, Utah	Oct. 24, 1872	H. W. Henshaw and Dr. H. C. Yarrow.	.....	.....	.....	.....
468	♂ ad.	Provo, Utah.....	Nov. 30, 1872	..... do .....	.....	.....	.....	.....
469	♂ ad.	..... do .....	..... do .....	..... do .....	.....	.....	.....	.....
486	♂ ad.	..... do	Dec. 1, 1872	..... do .....	.....	.....	.....	.....
189	♀ ad.	Fort Garland, Colo....	May 29, 1873	H. W. Henshaw.....	6.47	5.05	1.50	1.10
272	♂ ad.	..... do	June 6, 1873	..... do	6.50	4.84	1.35	1.08
284	♀ ad.	..... do	June 7, 1873	..... do	6.23	4.30	1.42	1.08
911	♂ ad.	San Francisco River, Ariz.	Oct. 14, 1873	..... do	6.37	4.76	1.63	1.13
913	♀	..... do	Oct. 16, 1873	..... do	6.45	4.90	1.40	1.07
95	♂ jun.	Willow Spring, Ariz...	July 12, 1874	Dr. J. T. Rothrock .....	.....	.....	.....	.....
106	♀ jun.	..... do .....	..... do .....	..... do .....	.....	.....	.....	.....
257	♂ jun.	Mount Graham, Ariz..	Aug. 1, 1874	H. W. Henshaw.....	.....	.....	.....	.....
747	♂ ad.	..... do	Sept. 19, 1874	..... do .....	.....	.....	.....	.....
757	♀ jun.	..... do .....	..... do .....	..... do .....	.....	.....	.....	.....
842	♂ ad.	..... do	Sept. 24, 1874	..... do .....	.....	.....	.....	.....
304	♂ ad.	Del Norte, Colo	Sept. 28, 1874	C. E. Aiken.....	.....	.....	.....	.....
345	♂ ad.	Pueblo, Colo.....	Oct. 14, 1874	..... do .....	.....	.....	.....	.....
1066	♀ ad.	Camp Apache, Ariz....	Oct. 26, 1874	H. W. Henshaw.....	.....	.....	.....	.....

ORDER RAPTORES: RAPTORIAL BIRDS.

FAM. STRIGIDAE: OWLS.

OTUS VULGARIS (Linn.), var. WILSONIANUS (Less.).

Long-eared Owl.

Otus wilsonianus, LESS., Trans. Orn., 1831, 110.—BD., P. R. R. Rep., Beckwith's Route, x, 1857, 12.—*Id.*, Birds N. A., 1858, 53.—KENNERLY, P. R. R. Rep., Whipple's Route, x, 1859, 20.—HENRY, Proc. Acad. Nat. Sci. Phila., 1859, 105 (New Mexico).—COQP. & SUCKL., P. R. R. Rep., xii, pt. ii, 1860, 155.—HAYD., Trans. Am. Phil. Soc., xii, 1862, 153.—COUES, Proc. Acad. Nat. Sci., Phila., 1866, 50.—COOPER, Birds Cal., i, 1870, 426.—SNOW, Birds Kan., 1872, 5.—MERRIAM, U. S. Geol. Surv. Terr., 1872, 695.—YARROW, Rep. Orn. Specs., 1871, Wheeler's Exped., 1874, 36.

Otus vulgaris var. *wilsonianus*, ALLEN, Bull. Mus. Comp. Zoöl., 1872, 180.—COUES, Key N. A. Birds, 1872, 204.—BD., BREW., & RIDG., N. A. Birds, iii, 1874, 18.—HENSHAW, An. Lyc. Nat. Hist. N. Y., xi, 1874, 9.—YARROW & HENSHAW, Rep. Orn. Specs., 1872, Wheeler's Exped., 1874, 24.—ALLEN, Proc. Bost. Soc. Nat. Hist., June, 1874, 34.—COUES, Birds Northwest, 1874, 304.

Possessing a general distribution in the West, this owl was found particularly numerous in Utah, where it is probably the most common of the family. It seems to be a habit with this species in the West to congregate together and form colonies, often made up of a large number of individuals. I have, however, noticed this to be most frequently the case in regions where timber was very scarce, and doubtless this lack of places suited to the necessities of their nature, which requires them to pass the hours of daylight in some dark, secluded retreat, furnishes the reason for this apparent sociability. In Grass Valley, Utah, I thus found at least a dozen individuals together in a small grove of cedars, and nearly every tree contained one of their nests, rudely made of coarse sticks, while some supported two or three. The birds were roosting on the low branches in the darkest portions of the clump, and they were generally so well concealed that I saw them only as they dashed hurriedly out when I was close upon their retreats. Though very reluctant to fly, they seemed to have no difficulty in threading the mazes of the wood, flying very rapidly in and out among the trees, and not alighting till they had found some snug little corner, as far from the light as possible. They refused to leave the grove, and I could easily have

destroyed the whole colony, one after another, but having procured four of the number, I left the remainder to finish their nap in undisturbed tranquillity.

In Arizona, this bird is not uncommon, and Captain Bendire has informed me that he found some large colonies under much the same circumstances as that mentioned above.

No.	Sex.	Locality.	Date.	Collector.	Wing.	Tail.	Bill.	Tarsus.
....	♂ ad.	Carlin, Nev	May. 19, 1871	Dr. W. J. Hoffman .....	.....	.....	.....	.....
154	♀ ad.	Grass Valley, Utah ...	Sept. 10, 1872	H. W. Henshaw .....	.....	.....	.....	.....
159	♂ ad.	..... do .....	..... do .....	..... do .....	.....	.....	.....	.....
421	♂ ad.	Fillmore, Utah	Nov. 18, 1872	H. W. Henshaw and Dr. H. C. Yarrow.	.....	.....	.....	.....
422	♂ ad.	..... do .....	..... do .....	..... do .....	.....	.....	.....	.....
423	♂ ad.	..... do .....	..... do .....	..... do .....	.....	.....	.....	.....
426	♀ ad.	..... do .....	..... do .....	..... do .....	.....	.....	.....	.....

OTUS (BRACHYOTUS) BRACHYOTUS, Stev.

Short-eared Owl.

Strix brachyotus, GMEL., Syst. Nat., 1789, 289.

Brachyotus cassinii, NEWB., P. R. R. Rep., vi, 1857, 76.—BD., Birds N. A., 1858, 54.—HEERM., P. R. R. Rep., x, pt. ii, 1859, 34.—HENRY, Proc. Acad. Nat. Sci. Phila., 1859, 105 (New Mexico).—COOP. & SUCKL., P. R. R. Rep., xii, pt. ii, 1860, 155.—HAYD., Trans. Am. Phil. Soc., xii, 1862, 154.—COUES, Proc. Acad. Nat. Sci. Phila., 1866, 50.—COOPER, Birds Cal., i, 1870, 428.—STEV., U. S. Geol. Surv. Terr., 1870, 462.—SNOW, Birds Kan., 1872, 5.

Otus (Brachyotus) brachyotus, BD., BREW., & RIDG., N. A. Birds, iii, 1874, 22.

Otus brachyotus, HENSHAW, Rep. Orn. Specs., 1873, Wheeler's Exped., 1874, 135.

Brachyotus palustris, COUES, Key N. A. Birds, 1872, 204.—ALLEN, Proc. Bost. Soc. Nat. Hist., June, 1874, 34.—COUES, Birds Northwest, 1874, 306.

A single specimen was obtained near Camp Bowie, Southeastern Arizona, which was the only occasion the species was met with. This bird was started from a low clump of bushes on an open plain, and flew in a wild, uncertain manner, as though completely bewildered. It proved, however, no easy matter to get within gunshot of it a second time, and several unsuccessful attempts were made before a long shot brought it down.

Dr. Coues speaks of having seen "a surprising number on different occasions along the Colorado River," and gives it as common throughout the Territory. The above instance is, however, the only one where the

bird has been seen by our parties, and I am inclined to regard it as a rare bird in the eastern part of the Territory. It is most everywhere an inhabitant of the marshes and swampy meadows, the dry, naked plains of the interior country not being adapted to its wants. Along the large rivers, however, it probably finds congenial abodes.

SCOPS ASIO (Linn.), var. MACCALLI, Cass.

Western Mottled Owl.

- Scops maccalli*, CASS., Birds Cal. & Texas, 1850, 180.—*Id.*, Birds N. A., 1858, 52, pl. 39.—BD., U. S. & Mex. Bound. Surv., ii, pt. ii, 1859, Birds, 4.—KENNERLY, P. R. R. Rep., Whipple's Route, x, 1859, 20.—COUES, Proc. Acad. Nat. Sci. Phila., 1866, 49 (Fort Mojave, Cooper; Colorado, Chiquito River, Kennerly).
- Scops asio* var. *maccalli*, COUES, Key N. A. Birds, 1872, 203.—BD., BREW., & RIDG., N. A. Birds, iii, 1874, 52.—HENSHAW, Rep. Orn. Specs., 1873, Wheeler's Exped., 1874, 135.—COUES, Birds Northwest, 1874, 303.
- Ephialtes asio*, WOODH., Sitgreave's Exp. Zuni & Col. Riv., 1854, 62.
- Scops asio* (?), HEERM., P. R. R. Rep., x, pt. ii, 1859, 35.—COOP. & SUCKL. (?), P. R. R. Rep., xii, pt. ii, 1860, 155.

This bird was very common both in Arizona and New Mexico, and is, I think, the most numerous of the family in this region. Whenever our camp chanced to be made near one of the groves of oaks, which are numerous, these owls were sure to be heard soon after dusk, and, not infrequently, several would take up their stations in a tree within a few feet of the camp fire, and remain for an hour or more, apparently to satisfy their curiosity, uttering, from time to time, their low, responsive cries. Their notes vary much in length, but, when full, consist of two prolonged syllables, with quite an interval between, followed by a rapid utterance of six or seven notes, which, at the end, are run together. They are very sociable in their disposition, and, as soon as it is fairly dusk, the first call of a solitary bird may be heard issuing from some thicket, where it has remained in concealment during the day. After one or two repetitions, this will be answered by another, perhaps half a mile away, and soon by a third and a fourth, apparently all coming together; and I have heard at least eight of these owls, congregated within a short distance in the tree tops. When the band was complete, they would move off, still apparently keeping together, till their notes were lost in the distance.

No.	Sex.	Locality.	Date.	Collector.	Wing.	Tail.	Bill.	Tarsus.
790	♂ ad.	Gila River, Ariz	Sept. 15, 1873	H. W. Henshaw.....	6.58	3.45	0.53	1.32
895	♂	Camp Grant, Ariz.....	Sept. 29, 1873	.....do	6.62	3.45	0.60	1.15
907	♀	San Pedro, Ariz	Oct. 4, 1874	.....do	6.48	3.58	0.54	1.25

SCOPS FLAMMEOLA, Licht.

Flammulated Owl.

Scops flammeola, LIGHT., Mus. Berol. Nomenclat., 1854, 7.—COOPER, Birds Cal., 1870, 423.—COUES, Key N. A. Birds, 1872, 203.—BD., BREW., & RIDG., N. A. Birds, iii, 1874, 58.—HENSHAW, Rep. Orn. Specs., 1873, Wheeler's Exped., 1874, 135.—COUES, Birds Northwest, 1874, 304.

This rare species has hitherto been known to our fauna through a single specimen taken at Fort Crook, Cal. I think, however, that it may be not uncommon in Arizona, though, like others of this genus, its strictly nocturnal habits render it extremely liable to escape detection. A fine specimen was secured by Dr. C. G. Newberry in a cañon thirty miles south of Camp Apache. Having shot a small bird, he was pushing through the brush to pick it up, when this little owl started from a low tree, where it was concealed, probably asleep, and alighted a few yards distant, where it was shot. At the report of his gun, a second flew out from a low bush, but was lost in the thick brush. The following evening, when returning to camp, gun in hand, I was imitating the notes of the Screech Owl, and was answered by notes similar in character, but shorter and weaker. Stationing myself directly under an oak, the top branches of which I could see outlined against the sky, and continuing the call, I soon saw the form of a diminutive owl clearly defined against the sky, and I think it probably was the mate of the one shot. Upon shooting, the bird fell part way down, but recovered itself, and I obtained only a glimpse of it as it flew out, and was lost in the deep shadows of the cañon's sides.

No.	Sex.	Locality.	Date.	Collector.	Wing.	Tail.	Bill.	Tarsus.
735	Thirty miles south of Camp Apache, Ariz.	Sept. 11, 1873	Dr. C. G. Newberry ..	5.28	2.73	0.88	0.82

BUBO VIRGINIANUS (Gmel.), var. ARCTICUS, Swains.

Western Great Horned Owl.

Strix (Bubo) arctica, SWAINS., Fn. Bor.-Am., ii, 1831, 86.

Bubo virginianus var. *arcticus*, COUES, Key N. A. Birds, 1872, 202.—BD., BREW., & RIDG., N. A. Birds, iii, 1874, 60, 64.—HENSHAW, Rep. Orn. Specs., 1873, Wheeler's Exped., 1874, 91, 136.—COUES, Birds Northwest, 1874, 301.

Bubo virginianus, WOODH., Sitgreave's Exp. Zuñi & Col. Riv., 1854, 62.—NEWB., P. R. R. Rep., vi, 1857, 76.—BD., U. S. & Mex. Bound. Surv., ii, pt. ii, 1859, Birds, 4 (Devil's River, Texas).—KENNERLY, P. R. R. Rep., Whipple's Route, x, 1859, 19.—HEERM., P. R. R. Rep., x, pt. iv, 1859, 34.—XANTUS, Proc. Acad. Nat. Sci. Phila., 1859, 190 (Fort Tejon, Cal.).—BD., Proc. Acad. Nat. Sci. Phila., 1859, 302 (Cape Saint Lucas).—HENRY, Proc. Acad. Nat. Sci. Phila., 1859, 105 (New Mexico).—COOP. & SUCKL., P. R. R. Rep., xii, pt. ii, 1860, 154.—HAYD., Trans. Am. Phil. Soc., xii, 1862, 153.—COUES, Proc. Acad. Nat. Sci. Phila., 1866, 49 (Fort Whipple, Ariz.).

The only specimen taken is quite typical of the paler, grayer race, which represents the Horned Owl in the West. In Arizona, the species was very abundant, and scarcely a camp was made but we were aware of the presence of these owls by their loud hootings through the night. During the day, they remain hidden in the deep, dark cañons, or among the thick foliage of the largest cottonwoods.

It occurs throughout the West generally, and was seen by myself and others of our parties in Utah, Colorado, and New Mexico. Its usual habit is to remain quiet during the day, and commence its hunting forays just after dusk. This owl, however, enjoys most excellent vision in the brightest hours of day, and if disturbed in its retreat flies boldly out, and requires very careful stalking ere it can be killed. While caring for its young, I am inclined to believe that it hunts indifferently by day and night.

No.	Sex.	Locality.	Date.	Collector.	Wing.	Tail.	Bill.	Tarsus.
793	♀ ad.	Gila River, Ariz	Sept. 17, 1873	H. W. Henshaw	14.25	8.50	1.66	0.20

GLAUCIDIUM PASSERINUM (Linn.), var. CALIFORNICUM, Sclat.

Californian Pigmy Owl.

Glaucidium californicum, SCLAT., Proc. Zoöl. Soc. Lond., 1857, 4.

Glaucidium passerinum var. *californicum*, RIDG. *apud* COUES, Key N. A. Birds, 1872, 206.—BD., BREW., & RIDG., N. A. Birds, iii, 1874, 81.—HENSHAW, Rep. Orn. Specs., 1873, Wheeler's Exped., 1874, 136.—COUES, Birds Northwest, 1874, 317.

Glaucidium infuscatum, NEWB., P. R. R. Rep., vi, 1857, 77.

Glaucidium gnoma, BD., Birds N. A., 1858, 62 (not of WAGLER?).—HEERM., P. R. R. Rep., x, pt. ii, 189, 34.—COOP. & SUCKL., P. R. R. Rep., xii, pt. ii, 1860, 158.—COUES, Proc. Acad. Nat. Sci. Phila., 1866, 50 (Fort Whipple, Ariz.).

This little owl is apparently quite common in Arizona and New Mexico. It does not appear to be at all a nocturnal species, but was observed to be most active in the early morning and late afternoon, and on one occasion was seen flying at broad noonday. Their notes are quite similar to those of the Mottled Owl (*Scops maccalli*), by imitating which I succeeded in enticing one, step by step, till he finally sat on the top of a small oak within thirty feet, and scanned my person with evident astonishment, and, I could not help fancying, with an air of abused confidence.

Among the pine woods of the White Mountains, Arizona, these owls appeared to be particularly numerous toward the latter part of October, and I had good reasons for believing that at this season they are quite gregarious. During a week's reconnaissance here, scarcely a camp was made but that at some period of the day the notes of this species could be heard, usually coming from some perch, hidden away in the tops of the lofty pines. These notes were most frequent at about nine in the morning, at which time they appeared to gather at some rendezvous, and then doze away the time till about four in the afternoon, when they again became noisy, as they wakened up, and prepared to sally out for a fresh supply of provisions. When camped one morning in a little valley hemmed in on all sides by steep banks, clothed with pines, I estimated there must have been at least twenty of these diminutive owls within a radius of a quarter of a mile; their calls to each other were incessant, and from all directions at once. I found no difficulty in imitating them, and in a few moments had one of the little fellows sitting in a high pine above my head, answering note for note, though how he got there I was puzzled to tell, as I certainly did not see him fly in. For full five minutes I strained my eyes, endeavoring to make out his form, but all in vain, until, perhaps having satisfied himself of the fraud, he flew out, when I obtained a shot at him.

A young bird collected by Dr. C. G. Newberry is appreciably different from the adult. The entire plumage has more of a slaty tinge, while the back and under parts are strongly suffused with rufous. The head above

lacks the numerous rounded reddish-white spots, but each feather has a single elongated white spot at the end of the shaft.

No.	Sex.	Locality.	Date.	Collector.	Wing.	Tail.	Bill.	Tarsus.
46	♀ jun.	Near Camp Apache, Ariz	Aug. 9, 1873	Dr. C. G. Newberry...	3.82	2.83	0.45	0.78
761	♂	Thirty miles south of Camp Apache, Ariz.	Sept. 12, 1873	H. W. Henshaw.....	3.53	3.05	0.40	0.76
971	♂ ad.	Gila River, Ariz	Oct. 26, 1873	..... do	3.87	3.05	0.47	0.88

SPEOTYTO CUNICULARIA (Mol.), var. HYPOGÆA, (Bon.).

Burrowing Owl.

Strix hypogæa, BON., Am. Orn., i, 1825, 72.

Athene hypogæa, BD., Staus. Rep. Exp. Great Salt Lake, 1852, 314.—WOODH., Sitgreave's Exp. Zuñi & Col. Riv., 1854, 62.—NEWB., P. R. R. Rep., vi, 1857, 77.—BD., U. S. & Mex. Bound. Surv., ii, pt. ii, 1859, Birds, 5.—HENRY, Proc. Acad. Nat. Sci. Phila., 1859, 105 (New Mexico).—COOP. & SUCKL., P. R. R. Rep., xii, pt. ii, 1860, 157.—HAYD., Trans. Am. Phil. Soc., xii, 1862, 154.—COOPER, Birds Cal., i, 1870, 448 (*hypugæa*).—STEV., U. S. Geol. Surv. Terr., 1870, 462 (*hypugæa*).—ALLEN, Bul. Mus. Comp. Zoöl., 1872, 180 (western edge of plains).—SNOW, Birds Kan., 1872, 5.—HOLD., Proc. Bost. Soc. Nat. Hist., 1872, 208 (*hypugæa*).—MERRIAM, U. S. Geol. Surv. Terr., 1872, 696 (Utah; Idaho).

Speotyto cunicularia var. *hypogæa*, COUES, Key N. A. Birds, 1872, 207.—BD., BREW., & RIDG., N. A. Birds, iii, 1874, 90.—YARROW & HENSHAW, Rep. Orn. Specs., 1872, Wheeler's Exped., 1874, 25.—HENSHAW, An. Lyc. Nat. Hist. N. Y., xi, 1874, 9.—*Id.*, An. List Birds Utah, 1872, Wheeler's Exped., 1874, 48.—*Id.*, Rep. Orn. Specs., 1873, Wheeler's Exped., 1874, 136.—COUES, Birds Northwest, 1874, 322.—ALLEN, Proc. Bost. Soc. Nat. Hist., June, 1874, 34.

Athene cunicularia, BD., P. R. R. Rep., Beckwith's Route, x, 1857, 13.—KENNERLY, P. R. R. Rep., Whipple's Route, 1859, 20.—HEERM., P. R. R. Rep., x, pt. ii, 1859, 33.—XANTUS, Proc. Acad. Nat. Sci. Phila., 1859, 190 (Fort Tejon, Cal.).—BD., U. S. & Mex. Bound. Surv., ii, pt. ii, 1859, Birds, 5.—COOPER, Birds Cal., i, 1870, 437.

This curious owl appears not to be a very abundant resident either in Arizona or New Mexico, at least in those portions visited by the survey during the past season. They prefer the lower plains, and are not found, I think, at a higher altitude than 6,000 feet. Near Zuñi, N. Mex., Camps Grant and Bowie, Ariz., and a few other places, they were seen, but never away from the settlements of the prairie dogs. Their sight in the day appears to be remarkably good, and, as all I saw were very shy, it proved

to be no easy matter to get within shooting distance. Their flight is rather laborious and irregular, and they do not fly to any great distance when alarmed, but try to hide in the mouths of the prairie-dog holes, though I never saw one take refuge in them.

No.	Sex.	Locality.	Date.	Collector.	Wing.	Tail.	Bill.	Tarsus.
933	♀	Camp Bowie, Ariz	Oct. 9, 1873	H. W. Henshaw	6.66	3.40	0.55	1.73

FAM. FALCONIDAE: FALCONS.

FALCO LANARIUS (Auct.), var. POLYAGRUS (Cass.).

Prairie Falcon.

Falco polyagrus, BD., Birds N. A., 1858, 12.—KENNERLY, P. R. R. Rep., Whipple's Route, x, 1859, 19.—HEERM., P. R. R. Rep., x, pt. iv, 1859, 31.—COOP. & SUCKL., P. R. R. Rep., xii, pt. ii, 1860, 143.—HAYD., Trans. Am. Phil. Soc., xii, 1862, 152.—COUES, Proc. Acad. Nat. Sci. Phila., 1866, 43.—COOPER, Birds Cal., i, 1870, 458 (California).—STEV., U. S. Geol. Surv. Terr., 1870, 462 (Wyoming).—SNOW, Birds Kan., 1872, 3.—HENSHAW, An. Lyc. Nat. Hist. N. Y., xi, 1871, 9.—YARROW, Rep. Orn. Specs., 1871, Wheeler's Exped., 1874, 36.

Gennaia polyagrus, HENRY, Proc. Acad. Nat. Sci. Phila., 1859, 105 (New Mexico).

Falco mexicanus, RIDG., Am. Nat., vi, 1872, 430 (Illinois).—COUES, Key N. A. Birds, 1872, 213.

Falco mexicanus var. *polyagrus*, COUES, Birds Northwest, 1874, 339.

Falco saker var. *polyagrus*, HENSHAW, Rep. Orn. Specs., 1873, Wheeler's Exped., 1874, 67, 137.

Falco (Hierofalco) lanarius var. *polyagrus*, RIDG., Proc. Bost. Soc. Nat. Hist., xvi, 1873, 44.—BD., BREW., & RIDG., N. A. Birds, iii, 1874, 123.

Seen at several points in Arizona and New Mexico. In habits, shy and solitary. I never observed it hunting its prey, but when flying it maintains a direct course through the air from point to point, and progresses very swiftly by short, powerful strokes of the wings. Its flight is sufficiently peculiar to distinguish it from any other hawk with which I am acquainted.

A species of hawk which I saw frequently in the fall in Utah I am certain was of this kind. It frequented the open prairie, and in some places along the road the telegraph poles formed favorite places for them to perch

on and survey the adjoining country. Their method of alighting on these was peculiar. They flew low down, and when just at the foot of the pole suddenly closed the wings and shot up to the top, the impetus gained in flight being sufficient to propel them upward to the desired height.

Of this falcon, a single male in adult plumage was shot near Denver, Colo. The specimen is of interest, as being the third only known to have been taken in this plumage. Mr. Ridgway has kindly compared this with the others in the Smithsonian collection, and finds it to present the following differences: The transverse bars of the upper surface are more sharply defined, and are pale earth-brown or dull ochraceous, instead of ashy-drab, and are very distinct on the rump instead of being entirely obsolete. *The upper parts lack entirely any bluish tinge*, which is so strongly marked on the other two specimens. The markings on the flanks are in the form of large transverse spots of dark vandyke-brown, with intervening rounded spots of pale reddish-drab. Cere, legs, and feet light-yellow.

No.	Sex.	Locality.	Date.	Collector.	Wing.	Tail.	Bill.	Tarsus.
....	♀ jun.	Arizona	Nov. 3, 1871	F. Bischoff .....	.....	.....	.....	.....
64	♂ ad.	Denver, Colo.	May 12, 1873	H. W. Henshaw	12.25	8.00	0.75	2.00
974	♂ jun.	Gila River, N. Mex ...	Nov. 1, 1873	..... do	11.55	7.00	0.77	1.85

FALCO COMMUNIS, Gmel., var. ANATUM, Bon.

Duck Hawk.

- Falco anatum*, BON., Eur. & N. Am. Birds, 1838, 4.—BD., Birds N. A., 1858, 7.—HAYD., Trans. Am. Phil. Soc., xii, 1862, 152.—COOPER, Birds Cal., i, 1870, 457.—SNOW, Birds Kan., 1872, 3.
- Falco communis* var. *anatum*, RIDG., Proc. Bost. Soc. Nat. Hist., 1873, 45.—BD., BREW., & RIDG., N. A. Birds, 1874, iii, 132.—RIDG. *apud* ALLEN, Proc. Bost. Soc. Nat. Hist., June, 1874, 18, 34.—HENSHAW, An. Lyc. Nat. Hist. N. Y., xi, 1874, 9.
- Falco nigriceps*, HENRY, Proc. Acad. Nat. Sci. Phila., 1859, 105 (New Mexico).—COOP. & SUCKL., P. R. R. Rep., xii, pt. ii, 1860, 142, pl. xi.—COOPER, Birds Cal., i, 1870, 456.
- Falco peregrinus*, WOODH., Sitgreave's Exp. Zuñi & Col. Riv., 1854, 61.—ALLEN, Bul. Mus. Comp. Zool., 1872, 180 (Middle Kansas; South Park; plains of Wyoming; Ogden, Utah).

Falco communis, COUES, Key N. A. Birds, 1872, 213, f. 141.—*Id.*, Am. Nat., viii, 1874, 598 (Eastern Montana, nesting).—*Id.*, Birds Northwest, 1874, 341.

This hawk appears to be rather numerous in Southeastern Arizona, especially about Camp Lowell, where I saw several. I have never had opportunity to observe their habits; but these are tolerably well known, and probably do not differ in this region from their usual manners elsewhere. I saw one in hot pursuit of a Mallard Duck one day, and the latter appeared to maintain well the advantage of a dozen feet which it had, though its ultimate fate could hardly have been doubtful had not the hawk, observing me, given over its design, and retired, to be met with again a few minutes later and secured.

No.	Sex.	Locality.	Date.	Collector.	Wing.	Tail.	Bill.	Tarsus.
618	♂ jun.	Camp Lowell, Ariz	Sept. 8, 1874	H. W. Henshaw.....	14.25	7.50	0.75	1.77

FALCO COLUMBARIUS, Linn.

Pigeon Hawk.

Falco columbarius, LINN., Syst. Nat., 1766, 128.

Hypotriorchis columbarius, WOODH., Sitgreave's Exp. Zuñi & Col. Riv., 1854, 60.—NEWB., P. R. R. Rep., vi, 1857, 74.—HEERM., P. R. R. Rep., x, pt. iv, 1859, 31.—HAYD., Trans. Am. Phil. Soc., xii, 1862, 152.—STEV., U. S. Geol. Surv. Terr., 1870, 462.—SNOW, Birds Kan., 1872, 3.

Falco columbarius, BD., U. S. & Mex. Bound. Surv., ii, pt. ii, 1859, Birds, 3.—COOP. & SUCKL., P. R. R. Rep., xii, pt. ii, 1860, 142.—COOPER, Birds Cal., i, 1870, 460.—ALLEN, Bul. Mus. Comp. Zoöl., 1872, 180 (Utah).—COUES, Key N. A. Birds, 1872, 214.—HENSHAW, Rep. Orn. Specs., 1873, Wheeler's Exped., 1874, 137.—ALLEN, Proc. Bost. Soc. Nat. Hist., June, 1874, 34.—COUES, Birds Northwest, 1874, 345.

Falco (Hypotriorchis) columbarius, COUES, Proc. Acad. Nat. Sci. Phila., 1866, 42.

Falco (Falco) lithofalco var. *columbarius*, BD., BREW., & RIDG., N. A. Birds, iii, 1874, 144.

I am quite confident that I saw this species once or twice in Southern Arizona, and at least once in New Mexico, on the upper sources of the Gila. It is given by Dr. Coues, in his "Prodrome of a Work on the Ornithology of Arizona Territory," as a common resident.

FALCO FEMORALIS, Temm.

Aplomado Falcon.

Falco femoralis, BD., Birds N. A., ii, 1858, pl. 1.—BD., U. S. & Mex. Bound. Surv., ii, pt. ii, 1859, Birds, 3.—COOPER, Birds Cal., 1870, 461.—COUES, Key N. A. Birds, 1872, 215.—HENSHAW, Rep. Orn. Specs., 1873, Wheeler's Exped., 1874, 137.

Hypotriorchis femoralis, HEERM., P. R. R. Rep., Parke's Route, x, 1859, 9, pl. 1.

Falco (Hypotriorchis) femoralis, COUES, Proc. Acad. Nat. Sci. Phila., 1866, 43.

Falco (Rhynchofalco) femoralis, BD., BREW., & RIDG., N. A. Birds, iii, 1874, 155.

A hawk was seen in a mountainous locality near Camp Bowie, Southeastern Arizona, which was without doubt this species. It was about the size of a Cooper's Hawk, and, as it passed rapidly by within fair shooting distance, the black band across the abdomen was very conspicuous. It has been taken twice on our southern border.

In 1874, this hawk was seen, on four different occasions, at distant localities in Southeastern Arizona. It would thus appear to be not very rare in this section. All the individuals noticed were among the timber of the streams as they issued out on the plains; and in such localities it doubtless finds an abundance of small game, feathered and otherwise, which flock to the very limited supply of water. They did not appear very shy, and I had no difficulty in obtaining a shot in three instances, in two of which, however, the birds, though most grievously wounded, succeeded in flying so far that I was compelled to give them up. Their flight is light, powerful, and easy, and their whole organization classes them at once among the noble birds of prey.

FALCO SPARVERIUS, Linn.

Sparrow Hawk.

Falco sparverius, LINN., Syst. Nat., 1766, 128.—BD., Stans. Rep. Exp. Great Salt Lake, 1852, 325.—*Id.*, U. S. & Mex. Bound. Surv., ii, pt. ii, 1859, Birds, 3.—COOP. & SUCKL., P. R. R. Rep., xii, pt. ii, 1860, 143.—COUES, Proc. Acad. Nat. Sci. Phila., 1868, 82.—HENRY, Proc. Acad. Nat. Sci. Phila., 1859, 104 (New Mexico).—COOPER, Birds Cal., i, 1870, 462.—ALLEN, Bul. Mus. Comp. Zool., 1872, 180.—COUES, Key N. A. Birds, 1872, 214, f. 142.—HOLD., Proc. Bost. Soc. Nat. Hist., 1872, 207.—YARROW, Rep. Orn. Specs., 1871, Wheeler's Exped., 1874, 36.—YARROW & HENSHAW, Rep. Orn. Specs., 1872, Wheeler's Exped., 1874, 25.—HENSHAW, Rep. Orn. Specs., 1873, Wheeler's Exped.,

1874, 67, 91, 137.—ALLEN, Proc. Bost. Soc. Nat. Hist., June, 1874, 16, 34.—COUES, Birds Northwest, 1874, 349.—BD., BREW., & RIDG., N. A. Birds, iii, 1874, 349.

Falco (Tinnunculus) sparverius, COUES, Proc. Acad. Nat. Sci. Phila., 1866, 42 (Fort Whipple, Ariz.).

Tinnunculus sparverius, WOODH., Sitgreave's Exp. Zuñi & Col. Riv., 1854, 60.—NEWB., P. R. R. Rep., vi, 1857, 74.—BD., U. S. & Mex. Bound. Surv., ii, pt. ii, 1857, 12.—XANTUS, Proc. Acad. Nat. Sci. Phila., 1859, 190 (Fort Tejon, Cal.).—BD., Proc. Acad. Nat. Sci. Phila., 1859, 302 (Cape Saint Lucas).—KENNERLY, P. R. R. Rep., Whipple's Route, 1859, 19.—HEERM., P. R. R. Rep., x, pt. iv, 1859, 31.—HAYD., Trans. Am. Phil. Soc., xii, 1862, 152.—STEV., U. S. Geol. Surv. Terr., 1870, 462.—SNOW, Birds Kan., 1872, 3.—MERRIAM, U. S. Geol. Surv. Terr., 1872, 696.

This little falcon is the most numerous of all his tribe throughout the West, and ranges over the country at will, from the plains up along the mountains to an altitude of 10,000 feet, below which it is common. In summer, its mode of nesting, in the hollows of trees, confines it to the vicinity of timber, and on the lowlands it is never found far away from the streams, where it finds opportunities for nidification, and an abundant supply of game in the shape of the small insectivorous birds; but more especially does its food consist of the various kinds of coleopterous insects and grasshoppers, of which it destroys multitudes. In fact, this last item is the most important one of all, and where these insects are abundant I have never seen them have recourse to any other kind of food.

No.	Sex.	Locality.	Date.	Collector.	Wing.	Tail.	Bill.	Tarsus.
....	♀ jun.	Nevada	Sept. 8, 1871	F. Bischoff .....	.....	.....	.....	.....
....	♂ ad.	Arizona	Oct. 30, 1871	.... do .....	.....	.....	.....	.....
97	♀ ad.	Wahsatch Mts., Utah..	Aug. 16, 1872	H. W. Henshaw .....	.....	.....	.....	.....
268	♂ ad.	Beaver, Utah	Sept. 22, 1872	Dr. H. C. Yarrow and H. W. Henshaw.	.....	.....	.....	.....
290	♂ ad.	.... do	Sept. 24, 1872	.... do .....	.....	.....	.....	.....
34	♂ ad.	Denver, Colo	May 9, 1873	H. W. Henshaw	7.67	5.05	0.50	1.37
184	♀ ad.	Fort Garland, Colo....	May 28, 1873	.... do	7.77	5.38	0.47	1.50
4	♂ ad.	Twin Lakes, Colo....	Aug. —, 1873	Dr. J. T. Rothrock....	7.20	5.13	0.45	1.42
586	♂ ad.	Camp Apache, Ariz ...	Aug. 4, 1873	H. W. Henshaw	7.22	5.23	0.45	1.45
73	♀ jun.	.... do	Sept. 13, 1873	M. N. Maguet.....	7.44	5.55	0.50	1.40
1	♀ ad.	Pueblo, Colo	July 23, 1874	C. E. Aiken .....	.....	.....	.....	.....
758	♀ ad.	Mount Graham, Ariz..	Sept. 19, 1874	H. W. Henshaw .....	.....	.....	.....	.....
959	♂ ad.	Gila River, Ariz	Oct. 3, 1874	.... do .....	.....	.....	.....	.....
1065	♀ ad.	Camp Apache, Ariz ...	Oct. 24, 1874	.... do .....	.....	.....	.....	.....
1069	♂ jun.	.... do	Oct. 26, 1874	.... do .....	.....	.....	.....	.....

PANDION HALIAETUS (Linn.), var. CAROLINENSIS, Gmel.

Fish Hawk.

Falco carolinensis, GMEL., Syst. Nat., 1789, 263

Pandion carolinensis, NEWB., P. R. R. Rep., x, pt. vi, 1857, 75.—BD., U. S. & Mex. Bound. Surv., ii, pt. ii, 1859, Birds, 4.—HEERM., P. R. R. Rep., x, pt. iv, 1859, 31.—COOP. & SUCKL., P. R. R. Rep., xii, pt. ii, 1860, 153.—COUES, Proc. Acad. Nat. Sci. Phila., 1866, 49 (Colorado River, Arizona).—SNOW, Birds Kan., 1872, 4.—MERRIAM, U. S. Geol. Surv. Terr., 1872, 698.

Pandion haliaetus var. *carolinensis*, BD., BREW., & RIDG., N. A. Birds, iii, 1874, 184.—HENSHAW, Rep. Orn. Specs., 1873, Wheeler's Exped., 1874, 138.

Pandion haliaetus, WOODH., Sitgreave's Exp. Zuni & Col. Riv., 1854, 59.—HENRY, Proc. Acad. Nat. Sci. Phila., 1859, 105 (New Mexico).—COUES, Key N. A. Birds, 1872, 219.—*Id.*, Birds Northwest, 1874, 367.

The Fish Hawk, though better known as a bird of the coast, is found in the West on all of the large rivers and bodies of water, and is not rare on the smaller streams as they issue from the mountains, which, though known as rivers, scarcely deserve this title if measured by the small quantity of water they carry down. On the Gila River, which is plentifully stocked with fish, some of large size, the Fish Hawks are quite numerous; and, in following its many devious windings and turnings upward toward its mountain sources, I noticed at short intervals these hawks, sometimes solitary, sometimes in pairs, either sitting on the top of some dead tree overlooking their fishing ground, or hovering just above the water, and scanning the shallows with anxious eyes, ready to pounce down on a victim as soon as opportunity should offer. Unlike the majority of the large birds of prey, isolation and freedom from persecution seem to have had no effect on the nature of this bird; and those I saw in this region were just as shy and suspicious of our appearance as though experience had taught them the treatment birds of their class usually receive at the hands of man.

No.	Sex.	Locality.	Date.	Collector.	Wing.	Tail.	Bill.	Tarsus.
938	♂	Gila River, N. Mex ..	Sept. 17, 1873	M. N. Maguet	18.00	8.50	1.13	2.08

CIRCUS CYANEUS (Linn.), var. HUDSONIUS, Linn.

Marsh Hawk.

Falco hudsonius, LINN., Syst. Nat., 1766, 128.

Circus hudsonius, NEWB., P. R. R. Rep., vi, 1857, 74.—BD., P. R. R. Rep., Beckwith's Route, x, 1857, 12.—KENNERLY, P. R. R. Rep., Whipple's Route, x, 1859, 19.—BD., U. S. & Mex. Bound. Surv., ii, pt. ii, 1859, Birds, 4.—HEERM., P. R. R. Rep., x, pt. iv, 1859, 33.—XANTUS, Proc. Acad. Nat. Sci. Phila., 1859, 190 (Fort Tejon, Cal.).—HENRY, Proc. Acad. Nat. Sci. Phila., 1859, 105 (New Mexico).—COOP. & SUCKL., P. R. R. Rep., xii, pt. ii, 1860, 150.—HAYD., Trans. Am. Phil. Soc., xii, 1862, 153.—COUES, Proc. Acad. Nat. Sci. Phila., 1866, 49.—STEV., U. S. Geol. Surv. Terr., 1870, 462.—SNOW, Birds Kan., 1872, 4.—MERRIAM, U. S. Geol. Surv. Terr., 1872, 698.—YARROW, Rep. Orn. Specs., 1871, Wheeler's Exped., 1874, 36.

Circus cyaneus var. *hudsonius*, ALLEN, Bull. Mus. Comp. Zool., 1872, 181.—COUES, Key N. A. Birds, 1872, 210.—BD., BREW., & RIDG., N. A. Birds, iii, 1874, 214.—YARROW & HENSHAW, Rep. Orn. Specs., 1872, Wheeler's Exped., 1874, 26.—ALLEN, Proc. Bost. Soc. Nat. Hist., June, 1874, 18, 34.—COUES, Birds Northwest, 1874, 327.

Circus cyaneus, WOODH., Sitgreave's Exp. Zuñi & Col. Riv., 1854, 61.

In Utah, this species was observed at many points in the lowland districts; while, near Utah Lake, their numbers were scarcely less than were the Rough-legged Hawks. They were seen at all hours of the day, sweeping over the marshes, where they just clear the tops of the tall grasses, turning quickly in and out of the reedy recesses in search of mice and gophers, which, when obtainable, constitute the major part of its food. When urged by hunger, it may attack birds; and I once remember to have been robbed of a Widgeon, I had killed and kept lying in the water, by one of these birds; but generally they confine their attacks to the humblest kind of game, which possesses neither the strength to enable them to resist, nor the activity to evade the sudden descent of their winged enemy.

A common hawk in Arizona and New Mexico, but here, as elsewhere, confined rather exclusively to the vicinity of marshes and water courses. I noticed many on the creeks about Camp Grant, where they were remarkably tame and unsuspicious, passing by within easy gunshot when intent in coursing for their prey, as though utterly indifferent to the presence of man.

No.	Sex.	Locality.	Date.	Collector.	Wing.	Tail.	Bill.	Tarsus.
....	♀ jun.	Nevada	Sept. 10, 1871	F. Bischoff .....	.....	.....	.....	.....
....	♀ ad.	.... do .....	.... do .....	.... do .....	.....	.....	.....	.....
439	♂ ad.	Beaver, Utah	Nov. 26, 1872	H. W. Henshaw and Dr. H. C. Yarrow.	.....	.....	.....	.....
440	♂ jun.	.... do .....	.... do .....	.... do .....	.....	.....	.....	.....
470	♀ ad.	Provo, Utah	Nov. 30, 1872	.... do .....	.....	.....	.....	.....
482	♂ jun.	.... do	Dec. 1, 1872	.... do .....	.....	.....	.....	.....
489	♂ jun.	.... do	Dec. 2, 1872	.... do .....	.....	.....	.....	.....
851	♀ jun.	Camp Grant, Ariz.	Sept. 24, 1873	H. W. Henshaw	13.40	8.60	0.63	2.86

NISUS FUSCUS, Gmel.

Sharped-shinned Hawk.

Falco fuscus, GMEL., Syst. Nat., 1789, 283.

Accipiter fuscus, BD., Stans. Rep. Exp. Great Salt Lake, 1852, 314.—WOODH., Sitgreave's Exp. Zuñi & Col. Riv., 1854, 61.—NEWB., P. R. R. Rep., vi, 1857, 74.—BD., Birds N. A., 1858, 18.—HEERM., P. R. R. Rep., x, pt. iv, 1859, 33.—BD., U. S. & Mex. Bound Surv., ii, pt. ii, 1859, Birds, 3.—COUES, Proc. Acad. Nat. Sci. Phila., 1866, 43.—COOPER, Birds Cal., 1870, 466.—STEV., U. S. Geol. Surv. Terr., 1872, 212.—SNOW, Birds Kan., 1872, 4.—MERRIAM, U. S. Geol. Surv. Terr., 1872, 697.—COUES, Birds Northwest, 1874, 332.

Nisus fuscus, BD., BREW., & RIDG., N. A. Birds, iii, 1874, 224.—YARROW & HENSHAW, Rep. Orn. Specs., 1872, Wheeler's Exped., 1874, 25.—HENSHAW, Rep. Orn. Specs., 1873, Wheeler's Exped., 1874, 68, 138.

Not uncommon in Nevada and Utah. A beautiful adult pair were taken in Beaver Cañon September 24. Upon one occasion, while watching a pair of doves feeding upon the ground, a female of this species made a daring and successful swoop upon one of them, passing within a few feet of the observer's head. As a further illustration of the bravery and hardihood with which this bird pursues its prey, it may be mentioned that one was observed in the town of Panquitch eagerly pursuing a common pigeon, apparently oblivious of the presence of spectators, who, for some time, vainly endeavored to drive it away. Such was its determination that it actually followed the pigeon into a deserted house, but was finally obliged to retire without accomplishing its object.

In Arizona and New Mexico, it is one of the most numerous of the hawks, inhabiting the country with little regard to nature of locality. In the fall, when the small birds and gather in favored spots about the streams, this

little falcon is found in their midst, and selecting his victims as whim or appetite urges. They often choose the Turtle Doves, and, swooping down in the midst of a flock gathered about a pool of water, almost invariably contrive to seize one of the bewildered birds ere the surprise caused by the suddenness of the attack is over. Occasionally, however, the first swoop is unsuccessful, and then they usually return to some perch near by to await another opportunity; but, when urged by hunger, I have seen a hawk, having failed in his swoop, turn, with the quickness of thought, and pursue one of the flying birds; unless there should chance to be some thick covert hard by into which the timid quarry darts and conceals itself, the race is usually a short one, and terminates by the hawk bearing away his struggling victim to some perch where at leisure he picks and devours his prize.

No.	Sex.	Locality.	Date.	Collector.	Wing.	Tail.	Bill.	Tarsus.
284	♂ ad.	Beaver Creek, Utah...	Sept. 24, 1872	Dr. H. C. Yarrow and H. W. Henshaw.	.....	.....	.....	.....
301	♀ ad.	..... do .....	..... do .....	..... do .....	.....	.....	.....	.....
472	♀ jun.	Provo, Utah.....	Nov. 30, 1872	..... do .....	.....	.....	.....	.....
35	♀ jun.	.....	May 9, 1873	H. W. Henshaw.....	7. 70	6. 75	0. 50	2. 00
867	♂ jun.	Camp Grant, Ariz.....	Sept. 24, 1873	..... do	6. 88	5. 72	0. 40	1. 90
875	♂ jun.	..... do	Sept. 27, 1873	..... do	6. 80	5. 90	0. 40	1. 80
914	♀ ad.	Gila River, Ariz	Oct. 16, 1873	..... do	8. 10	6. 60	0. 53	2. 17

NISUS COOPERI (Bon.).

Cooper's Hawk.

Falco cooperi, BON., Am. Orn., pl. x, f. 1, 1825.

Astur cooperi, NEWB., P. R. R. Rep., vi, 1857, 74.

Accipiter cooperi, BD., Birds N. A., 1858, 16.—*Id.*, U. S. & Mex. Bound. Surv., ii, pt. ii, 1859, Birds, 3.—HEERM., P. R. R. Rep., x, pt. iv, 1859, 33.—HENRY, Proc. Acad. Nat. Sci. Phila., 1859, 104 (New Mexico).—COOP. & SUCKL., P. R. R. Rep., xii, pt. ii, 1860, 145.—COUES, Proc. Acad. Nat. Sci. Phila., 1866, 43.—*Id.*, *ib.*, 1868, 82.—COOPER, Birds Cal., i, 1870, 464.—SNOW, Birds Kan., 1872, 3.—COUES, Key N. A. Birds, 1872, 212, f. 140.—ALLEN, Proc. Bost. Soc. Nat. Hist., June, 1874, 34.—COUES, Birds Northwest, 1874, 334.

Accipiter mexicanus, HENRY, Proc. Acad. Nat. Sci. Phila., 1854, 104 (New Mexico).—BD., Birds N. A., 1858, 17.—XANTUS, Proc. Acad. Nat. Sci. Phila., 1859, 190 (Fort Tejon, Cal.).—HAYD., Trans. Am. Phil. Soc., xii, 1862, 152.—COOP. & SUCKL., P. R. R. Rep., xii, pt. ii, 1860, 146.—COOPER, Birds Cal., i, 1870, 465.—STEV., U. S. Geol. Surv. Terr., 1870, 462.

Nisus cooperi var. *mexicanus*, BD., BREW., & RIDG., N. A. Birds, iii, 1874, 231.
Nisus cooperi, RIDG., Proc. Bost. Soc. Nat. Hist., xvi, 1873, 59.—BD., BREW., & RIDG., N. A. Birds, iii, 1874, 230.—YARROW, Rep. Orn. Specs., 1871, Wheeler's Exped., 1874, 36.—HENSHAW, Rep. Orn. Specs., 1873, Wheeler's Exped., 1874, 138.

An abundant species throughout Eastern Arizona and Western New Mexico. While sitting in my tent one day at Camp Apache, I noticed one of these hawks making repeated attacks upon a raven. It would force the raven to take refuge in a tree, and then fly to some neighboring perch and take its stand. The moment the persecuted raven essayed to move away, the hawk flew out and swooping down upon struck it and again forced it to cover. This was repeated several times, and apparently for no other reason than for the amusement of the hawk; though, judging from the discontented squawks and cries which the abused raven gave vent to, the pleasure was by no means mutual. So engrossed was the falcon in this sport that it allowed me unnoticed to walk up within a few feet, when my gun settled the dispute.

Bill bluish-black; legs and feet yellow.

No.	Sex.	Locality.	Date.	Collector.	Wing.	Tail.	Bill.	Tarsus.
.....	Jun.	Nevada	Sept. 6, 1871	F. Bischoff .....	.....	.....	.....	.....
616	♀ jun.	Camp Apache, Ariz ...	Aug. 26, 1873	H. W. Henshaw	10.30	9.75	0.68	2.65
802	♀ jun.	Camp Goodwin, Ariz..	Sept. 20, 1873	..... do	10.50	9.75	0.70	2.64
899	♀ jun.	San Pedro, Ariz	Oct. 1, 1873	..... do	10.70	9.75	0.71	2.58

ASTURINA NITIDA, Cass., var. PLAGIATA (Schleg.).

Mexican Hawk.

PLATE XV.

Asturina plagiata, SCLEG., Mus. Pays-Bas, Asturinæ, 1.—COUES, Key N. A. Birds, 1872, 218.—COOPER, Birds Cal., 1870, 487.—RIDG., Am. Nat., vi, July, 1872, 430.—*Id.*, *ib.*, vii, April, 1873, 203 (Southern Illinois, August).
Asturina nitida var. *plagiata*, BD., BREW., & RIDG., N. A. Birds, iii, 1875, 246.
Asturina nitida, CASS., Birds N. A., 1858, 35, pl. 64.—BD., U. S. & Mex. Bound. Surv., ii, pt. ii, 1859, Birds, 4 (Nuevo Leon, Mex.).

This handsome hawk is more properly a component of the Mexican fauna, and its occurrence within the borders of Arizona goes to show how close is the relationship between the faunas of the extreme southern portion

of that Territory and Mexico proper. Captain Bendire found this hawk not uncommon near Camp Lowell, where it was breeding; and it was only at this point that our party detected its presence. It probably, however, is not confined to this one spot, but wanders over the southern part of the Territory; and, in common with quite a number of birds more peculiarly Mexican in their distribution, may get as far north as the Gila River. Of its habits I know nothing; the pair I procured being shot just at dusk when they had retired to roost in the top of a dead cottonwood.

No.	Sex.	Locality.	Date.	Collector.	Wing.	Tail.	Bill.	Tarsus.
639	♂	Camp Lowell, Ariz....	Sept. 9, 1874	H. W. Henshaw.....	10. 25	7. 75	0. 84	2. 93
682	♂	..... do .....	..... do .....	..... do	10. 15	7. 50	0. 86	2. 68

URUBITINGA ANTHRACINA, Nitzsch.

Anthracite Hawk.

Urubitinga anthracina, HENSHAW, Am. Sportsman, v, Feb. 20, 1875, 328 (introduced into United States fauna).

SP. CHAR.—Wing, 13.15–15.80; tail, 7.90–11.00; culmen, 1.00–1.10; tarsus, 3.00–3.50; middle toe, 1.60–1.80. Third and fifth quills longest; the first intermediate between the eighth and tenth; outer four with the inner webs slightly sinuated. Tail very slightly rounded, the outer pair of feathers just appreciably the shortest. Upper tail-coverts black, barred with white.

Adult.—General color uniform carbonaceous black, with a strong glaucous cast on the back, neck, and breast. Upper tail-coverts narrowly tipped with white. Tail deep black, narrowly tipped with white; extreme base also white, and crossed at about the middle by a broad continuous zone of the same of variable width. Inner webs, and the concealed portion of the outer webs, of the secondaries mottled with rusty ochraceous. Terminal half of the bill plumbeous black; the basal half, the cere, and the rictus yellow; tarsi and toes yellow; claws plumbeous black.

Young.—Above brownish-black, more or less variegated with ochraceous, and sometimes with rusty, on wing coverts and scapulars. Wings indistinctly banded with dark grayish-brown. Head, neck, and lower parts ochraceous-white, with longitudinal stripes of black; tibiae transversely barred with the same. Tail crossed with about seven bands of black and white; the bands of each individual feather oblique; the relative width of the two colors varying with the individual; but the subterminal black bands always about twice as broad as the others. Inner ends of secondaries strongly tinged with rufous. Upper tail-coverts white, more or less barred with black. On the head and neck, the streaking is not uniform, but the areas where the light or dark markings predominate, respectively, are as follows: The gular region, cheeks, and supraoral region are whitish, with fine streaks; but the pileum and nape, upper half

of the auriculars, and maxillary stripe extending across the jugulum, are nearly uniform black, in consequence of the enlargement and blending of the streaks. "Iris brown; cere and base of bill olive-yellow or greenish; feet yellow."

HAB.—Mexico; Arizona (Henshaw).

The preceding accurate description has been kindly furnished by Mr. Ridgway, who examined, for the purpose, a very large *suite* of specimens in the collection of the Smithsonian.

Captain Bendire writes me that in 1872 he found this hawk breeding in Arizona, and obtained the nest and eggs. The bird was supposed by him to be the *Buteo zonozercus*, but has since been ascertained to be this species. It thus has a good claim to a place in our fauna, and may indeed be not uncommon in the southern part of the Territory, since two individuals were seen by us during the past season. While riding one day a short distance from Camp Bowie, one of these birds sailed past within a few feet, affording me an excellent opportunity for its identification. On a second occasion, while passing through a narrow cañon, about sixty miles north of Camp Lowell, another flew out from a large cottonwood, on one of the lower limbs of which it had been perching; it was certainly not more than a dozen feet from my head. In each instance, the narrow white band across the tail, with the size and colors generally, established its identity beyond a question. The flight is easy and powerful.

BUTEO SWAINSONI, Bon.

Swainson's Hawk.

- Buteo swainsoni*, BON., Comp. List, 1838, 3.—BD., P. R. R. Rep., Beckwith's Route, x, 1859, 11, pl. xii, xiii.—*Id.*, U. S. & Mex. Bound. Surv., ii, pt. ii, 1859, Birds, 3.—HAYD., Trans. Am. Phil. Soc., xii, 1862, 152.—COUES, Proc. Acad. Nat. Sci. Phila., 1866, 45.—COOPER, Birds Cal., i, 1870, 476.—STEV., U. S. Geol. Surv. Terr., 1870, 462.—COUES, Key N. A. Birds, 1872, 217.—SNOW, Birds Kan., 1872, 4.—MERRIAM, U. S. Geol. Surv. Terr., 1872, 697 (Idaho; Wyoming; Montana).—YARROW, Rep. Orn. Specs., 1871, Wheeler's Exped., 1874, 36.—BD., BREW., & RIDG., N. A. Birds, iii, 1874, 263.—HENSCHAW, Rep. Orn. Specs., 1873, Wheeler's Exped., 1874, 139.—COUES, Am. Nat., viii, 1874, 596 (Montana and Dakota, breeding).—ALLEN, Proc. Bost. Soc. Nat. Hist., June, 1874, 34.—COUES, Birds Northwest, 1874, 357.
- Buteo oxypterus*, CASS., Birds N. A., 1858, 30 (young).—BD., P. R. R. Rep., Beckwith's Route, x, 1859, 11, pl. xv.—HENRY, Proc. Acad. Nat. Sci. Phila., 1859, 105 (New Mexico).—COUES, Proc. Acad. Nat. Sci. Phila., 1866, 45.—COOPER, Birds Cal., i, 1870, 480.

- Buteo swainsonii* var. *oxypterus*, RIDG. *apud* BD., BREW., & RIDG., N. A. Birds, iii, 1874, 266.
- Buteo insignatus*, CASS., Birds Cal. & Texas, 1854, 102, 198, pl. 31.—*Id.*, Birds N. A., 1858, 23.—HEERM., P. R. R. Rep., x, pt. ii, 1859, 32.—COUES, Proc. Acad. Nat. Sci. Phila., 1866, 45.—COOPER, Birds Cal., i, 1870, 474.—SNOW, Birds Kan., 1872, 4.
- Buteo bairdii*, HOY, Proc. Acad. Nat. Sci. Phila., 1853, 451.—CASS., Birds Cal. & Texas, 1854, 99, 257, pl. 41.—*Id.*, Birds N. A., 1858, 21.—HAYD., Trans. Am. Phil. Soc., xii, 1862, 152.

At Camp Grant, Ariz., in the latter part of September, this hawk was present in very large numbers. About a mile below the post, out on the plain, the stream was bordered by some large cottonwoods; and these were habitually used as roosting-places by the Turkey Buzzards and Hawks conjointly, as the whitened appearance of the branches and the ground below testified. Hawks and buzzards appeared to be on terms of the most intimate companionship with each other, and one tree often held seven or eight of either birds. The buzzards seemed if anything rather the shyer of the two, and were generally the first to start, when immediately the whole band would leave their perches, and begin circling in the air, gradually ascending higher and higher till out of danger. Thus they would continue wheeling about till the coast was clear, when all would again resume their perches. After leaving these, and getting fairly on the wing, which they did rather clumsily, the flight of these hawks is firm and easy; and, as they gradually soar higher and higher in circles, it bears no little resemblance to that of the buzzards, though it is less powerful and not so well sustained. I am not aware that these hawks feed upon carrion, though that they occasionally do so is not unlikely. The crops of all those shot were crammed with grasshoppers; and, as these insects were very abundant, the hawks, as a matter of course, were very fat.

Dr. Hoffman speaks of finding a nest of this hawk built in a cluster of willows, about twenty feet from the ground, while within eight feet was a nest of Bullock's Oriole, the two species appearing entirely indifferent to each other's presence. Mr. Aiken examined a nest of this buzzard, which contained newly-hatched young as late as August 1. Other observers have noticed a similar irregularity in the nesting of this species, so that it seems highly probable that the rearing of a second brood is a rule with the species.

RAPTORES—FALCONIDAE—B. BOREALIS VAR. CALURUS. 423

No.	Sex.	Locality.	Date.	Collector.	Length.	Stretch.	Wing.	Tail.	Bill.	Tars.
870	♂ ad.	Antelope, Nev	May 28, 1871	F. Bischoff.....	.....	.....	.....	.....	.....	.....
	♀ ad.	Camp Grant, Ariz.	Sept. 26, 1873	H. W. Henshaw	18.86	47.74	15.31	9.32	0.84	2.12

Bill black; cere yellow; legs and feet yellow.

No.	Sex.	Locality.	Date.	Collector.	Length.	Stretch.	Wing.	Tail.	Bill.	Tars.
871	♀ ad.	Camp Grant, Ariz.	Sept. 26, 1873	H. W. Henshaw	.....	.....	15.15	8.50	0.84	2.70
876	♂ jun.	..... do .....	..... do .....	..... do	18.74	47.24	14.74	8.62	0.80	2.49

Iris brown; cere greenish-yellow; base, lower mandible, and edge along gape greenish-yellow; legs and feet yellow.

No.	Sex.	Locality.	Date.	Collector.	Length.	Stretch.	Wing.	Tail.	Bill.	Tars.
877	♂ ad.	Camp Grant, Ariz.	.....	H. W. Henshaw	19.00	47.86	15.00	8.49	0.85	2.49

Iris dark-brown; cere greenish-yellow; legs and feet yellow.

No.	Sex.	Locality.	Date.	Collector.	Wing.	Tail.	Bill.	Tarsus.
894	♀ ad.	Camp Grant, Ariz.	Sept. 29, 1873	H. W. Henshaw.....	16.20	8.50	1.00	2.78

BUTEO BOREALIS (Gmel.), var. CALURUS, Cassin.

Western Red-tailed Hawk.

Buteo calurus, CASS., Proc. Acad. Nat. Sci. Phila., vii, 1855, 281.—*Id.*, Birds N. A., 1858, 22.—BD., U. S. & Mex. Bound. Surv., ii, pt. ii, 1859, Birds, 3.—*Id.*, P. R. R. Rep., Beckwith's Route, x, 1859, 11, pl. xiv.—COUES, Proc. Acad. Nat. Sci. Phila., 1866, 44.—COOPER, Birds Cal., i, 1870, 471.—STEV., U. S. Geol. Surv. Terr., 1870, 462.—YARROW, Rep. Orn. Specs., 1871, Wheeler's Exped., 1874, 36.

Buteo borealis var. *calurus*, BD., BREW., & RIDG., N. A. Birds, iii, 1874, 286.—YARROW & HENSHAW, Rep. Orn. Specs., 1872, Wheeler's Exped., 1874, 25.—HENSHAW, Rep. Orn. Specs., 1873, Wheeler's Exped., 1874, 91, 140.—COUES, Birds Northwest, 1874, 353.

Pœcilopternis borealis, HENRY, Proc. Acad. Nat. Sci. Phila., 1859, 105 (New Mexico).

Buteo montanus, NEWB., P. R. R. Rep., vi, 1857, 75.—BD., P. R. R. Rep., Beckwith's Route, x, 1859, 12.—XANTUS, Proc. Acad. Nat. Sci. Phila., 1859, 190 (Fort Tejon, Cal.).—HEERM., P. R. R. Rep., x, pt. ii, 1859, 32.—KENNERLY, P. R. R. Rep., Whipple's Route, x, 1859, 19.—BD., U. S. & Mex. Bound. Surv., ii, pt. ii, 1859, Birds, 3.—COOP. & SUCKL., P. R. R. Rep., xii, pt. ii, 1860, 147.—COUES, Proc. Acad. Nat. Sci. Phila., 1866, 43.—COOPER, Birds Cal., i, 1870, 469.—STEV., U. S. Geol. Surv. Terr., 1870, 462.—SNOW, Birds Kan., 1872, 4.—MERRIAM, U. S. Geol. Surv. Terr., 1872, 697.

The Red-tailed Hawk is an abundant resident through the West, confining itself in summer to the mountains, and becoming more or less abundant in the lowlands as winter approaches. The dark type of this bird seems to be very numerous in Arizona; individuals varying from the light form known as *montanus* to the dark fuliginous condition characterized under the name *calurus*, the last condition being represented in perhaps one-third of the number seen. The two forms occur together; and on one occasion, at least, I noticed a pair of the birds, evidently mates, in which the difference in coloration was striking, and visible at a long distance. At Mount Graham, in October, these hawks were present in large numbers, and tamer than I ever have known hawks to be elsewhere. Walking quietly along, there was no difficulty in approaching within a few yards of the tree where one chanced to perch. One individual which I scared from its perch by throwing a stone, took a few broad circles about me, as though wondering what it meant, and then quietly returned to his former stand.

No.	Sex.	Locality.	Date.	Collector.	Wing.	Tail.	Bill.	Tarsus.
.....	.....	Arizona	Nov. 6, 1871	F. Bischoff .....	.....	.....	.....	.....
.....	.....	do	do	do .....	.....	.....	.....	.....
184	♀ ad.	Otter Creek, Utah	Sept. 19, 1872	H. W. Henshaw .....	.....	.....	.....	.....
687	♂ ad.	Camp Apache, Ariz.	Sept. 1, 1873	do	14.65	9.50	1.00	3.27
290	♀ ad.	Mount Graham, Ariz. ..	Aug. 3, 1874	do .....	.....	.....	.....	.....
855	♀ ad.	do	Sept. 24, 1874	do .....	.....	.....	.....	.....
902	♂?	Cottonwood, Ariz.	Sept. 29, 1874	do .....	.....	.....	.....	.....

ARCHIBUTEO FERRUGINEUS (Licht.).

California Squirrel Hawk.

Falco ferrugineus, LICHT., Berl. Trans., 1838, 429.

Archibuteo ferrugineus, BD., Birds N. A., 1858, 34.—*Id.*, U. S. & Mex. Bound. Surv., ii, pt. ii, 1859, Birds, 4 (Fort Davis, Texas).—HEERM., P. R. R. Rep., x, pt. iv, 1859, 32.—XANTUS, Proc. Acad. Nat. Sci. Phila., 1859, 190 (Fort Tejon, Cal.).—HENRY, Proc. Acad. Nat. Sci. Phila., 1859, 105 (New Mexico).—COOP & SUCKL., P. R. R. Rep., xii, pt. ii, 1860, 149.—HAYD., Trans. Am. Phil. Soc., xii, 1862, 153.—COUES, Proc. Acad. Nat. Sci. Phila., 1866, 46 (Fort Whipple, Ariz.).—COOPER, Birds Cal., i, 1870, 482.—COUES, Key N. A. Birds, 1872, 218.—*Id.*, Am. Nat., viii, 1874, 593 (Eastern Montana, breeding).—BD., BREW., & RIDG., N. A. Birds, iii, 1874, 300.—HENSHAW, Rep. Orn. Specs., 1873, Wheeler's Exped., 1874, 91.—ALLEN, Proc. Bost. Soc. Nat. Hist., June, 1874, 18, 35.—COUES, Birds Northwest, 1874, 363.

This handsome hawk is given by Dr. Coues as common about Fort Whipple, Ariz., especially in winter, but as apparently resident. In Eastern Arizona, on the contrary, I have not seen it at all; and if it occur there, it must, I think, be rare, and only in winter. In Northern New Mexico and Southern Colorado, it was quite numerous in November, 1873; and Mr. Aiken has taken quite a number of them in El Paso County, they returning from the mountains, their summer home, and dwelling in winter on the open plains and along the streams. Their prey consists principally of the small mammals,—mice and ground squirrels,—to secure which they fly a few feet from the ground.

ARCHIBUTEO LAGOPUS (Brünn.), var. SANCTI-JOHANNIS, Gmel.

Black Hawk.

Falco sancti-johannis, GM., Syst. Nat., i, 1788, 273.

Archibuteo lagopus, BD., Birds N. A., 1858, 32.—KENNERLY, P. R. R. Rep., Whipple's Route, x, 1859, 19.—HENRY, Proc. Acad. Nat. Sci. Phila., 1859, 105 (New Mexico).—COOP. & SUCKL., P. R. R. Rep., xii, pt. ii, 1860, 148.—COUES, Proc. Acad. Nat. Sci. Phila., 1866, 48 (Fort Whipple, Ariz.).—COOPER, Birds Cal., i, 1870, 483.—SNOW, Birds Kan., 1872, 4.

Archibuteo lagopus var. *sancti-johannis*, COOPER, Birds Cal., 1870, 485.—ALLEN, Bull. Mus. Comp. Zoöl., 1872, 181 (Western and Middle Kansas; Wyoming).—COUES, Key N. A. Birds, 1872, 218.—BD., BREW., & RIDG., N. A. Birds, iii, 1874, 304.—YARROW & HENSHAW, Rep. Orn. Specs., 1872, Wheeler's Exped., 1874, 25.—HENSHAW, Rep. Orn. Specs., 1873, Wheeler's Exped., 1874, 91.—COUES, Birds Northwest, 1874, 361.

Although seen several times in the mountains during the summer, none were obtained until we reached Provo, where it was the most numerous of the hawks. At this place, from November 25 until December 4, no less than eleven specimens were taken, representing the bird in all stages of plumage. On foot, it was extremely difficult to approach this hawk, but it could be ridden up to with ease; most of the specimens being shot in this way from the back of a mule.

Utah Lake and the surrounding marshes attract multitudes of waterfowl; and this undoubtedly explains in part the abundance of hawks at this season, since wounded and disabled ducks must form no inconsiderable part of their food. In its manner of hunting it much resembles the foregoing species, and like it subsists to a great extent upon mice, which are very numerous in the rushes. In the stomachs of every individual captured were found the remains of these little animals.

I saw several of these hawks near Colorado Springs, Colo., in November, where, however, I was told by Mr. Aiken he had never seen it.

No.	Sex.	Locality.	Date.	Collector.	Wing.	Tail.	Bill.	Tarsus.
429	♂ ad.	Provo, Utah.....	Nov. 25, 1872	Dr. H. C. Yarrow and H. W. Henshaw.	.....	.....	.....	.....
437	♂	..... do	Nov. 26, 1872	..... do .....	.....	.....	.....	.....
438	♂	..... do .....	..... do .....	..... do .....	.....	.....	.....	.....
446	♂	..... do	Nov. 27, 1872	..... do .....	.....	.....	.....	.....
447	♂	..... do .....	..... do .....	..... do .....	.....	.....	.....	.....
448	♀ jun.	..... do .....	..... do .....	..... do .....	.....	.....	.....	.....
458	♂ ad.	..... do	Nov. 30, 1872	..... do .....	.....	.....	.....	.....
466	♂ ad.	..... do .....	..... do .....	..... do .....	.....	.....	.....	.....
485	♀ ad.	..... do	Dec. 1, 1872	..... do .....	.....	.....	.....	.....
488	♂	..... do	Dec. 2, 1872	..... do .....	.....	.....	.....	.....
491	♂	..... do	Dec. 3, 1872	..... do .....	.....	.....	.....	.....

AQUILA CHRYSÆTOS (Linn.), var. CANADENSIS, Linn.

Golden Eagle.

Aquila canadensis, CASS, Birds N. A., 1858, 41.—HEERM., P. R. R. Rep., x, pt. iv, 1859, 30.—HENRY, Proc. Acad. Nat. Sci. Phila., 1859, 105 (New Mexico).—COUES, Proc. Acad. Nat. Sci. Phila., 1866, 49 (Fort Whipple, Ariz.).—*Id.*, Proc. Acad. Nat. Sci. Phila., 1868, 82.—COOPER, Birds Cal., i, 1870, 449.—SNOW, Birds Kan., 1872, 4

- Aquila chrysaëtos*, ALLEN, Bull. Mus. Comp. Zool., 1872, 181.—COUES, Key N. A. Birds, 1872, 219.—ALLEN, Proc. Bost. Soc. Nat. Hist., June, 1874, 35.—COUES, Birds Northwest, 1874, 368.—*Id.*, Am. Nat., viii, 1874, 76.
- Aquila chrysaëtos* var. *canadensis*, BD., BREW., & RIDG., N. A. Birds, iii, 1874, 314.—YARROW & HENSHAW, Rep. Orn. Specs., 1872, Wheeler's Exped., 1874, 26.

We saw this species several times in the mountains of Utah, where it is probably a resident throughout the year. Its occurrence in Colorado, New Mexico, and Arizona has been recorded by various observers.

HALIAËTUS LEUCOCEPHALUS (Linn.)

American Eagle; Bald Eagle.

- Falco leucocephalus*, LINN., Syst. Nat., 1766, 124.
- Haliaëtus leucocephalus*, WOODH., Sitgreave's Exp. Zuñi & Col. Riv., 1854, 59.—NEWB., P. R. R. Rep., vi, 1857, 75.—HEERM., P. R. R. Rep., x, pt. iv, 1859, 30.—HENRY, Proc. Acad. Nat. Sci. Phila., 1859, 105 (New Mexico).—COOP. & SUCKL., P. R. R. Rep., xii, pt. ii, 1860, 151.—HAYD., Trans. Am. Phil. Soc., xii, 1862, 153.—COUES, Proc. Acad. Nat. Sci. Phila., 1866, 49 (Fort Whipple, Ariz.).—COOPER, Birds Cal., i, 1870, 451.—ALLEN, Bull. Mus. Comp. Zool., 1872, 181.—SNOW, Birds Kan., 1872, 4.—COUES, Key N. A. Birds, 1872, 219.—HOLD., Proc. Bost. Soc. Nat. Hist., 1872, 207.—BD., BREW., & RIDG., N. A. Birds, iii, 1874, 326.—YARROW & HENSHAW, Rep. Orn. Specs., 1872, Wheeler's Exped., 1874, 26.—ALLEN, Proc. Bost. Soc. Nat. Hist., June, 1874, 35.—COUES, Birds Northwest, 1874, 369.

The White-headed Eagle is numerous in Utah; perhaps more so than is usual in the West, as the presence of several large lakes well stocked with fish attract it. It regularly visits the shores of Utah Lake from the adjoining mountains, where it finds opportunities for rearing its young undisturbed, within easy distance of the lake.

An adult pair of these magnificent birds were seen in a cañon a few miles south of Camp Apache. A solitary bird was to be noticed now and then perched on some lofty dead stub, on the watch for fish. As Fish Hawks are not numerous, the eagles are thrown on their own resources, and do more fishing and hunting than upon the coast, where their robbing the Osprey is so well known.

Among the Zuñi Indians, these birds are highly prized for their feathers, with which they deck themselves at their sacred feasts and dances. At Zuñi, I saw perhaps a dozen kept in wicker inclosures. They presented a lamentable appearance, as their feathers had been plucked out to serve as ornaments. The quills and tail-feathers are especially valued.

FAM. CATHARTIDAE: AMERICAN VULTURES.

PSEUDOGRYPHUS CALIFORNIANUS (Shaw).

California Vulture.

- Vultur californianus*, SHAW, Nat. Misc., iv, pl. ccci, 1797.
Cathartes californianus, WOODH., Sitgreave's Exp. Zuñi & Col. Riv., 1854, 58.—NEWB., P. R. R. Rep., vi, 1857, 73.—HEERM., P. R. R. Rep., x, pt. ii, 1859, 29.—COOP. & SUCKL., P. R. R. Rep., xii, pt. ii, 1860, 141.—COUES, Proc. Acad. Nat. Sci. Phila., 1866, 42.—COOPER, Birds Cal., i, 1870, 496.—COUES, Key N. A. Birds, 1872, 222.—*Id.*, Birds Northwest, 1874, 384.
Pseudogryphus californianus, RIDG. *apud* BD., BREW., & RIDG., N. A. Birds, iii, 1874, 338.—YARROW & HENSHAW, Rep. Orn. Specs., 1872, Wheeler's Exped., 1874, 26.

A very large vulture, seen near Beaver, Utah, November 25, was believed to be of this species. In company with a flock of the Red-headed Vultures, it had been feeding upon the carcass of a horse, and, as they all made off at my approach, I was enabled to note the comparative sizes of the two; the bird supposed to be this species greatly exceeding the others in size.

RHINOGRYPHUS AURA (Linn.).

Red-headed Vulture.

- Vultur aura*, LINN., Syst. Nat., 1766, 122.
Cathartes aura, WOODH., Sitgreave's Exp. Zuñi & Col. Riv., 1854, 58.—NEWB., P. R. R. Rep., vi, 1857, 73.—HEERM., P. R. R. Rep., x, pt. iv, 1859, 29.—BD., U. S. & Mex. Bound. Surv., ii, pt. ii, 1859, Birds, 3.—XANTUS, Proc. Acad. Nat. Sci. Phila., 1859, 190 (Fort Tejon, Cal.).—HENRY, Proc. Acad. Nat. Sci. Phila., 1859, 104 (New Mexico).—HAYD., Trans. Am. Phil. Soc., xii, 1862, 151.—COOP. & SUCKL., P. R. R. Rep., xii, pt. ii, 1860, 140.—COUES, Proc. Acad. Nat. Sci. Phila., 1866, 42 (Fort Whipple, Ariz.).—*Id.*, *ib.*, 1868, 82.—COOPER, Birds Cal., i, 1870, 502.—ALLEN, Bull. Mus. Comp. Zoöl., 1872, 181.—SNOW, Birds Kan., 1872, 3.—COUES, Key N. A. Birds, 1872, 222.—*Id.*, Birds Northwest, 1874, 379.
Rhinogryphus aura, RIDG. *apud* BD., BREW., & RIDG., N. A. Birds, iii, 1874, 344.—YARROW & HENSHAW, Rep. Orn. Specs., 1872, Wheeler's Exped., 1874, 26.—HENSHAW, Rep. Orn. Specs., 1873, Wheeler's Exped., 1874, 91, 140.

The Turkey Buzzard is found throughout Eastern Arizona and Western New Mexico, Utah and Colorado, where it congregates near the settlements, to feed upon refuse and carrion. At Camp Apache and Camp Grant, it was

particularly numerous, and, at the latter place, associated with Swainson's Hawk (*B. swainsoni*). The quills of this bird are generally used by the Indians to feather their arrows. Perhaps this may account for their distrust of man; for even when found near the settlements, they have none of the semi-domesticated habits which they possess in southern cities, while in the solitudes of the western wilderness they are among the shyest of birds of prey.

ORDER COLUMBAE: COLUMBINE BIRDS.

FAM. COLUMBIDAE: PIGEONS.

COLUMBA FASCIATA, Say.

Band-tailed Pigeon.

Columba fasciata, SAY, Long's Exped. Rocky Mts., ii, 1823, 10.—WOODH., Sitgreave's Exp. Zuñi & Col. Riv., 1854, 92.—NEWB., P. R. R. Rep., vi, 1857, 92.—BD., Birds N. A., 1858, 597.—XANTUS, Proc. Acad. Nat. Sci. Phila., 1859, 192 (Fort Tejon, Cal.).—BD., U. S. & Mex. Bound. Surv., ii, pt. ii, 1859, Birds, 21.—HENRY, Proc. Acad. Nat. Sci. Phila., 1859, 108 (New Mexico).—COOP. & SUCKL., P. R. R. Rep., xii, pt. ii, 1860, 217.—COUES, Proc. Acad. Nat. Sci. Phila., 1866, 93 (Fort Whipple, Ariz.).—COOPER, Am. Nat., iii, 1869, 80 (Montana).—*Id.*, Birds Cal., i, 1870, 506.—COUES, Key N. A. Birds, 1872, 225.—BD., BREW., & RIDG., N. A. Birds, iii, 1874, 358, 360, pl. 57, f. 2.—HENSHAW, Rep. Orn. Specs., 1873, Wheeler's Exped., 1874, 140.—COUES, Birds Northwest, 1874, 385.

Of the habits of this beautiful pigeon I am able to add nothing to what is already known. At Camp Apache, Ariz., farther north than which I did not meet with it, I obtained a single specimen, August 21. In passing southward from here, during September, I saw an occasional flock; once at least two hundred. They were generally feeding and were very shy, so that I found it impossible to either observe their habits or procure specimens.

During the past season, I found this dove early in August in the pine region of Mount Graham, where it spends the summer. They were in pairs, and not unlikely had young still dependent upon their care. They were so shy that I only occasionally caught a glimpse of one as it flew out of the tops of the tall dead pines, where they were accustomed to perch. As they

launch out from their perches, the noisy flapping of their wings resembles that of the domestic pigeon, being different from the whistling flight of the Turtle Dove. At this season, they were silent. Returning here in October, I found they had nearly abandoned the higher regions of the mountains, and were congregated in flocks among the oaks farther down; acorns, as long as the supply holds out, being their chief resource. While upon the west coast this pigeon has a very extensive range, reaching into Washington Territory, and presumably into British Columbia, its habitat in the Interior is much more restricted. Its occurrence, therefore, in Colorado, as ascertained by Mr. Aiken during the past season, is interesting. He detected it first at the western base of the Spanish Peaks, early in September, and later (September 25) met with them again in "considerable numbers about fifteen miles above the town of Del Norte, on the Rio Grande River." His notes are as follows: "At the latter place, a flock of twenty of these pigeons was found, and I learned from persons living in the vicinity that the same birds had been noticed throughout the summer; so they had doubtless reared their young there. In their habits, they resemble the common wild pigeon (*Ectopistes migratoria*). They fly in a compact flock, and frequent both the conifers of the mountains and the cottonwood groves of the river bottoms, though apparently preferring the latter. On the Rio Grande, they were feeding greedily upon a small white berry that grew abundantly upon the river bank."

Iris red; bill yellow, black at tip; legs and feet yellow.

No.	Sex.	Locality.	Date.	Collector.	Wing.	Tail.	Bill.	Tarsus.
582	♂ ad.	Camp Apache, Ariz....	Aug. 21, 1873	H. W. Henshaw.....	8.80	6.60	0.62	0.98
197	♀ *	Spanish Peaks, Colo...	Sept. 3, 1874	C. E. Aiken	7.25	4.32	0.55	1.17
201	♂ *	..... do .....	..... do .....	..... do	7.45	4.35	0.67	1.22
203	♂ *	..... do .....	..... do .....	..... do	7.25	4.33	0.57	1.22
798	♂ ad.	Mount Graham, Ariz..	Sept. 22, 1874	H. W. Henshaw.....	8.75	6.25	0.75	1.07
306	Jun.	Forks of Rio Grande, Colo.	Sept. 26, 1874	C. E. Aiken.....	7.90	5.50	0.72	1.07
307	♂ jun.	..... do .....	..... do .....	..... do	8.20	5.75	0.73	1.06
308	♀ jun.	..... do .....	..... do .....	..... do	8.10	5.60	0.68	1.03
309	♀ jun.	..... do .....	..... do .....	..... do	8.25	5.50	0.73	1.02
310	♀ ad.	..... do .....	..... do .....	..... do	8.00	5.50	0.77	1.06
312	Jun.	..... do .....	..... do .....	..... do	8.30	6.00	0.73	1.08

* Worn.

MELOPELIA LEUCOPTERA, Linn.

White-winged Dove.

Melopelia leucoptera, LINN., Syst. Nat., i, 1758, 164 (Jamaica).—BD., Birds N. A., 1858, 603.—*Id.*, U. S. & Mex. Bound. Surv., ii, pt. ii, 1859, Birds, 21.—XANTUS, Proc. Acad. Nat. Sci. Phila., 1859, 305 (Cape Saint Lucas).—COUES, Proc. Acad. Nat. Sci. Phila., 1866, 93 (Fort Whipple, Ariz.).—COOPER, Birds Cal., 1870, 515.—COUES, Key N. A. Birds, 1872, 226.—BD., BREW., & RIDG., N. A. Birds, iii, 1875, 376, pl. lviii, f. 4.—HENSHAW, Rep. Orn. Specs., 1873, Wheeler's Exped., 1874, 141.

Columba leucoptera, BD., Stans. Rep. Exp. Great Salt Lake, 1852, 326.

In 1873, a single bird, shot on the Gila River in New Mexico, was the only one seen. The White-winged Dove has been reported from as far north as Santa Fé, N. Mex. It, however, extends from Texas, in the southwest part of which it is found rather numerous, along the southern line of New Mexico and Arizona. In the last named Territory, it appears to be rather common in the extreme southeastern part. Dr. Coues found evidence of its breeding about Fort Whipple, but considered it as "rare". I found the old and young in August in the region about Camp Lowell, frequenting the groves of cottonwood. Some of the young were scarcely able to fly, and kept in the dense thickets, whence the low, mournful notes of the old birds were heard as they called to each other, or summoned their young from place to place. The notes consist of several soft toned *coos*, usually three, repeated regularly and at short intervals.

No.	Sex.	Locality.	Date.	Collector.	Wing.	Tail.	Bill.	Tarsus.
973	♂	Gila River, N. Mex . . .	Oct. 28, 1873	H. W. Henshaw	6.23	5.32	0.79	0.90
452	♂ jun.	Sienega, Ariz	Aug. 21, 1874	..... do	6.60	4.60	0.75	1.02

ZENAIDURA CAROLINENSIS (Linn.).

Carolina Dove.

Columba carolinensis, LINN., Syst. Nat., i, 1766, 286, No. 37.

Ectopistes carolinensis, WOODH., Sitgreave's Exp. Zuñi & Col. Riv., 1854, 92.—NEWB., P. R. R. Rep., vi, 1857, 92.—HEERM., P. R. R. Rep., x, pt. iv, 60.

Zenaidura carolinensis, BD., Ives' Col. Exped., 1857-58, pt. iv, 6.—*Id.*, Birds N. A., 1858, 604.—*Id.*, U. S. & Mex. Bound. Surv., ii, pt. ii, 1859, Birds, 21.—XANTUS, Proc. Acad. Nat. Sci. Phila., 1859, 192 (Fort Tejon, Cal.).—

KENNERLY, P. R. R. Rep., Whipple's Route, 1859, 33.—HENRY, Proc. Acad. Nat. Sci. Phila., 1859, 108 (New Mexico).—COUES, Proc. Acad. Nat. Sci. Phila., 1866, 93 (Fort Whipple, Ariz.).—COOP. & SUCKL., P. R. R. Rep., xii, pt. ii, 1860, 218.—HAYD., Trans. Am. Phil. Soc., xii, 1862, 172.—COOPER, Am. Nat., iii, 1869, 81.—*Id.*, Birds Cal., i, 1870, 512.—STEV., U. S. Geol. Surv. Terr., 1870, 465.—ALLEN, Bull. Mus. Comp. Zoöl., 1872, 181.—SNOW, Birds Kan., 1872, 12.—COUES, Key N. A. Birds, 1872, 226, f. 146.—AIKEN, Proc. Bost. Soc. Nat. Hist., 1872, 208.—YARROW & HENSHAW, Rep. Orn. Specs., 1872, Wheeler's Exped., 1874, 27.—BD., BREW., & RIDG., N. A. Birds, iii, 1874, 383, pl. 58, f. 2.—HENSHAW, Rep. Orn. Specs., 1873, Wheeler's Exped., 1874, 68, 92, 141.—ALLEN, Proc. Bost. Soc. Nat. Hist., June, 1874, 16, 35.—COUES, Birds Northwest, 1874, 389.

Ectopistes marginellus, WOODH., Sitgreave's Exp. Zuñi & Col. Riv., 1854, 93.

In Utah, common everywhere on the plains; occurs sparingly in mountains. A number of nests were found near Provo, some containing young fully fledged July 30, and others eggs; while, in other cases, the nests were still unfinished.

In very large numbers in the cottonwood groves along the banks of the Platte, and elsewhere abundant. The first nest was found on the ground May 7, and contained a freshly laid egg. This species is not particular in the choice of a location for its nest. A favorite site is the thick undergrowth which clothes the trunks of the cottonwoods. But nests are often placed on the ground, not infrequently in an open place. The nests are usually a slight mass of straws and twigs irregularly disposed, so that the eggs are often visible from the ground.

Abundant throughout Eastern Arizona. Being rarely molested, they seem to have no fear of man, and at Camp Apache, where they were especially numerous, were accustomed to remain about our camp all day.

No.	Sex.	Locality.	Date.	Collector.	Wing.	Tail.	Bill.	Tarsus.
47	♀ ad.	Provo, Utah.....	July 25, 1872	H. W. Henshaw and Dr. H. C. Yarrow.	.....	.....	.....	.....
71	♀ ad.	..... do	July 26, 1872	..... do .....	.....	.....	.....	.....
37	♂ ad.	..... do	July 30, 1872	..... do .....	.....	.....	.....	.....
29	♂	..... do	Aug. 2, 1872	..... do .....	.....	.....	.....	.....
302	♀ jun.	Toquerville, Utah.....	Oct. 15, 1872	H. W. Henshaw.....	.....	.....	.....	.....
6	♂ ad.	Colorado.....	June —, 1873	Dr. J. T. Rothrock....	5.53	7.14	0.58	0.75

CHAMAEPHELIA PASSERINA (Linn.).

Ground Dove.

Columba passerina, LINN., Syst. Nat., i, 1766, 285.

Chamaepelia passerina, BD., Birds N. A., 1858, 606.—BD., U. S. & Mex. Bound. Surv., ii, pt. ii, 1859, Birds, 22.—COUES, Proc. Acad. Nat. Sci. Phila., 1866, 93 (Fort Yuma, Ives).—*Id.*, Key N. A. Birds, 1872, 226.—COOPER, Birds Cal., i, 1870, 516.—BD., BREW., & RIDG., N. A. Birds, iii, 1874, 389, pl. lviii, f. 6.—COUES, Birds Northwest, 1874, 390.

Chapelia passerina var. *pallescens*, BD., Proc. Acad. Nat. Sci. Phila., 1859, 305.—COOPER, Birds Cal., i, 1870, 517 (Cape Saint Lucas).

The Ground Dove is very abundant in certain localities in the southeastern corner of Arizona, especially in the vicinity of Camp Lowell. It here frequented the same nature of locality that it favors in Florida, being found in the glades among the cottonwoods, and in the open spaces surrounded by bushes and mesquite shrubs, singly or in pairs. Often many were gathered together; the abundance of seeds having attracted them. In walking through the brush, I often started up a dozen or more from little openings; the shrill whistling of their wings, as they made off at their best speed, being lost as they disappeared in all directions. They usually fly but a few yards before they alight on some tree or bush. If left undisturbed, after walking for a few moments up and down the horizontal branches with uneasy turnings of the head and inquiring glances of their bright eyes, they quietly drop down to resume their wonted occupation.

No.	Sex.	Locality.	Date.	Collector.	Wing.	Tail.	Bill.	Tarsus.
619	♀ ad.	Camp Lowell, Ariz	Sept. 5, 1874	H. W. Henshaw.....	3.42	2.63	0.50	0.62
620	♀ ad.	..... do .....	..... do .....	..... do	3.39	2.48	0.50	0.66
624	♂ jun.	..... do	Sept. 9, 1874	..... do	3.35	2.70	0.52	0.62
642	♀ ad.	..... do	Sept. 10, 1874	Dr. J. T. Rothrock....	3.40	2.42	0.50	0.62
687	♀ ad.	..... do .....	..... do	H. W. Henshaw.....	3.47	2.67	0.48	0.62
688	♀ ad.	..... do .....	..... do .....	..... do	2.98	2.65	0.50	0.59
690	.....	..... do	Sept. 11, 1874	Dr. J. T. Rothrock....	2.45	2.63	0.45	0.58
703	♂	..... do .....	..... do	H. W. Henshaw.....	2.45	2.65	0.48	0.62

ORDER GALLINAE: GALLINACEOUS BIRDS.

FAM. MELEAGRIDAE: TURKEYS.

MELEAGRIS GALLOPAVO, Linn.

Mexican Turkey.

Meleagris gallopavo, LINN., Fn. Suec., No. 198.—*Id.*, Syst. Nat., i, 1766, 268 (based on domestic bird).—COUES, Birds Northwest, 1874, 391.

Meleagris mexicana, BD., Birds N. A., 1858, 618.—HENRY, Proc. Acad. Nat. Sci. Phila., 1859, 108 (New Mexico).—COUES, Proc. Acad. Nat. Sci. Phila., 1866, 93 (Fort Whipple, Ariz.).—*Id.*, *ib.*, 1868, 84.—COOPER, Birds Cal., i, 1870, 523.—SNOW, Birds Kan., 1872, 12.

Meleagris gallopavo var. *mexicana*, BD., BREW., & RIDG., N. A. Birds, iii, 1874, 410.—YARROW, Rep. Orn. Specs., 1871, Wheeler's Exped., 1874, 36.—HENSHAW, Rep. Orn. Specs., 1873, Wheeler's Exped., 1874, 141.

The Wild Turkey is found abundantly from Camp Apache throughout the mountainous portion of Southeastern Arizona. In New Mexico, it was met with farther to the north in the mountains, and I was informed by Colonel Alexander that he had found them in large numbers in the Raton Mountains in extreme northern New Mexico. It breeds abundantly through the White Mountains, Arizona; and about the middle of August several broods of the young, about two-thirds grown, were met with. Toward the head of the Gila, in New Mexico, the cañons, in November, were found literally swarming with these magnificent birds; in many places the ground being completely tracked up where they had been running. As many as eleven were killed by the members of our party during a day's march. They roost at night in the large cottonwoods by the streams, and soon after daylight, having visited the stream, they usually betake themselves to the dry hills, where they feed, in the fall at least, almost exclusively upon the seeds of grasses and upon grasshoppers. I think they return once or twice during the day to drink; the dry nature of their food rendering a copious supply of water necessary. In these wilds, they appear to be wholly unsuspicious, and without knowledge of danger from man; if not shot at, they will allow one to get within a few yards without manifesting any distrust. They

rarely fly, except when very hard pressed, but, when alarmed, run with great speed, betaking themselves to the steep sides of the ravines, which they easily scale, and thus elude pursuit. Apparently, the only danger they have to fear in these regions is from birds of prey, and especially the panthers. In certain portions of the Gila Cañon, the tracks of these animals are very numerous; these sections always appeared to have been depopulated of turkeys, an occasional pile of feathers marking the spot where one had fallen a victim to a panther. The moult is protracted; as late as November 15, many of the feathers were but partially developed, with the stems still soft.

Some of the gobblers in these wilds attain magnificent proportions. We had no means of determining accurately their weight; yet it is safe to say that several were killed weighing not less than twenty-five pounds, while in at least two instances that weight must have been exceeded. A few of the gobblers had spurs; in one instance these took the form of a blunt, rounded knob half an inch long. In others, however, it was much reduced, and in others still the spur was wanting; though my impression is that all the old males had this weapon.

FAM. TETRAONIDAE: GROUSE.

CANACE OBSCURA (Say).

Dusky Grouse.

Tetrao obscurus, SAY, Long's Exped. Rocky Mts., ii, 1823, 14.—WOODH., Sitgreave's Exp. Zuñi & Col. Riv., 1854, 96.—NEWB., P. R. R. Rep., vi, 1857, 93.—BD., Birds N. A., 1858, 620.—HEERM., P. R. R. Rep., x, pt. ii, 1859, 61.—HENRY, Proc. Acad. Nat. Sci. Phila., 1859, 108 (New Mexico).—COOP. & SUCKL., P. R. R. Rep., xii, pt. ii, 1860, 219.—HAYD., Trans. Am. Phil. Soc., xii, 1862, 172.—COOPER, Birds Cal., i, 1870, 526.—ALLEN, Bul. Mus. Comp. Zoöl., 1872, 181 (Colorado; Wyoming; Utah).—COUES, Key N. A. Birds, 1872, 233.—*Id.*, Birds Northwest, 1874, 395.

Canace obscura, BD., BREW., & RIDG., N. A. Birds, iii, 1874, 422, pl. 59, figs. 1, 2.—YARROW & HENSHAW, Rep. Orn. Specs., 1872, Wheeler's Exped., 1874, 27.—HENSHAW, Rep. Orn. Specs., 1873, Wheeler's Exped., 1874, 92, 142.

Abundant in both Utah and Colorado. Found during the summer on the mountain ridges, in groves of pine and aspen, from 7,000 feet up to timber line. Dr. Rothrock obtained specimens and found the species

numerous at an altitude of from 10,000 to 12,000 feet; those at the former elevation frequenting the cottonwood groves, while at the latter they were found in the pines only. It is tame and unsuspicious, and when forced to fly, which it does unwillingly, takes to the nearest tree, and then, as if incapable of further effort, stands gazing at the intruder with outstretched neck till brought down by a shot. A nest found June 16 contained seven eggs just on the point of hatching. The site was a peculiar one, being in an open glade, where the grass had been recently burned off. The nest proper was a slight collection of dried grass, placed in a depression between two tussocks; there apparently having been no attempt at concealment. The eggs are pale yellowish-white, spotted irregularly with reddish brown; length, 1.95; diameter, 1.39.

A rather common inhabitant of the White Mountains, Arizona. Quite a number were shot in August, and on the 15th Dr. Newberry saw a female with young, probably a second brood. This locality is much farther to the south than the bird was known to range. I once thought that it would be found in the mountains well down to our southern border; the experience of the past season has not, however, borne out this surmise. I searched carefully for signs of this grouse, both at Mount Graham and in the Chiricahua Mountains, close to the border line, but with negative result. On inquiring from the settlers and lumbermen of the mountains if they had ever seen grouse, I was always answered in the negative; and I found the belief general, as expressed by Dr. Coues, that none of the grouse family inhabited any portion of Arizona. As noted above, the Blue Grouse, or "Fool Hen", as it is not inappropriately named by the hunters, is actually a resident of the White Mountains, though by no means as abundant here as in similar districts in Colorado. I presume that the thirty-fourth parallel may be considered as marking the southern limit of the species.

No.	Sex.	Locality.	Date.	Collector.	Wing.	Tail.	Bill.	Tarsus.
61	♀ ad.	Hobble Creek Cañon ..	Aug. 9, 1872	H. W. Henshaw.....	.....	.....	.....	.....
69	Jun.	Daniell's Cañon, Utah.	Aug. 12, 1872	..... do .....	.....	.....	.....	.....
E	Jun.	..... do .....	..... do .....	..... do .....	.....	.....	.....	.....
129	.....	.....	.....	.....	9.35	7.90	0.75	1.60
63	.....	.....	.....	.....	9.10	7.40	0.75	1.60
312	♂ ad.	Rio Grande, Colo	June 12, 1873	H. W. Henshaw.....	9.70	7.50	0.75	1.75

CENTROCERCUS UROPHASIANUS (Bon.).

Sage Cock.

- Tetrao urophasianus*, BON., Zoöl. Jour., iii, Jan., 1828, 214.—BD., Stans. Rep. Exp. Great Salt Lake, 1852, 319.—*Id.*, P. R. R. Rep., Beckwith's Route, x, 1859, 14.—NEWB., P. R. R. Rep., vi, 1857, 95.
- Centrocercus urophasianus*, BD., Birds N. A., 1858, 624.—COOP. & SUCKL., P. R. R. Rep., xii, pt. ii, 1860, 222.—HAYD., Trans. Am. Phil. Soc., xii, 1862, 172.—COOPER, Birds Cal., i, 1870, 536.—ALLEN, Bull. Mus. Comp. Zoöl., 1872, 181 (Laramie Plains, Carbon County, Wyoming; Salt Lake Valley).—COUES, Key N. A. Birds, 1872, 233.—HOLD. *apud* AIKEN, Proc. Bost. Soc. Nat. Hist., xv, 1872, 209.—MERRIAM, U. S. Geol. Surv. Terr., 1872, 699 (Idaho).—BD., BREW., & RIDG., N. A. Birds, iii, 1874, 429, pl. 60. figs. 2, 4.—YARROW, Rep. Orn. Specs., 1871, Wheeler's Exped., 1874, 36.—HENSHAW, Rep. Orn. Specs., 1873, Wheeler's Exped., 1874, 92.—ALLEN, Proc. Bost. Soc. Nat. Hist., June, 1874, 35.—COUES, Birds Northwest, 1874, 400.

The Sage Hen is very numerous throughout Utah; its predilection, as its name implies, being for the open, barren plains of *Artemisia*; and wherever this plant exists in abundance, whether on the extensive stretches of open plain on the lowlands, entirely barren but for the growth of this shrub, or in the valleys high up among the mountains, this bird will not be looked for in vain. In the fall, it is gregarious to some extent; straggling companies of twelve or fifteen not being rare in a neighborhood which is well adapted to its wants. When startled, the individuals of a flock usually squat under the nearest cover, and remain motionless; but if left for a few moments, they quietly skulk away. When compelled to take wing, they do so in a rather clumsy manner; but, once under way, their flight is very strong and even, performed with alternate flappings and sailing. It is continued for an indefinite distance—prolonged at any rate till they are fairly out of all danger from further molestation. The few I dissected in Utah had nothing in their stomachs but a mass of half digested leaves of the *Artemisia*. It is, however, now known that grasshoppers form a portion of their fare; and Dr. Coues informs me that he has found various other kinds of insects in their crops.

As this grouse is quite numerous in the more southern portions of Utah, I am inclined to think that future observation will reveal its presence in Northern Arizona. It certainly reaches into the upper part of New Mexico, having been there taken by Mr. Aiken near Tierra Amarilla the past season.

After, however, leaving the central parts of Colorado, their numbers appear to diminish; and, in the vicinity of Fort Garland, I did not see it, although the region appears to be well adapted to its mode of life.

No.	Sex.	Locality.	Date.	Collector.	Wing.	Tail.	Bill.	Tarsus.
.....	♂ ad.	Nevada	— —, 1871	F. Bischoff .....	.....	.....	.....	.....
7	♀ (?)	Twin Lakes, Colo.	Aug. —, 1873	Dr. J. T. Rothrock	10.20	7.50	1.23	1.78

LAGOPUS LEUCURUS, Swains.

White-tailed Ptarmigan.

Tetrao (Lagopus) leucurus, SWAINS. & RICH., Fn. Bor.-Am., ii, 1831, 356, pl. lxiii.
Lagopus leucurus, BD., Birds N. A., 1858, 636.—COUES, Proc. Acad. Nat. Sci. Phila., 1866, 94 (Cantonment Burgwyn, New Mexico, latitude 37°).—COOPER, Birds, Cal., i, 1870, 542.—ALLEN, Bull. Mus. Comp. Zoöl., 1872, 181 (mountains of Colorado, above timber line).—COUES, Key N. A. Birds, 1872, 236.—AIKEN, Proc. Bost. Soc. Nat. Hist., xv, 1872, 209.—BD., BREW., & RIDG., N. A. Birds, iii, 1874, 464, pl. 62, f. 6.—COUES, Birds Northwest, 1874, 425.

This beautiful species was found by Dr. J. T. Rothrock abundant in the mountains of South Park during the latter part of June and July. It ranges from the timber line to the summits of the highest peaks, showing always a preference for rocky localities. It was found at the extreme height of 14,400 feet, in the most sterile districts, where no vegetation existed. Their habits, as observed by Dr. Rothrock, were as follows: "During the heat of the day, they remain quiet beneath the shelter of the rocks, but in early morning and evening were seen running over the ground, actively engaged in searching for food, and keeping up a constant chirruping. They usually seemed fearless, allowing themselves to be almost trodden upon before taking flight, but sometimes were very shy and wild. The young birds well grown were seen July 10, so that the eggs are deposited by the first of May. The nest is simply a small cavity scratched in the earth under a projecting rock, sometimes with a slight lining of sticks and grasses, but oftener without. In winter, they descend into the timber, and are then so tame as to be often killed with clubs."

Mr. Aiken thus speaks of his experience with these birds on Blaine's Peak, at an altitude of 13,000 feet: "Here the White-tailed Ptarmigan was found in large numbers; one flock of twenty-five, and several smaller

ones being seen, from which fourteen birds were killed in a short time. They were very unsuspicious, and would sometimes run along the ground before me like a domestic fowl; but, after being once flushed and thoroughly frightened, they would lie so close in the scant cover that it was almost impossible to find them."

The quotation of Cantonment Burgwyn, New Mexico, as above, is the southernmost record of this species.

No.	Sex.	Locality.	Date.	Collector.	Wing.	Tail.	Bill.	Tarsus.
101	South Park, Colo	July —, 1873	Dr. J. T. Rothrock.....	7.30	4.25	0.58	1.15
102do .....	.....do .....	.....do	7.27	4.58	0.56	1.24
196	♂	Mount Blaine, Colo ...	Sept. 3, 1874	C. E. Aiken	7.50	5.00	0.60	1.15
198	♂	.....do .....	.....do .....	.....do	7.60	4.75	0.63	1.17
199	♀	.....do .....	.....do .....	.....do	7.50	4.75	0.55	1.20
200	♂	.....do .....	.....do .....	.....do	7.35	4.40	0.57	1.23
202	♂	.....do .....	.....do .....	.....do	7.50	4.80	0.55	1.15
204	♂	.....do .....	.....do .....	.....do	7.45	4.50	0.63	1.17

FAM. PERDICIDAE: QUAILS.

ORTYX VIRGINIANUS (Linn.).

Quail.

Tetrao virginianus, LINN., Syst. Nat., i, 1766, 277, 16 (female?).

Ortyx virginianus, WOODH., Sitgreave's Exp. Zuñi & Col. Riv., 1854, 95.—BD., Birds N. A., 1858, 640.—HAYD., Trans. Am. Phil. Soc., xii, 1862, 173 (Missouri River, not far up).—ALLEN, Bul. Mus. Comp. Zool., 1872, 181 (Eastern and Middle Kansas, spreading westward; Great Salt Lake Valley, introduced).—COUES, Key N. A. Birds, 1872, 236.—SNOW, Birds Kan., 1872, 12.—BD., BREW., & RIDG., N. A. Birds, iii, 1874, 468, pl. 63, figs. 1, 2.—YARROW & HENSHAW, Rep. Orn. Specs., 1872, Wheeler's Exped., 1874, 27.—COUES, Birds Northwest, 1874, 431.

To the western extension of this species, the great plains appear to offer a complete barrier; it not being found anywhere in the region to the west save where it has been introduced.

A number of pairs of this bird were introduced at Provo, Utah, from the East a few years since, and everything would seem to indicate their rapid increase. In July, the call notes of the males were frequently heard, and a number of coveys were seen here in the fall near the thickets and hedges. They are carefully protected by law; a heavy fine being imposed for their destruction.

LOPHORTYX GAMBELI, Nuttall.

Gambel's Partridge.

- Lophortyx gambeli*, "NUTTALL" *apud* GAMBEL, Proc. Acad. Nat. Sci. Phila., i, 1843, 260.—BD., Birds N. A., 1858, 645.—KENNERLY, P. R. R. Rep., Whipple's Route, 1859, 33.—BD., U. S. & Mex. Bound. Surv., ii, pt. ii, 1859, Birds, 23.—*Id.*, P. R. R. Rep., Parke's Route, 1859, 19.—HENRY, Proc. Acad. Nat. Sci. Phila., 1859, 108 (New Mexico).—COUES, Proc. Acad. Nat. Sci. Phila., 1866, 94 (Fort Whipple, Ariz.). *Tophortyx* (sic) *gambelii* BD., Ives' Col. Exped., 1867-68, pt. iv, 6.—COUES, Proc. Acad. Nat. Sci. Phila., 1868, 84.—COOPER, Birds Cal., i, 1870, 553.—COUES, Key N. A. Birds, 1872, 236.—YARROW, Rep. Orn. Specs., 1871, Wheeler's Exped., 1874, 36.—YARROW & HENSHAW, Rep. Orn. Specs., 1872, Wheeler's Exped., 1874, 27.—HENSHAW, Rep. Orn. Specs., 1873, Wheeler's Exped., 1874, 142.—BD., BREW., & RIDG., N. A. Birds, iii, 1874, 482, pl. 64, figs. 4, 5.—COUES, Birds Northwest, 1874, 432.
- Callipepla gambelii*, BD., Stans. Rep. Exp. Great Salt Lake, 1852, 326.—WOODH., Sitgreave's Exp. Zuñi & Col. Riv., 1854, 95.—HEERM., P. R. R. Rep., x, pt. ii, 1859, 60.

This beautiful species, which is different from the California Quail, although called such in Utah, was first met with early in October at Harmony, Southern Utah, in large numbers, where it is resident all the year. The young, two-thirds grown, were taken at this place October 9. This locality would appear to be about its northern breeding limit; but information was received of the occasional appearance of these birds at Cedar City, some thirty miles to the northward.

From Harmony southward, it was found even more abundantly, frequenting the grain-fields and vineyards about the towns, where coveys of even one hundred were not infrequent.

Being rarely disturbed, it is quite tame, and, unless closely pursued, seldom takes wing, preferring to trust to its speed of foot. At Harmony, many coveys habitually roosted in the heavy brush along the banks of the small streams, which are conducted through the fields, resorting thither at early dusk and departing about sunrise for the rocky hills. For rocky ground, it shows great preference, and when flushed near such places invariably betakes itself thither for concealment.

Met with by Dr. C. G. Newberry, a few miles south of Santa Fé. It here, however, is not nearly so abundant as to the southward, in Arizona and New

Mexico. At Camp Apache, they were quite numerous, living in the river bottom and feeding upon seeds and insects. Near Mount Turnbull, also, I saw many coveys, though, from the apparently waterless condition of the cañons where they were found, it was not easy to see how they could exist. In the wilderness, they are very shy and wild; but near settlements they seem to lose their suspicion somewhat, and are much more easily approached. They are extremely loath to take wing, and, as they run very swiftly, it is no easy matter to force a covey to fly; yet, when once started, their flight is swift and strong, and usually protracted to a considerable distance. They rarely squat under cover, as the well known Bob White is wont to do, but usually take the shortest route to the nearest rocky hill, up which they run, and where it is useless to attempt pursuit. From the above characteristics, it will at once be seen that this bird has few qualities to attract the sportsman.

No.	Sex.	Locality.	Date.	Collector.	Wing.	Tail.	Bill.	Tarsus.
....	♀ ad.	Arizona	Sept. 8, 1871	F. Bischoff .....	.....	.....	.....	.....
266	♂ ad.	Harmony, Utah.....	Oct. 9, 1872	H. W. Henshaw .....	.....	.....	.....	.....
267	♀ jun.	..... do .....	..... do .....	..... do .....	.....	.....	.....	.....
268	♀ jun.	..... do	Oct. 10, 1872	..... do .....	.....	.....	.....	.....
269	♂ jun.	..... do .....	..... do .....	..... do .....	.....	.....	.....	.....
280	♀ ad.	..... do	Oct. 11, 1872	..... do .....	.....	.....	.....	.....
282	♂ ad.	..... do	Oct. 12, 1872	..... do .....	.....	.....	.....	.....
293	♂ ad.	..... do	Oct. 14, 1872	..... do .....	.....	.....	.....	.....
323	♀ ad.	Toquerville, Utah.....	Oct. 19, 1872	H. W. Henshaw and Dr. H. C. Yarrow.	.....	.....	.....	.....
333	♀ jun.	Washington, Utah.....	Oct. 22, 1872	..... do .....	.....	.....	.....	.....
338	♀ ad.	..... do .....	..... do .....	..... do .....	.....	.....	.....	.....
339	♀	..... do .....	..... do .....	..... do .....	.....	.....	.....	.....
337	♀	..... do .....	..... do .....	..... do .....	.....	.....	.....	.....
343	♀	..... do .....	..... do .....	..... do .....	.....	.....	.....	.....
322	♀ jun.	..... do .....	..... do .....	..... do .....	.....	.....	.....	.....
334	♂ ad.	..... do .....	..... do .....	..... do .....	.....	.....	.....	.....
353	♂ ad.	..... do .....	..... do .....	..... do .....	.....	.....	.....	.....
341	♂ ad.	..... do .....	..... do .....	..... do .....	.....	.....	.....	.....
342	♂ ad.	..... do .....	..... do .....	..... do .....	.....	.....	.....	.....
335	♂ ad.	..... do .....	..... do .....	..... do .....	.....	.....	.....	.....
336	♂ ad.	..... do .....	..... do .....	..... do .....	.....	.....	.....	.....
777	♂ ad.	Gila River, Ariz	Sept. 15, 1873	H. W. Henshaw	4.33	3.98	0.52	1.23
891	♂ ad.	Camp Grant, Ariz.....	Sept. 27, 1873	..... do	4.47	4.18	0.50	1.23
967	♂ ad.	Gila River, N. Mex ...	Oct. 25, 1873	..... do	4.43	3.93	0.45	1.17
968	♀ ad.	..... do .....	..... do .....	..... do	4.37	3.73	0.45	1.20

CALLIPEPLA SQUAMATA (Vigors).

Scaly Partridge.

Ortyx squamatus, VIGORS, Zoöl. Jour., v, 1830, 275.

Callipepla squamata, BD., Stans. Rep. Exp. Great Salt Lake, 1852, 326.—WOODH., Sitgreave's Exp. Zuñi & Col. Riv., 1854, 95.—BD., Birds N. A., 1858, 546.—BAIRD, P. R. R. Rep., Parke's Route, 1859, 19.—BD., U. S. & Mex. Bound. Surv., ii, pt. ii, 1859, Birds, 23.—HENRY, Proc. Acad. Nat. Sci. Phila., 1859, 108 (New Mexico).—COUES, Proc. Acad. Nat. Sci. Phila., 1866, 95 (valley of Gila and Colorado).—COOPER, Birds Cal., i, 1870, 556.—COUES, Key N. A. Birds, 1872, 238.—BD., BREW., & RIDG., N. A. Birds, iii, 1874, 487, pl. 63, f. 6.—HENSHAW, Rep. Orn. Specs., 1873, Wheeler's Exped., 1874, 142.—COUES, Birds Northwest, 1874, 441.

Camp Grant was the only locality where this quail was seen. A single small covey was met with among the bushes on the dry plain. They appeared remarkably unsuspicious, and were very loath to take wing, but, when they did so, flew a long distance, keeping nearly together, and on alighting began to run with remarkable speed, and soon eluded pursuit.

Description of young.—Head above grayish-brown, each feather of crest centrally streaked with white; prevailing color of back ashy-brown; tertiaries and interscapular region mottled transversely with rufous and black; wing coverts centrally streaked and tipped with white; throat ashy-white; under parts generally washed with rufous, and banded, most distinctly on sides, with transverse blackish-brown bars; tail above with indistinct bands, producing the general effect of mottlings of dark brown and white; bill dark brown above, lighter below; legs and feet light brown (when dried.)

During the last season, the observations of our party were almost as meager concerning this quail as they were the year previous; it being seen only on two occasions. The first, however, was at a point which would appear to be quite out of the usual range of the species, as it is if anything more southern in its habitat than the *Massena*. A single pair was seen along the road at a point about midway between Santa Fé and Albuquerque, while we came across no others of the species till well south of the Gila River. From all I could learn by inquiry, this quail is a sparse inhabitant of this section of Arizona; being, however, quite irregularly dispersed. Thus, at Camp Grant, I was informed by good authority that some seasons it was

not uncommon in that neighborhood; its numbers, however, being conspicuously less than those of the Plumed or Arizona Quail, while at other times it appeared to be absent. It seems an exclusive inhabitant of the warm valleys, and not, like the *Massena*, a dweller in the high mountainous districts.

No.	Sex.	Locality.	Date.	Collector.	Wing.	Tail.	Bill.	Tarsus.
625	♂ ad.	Camp Grant, Ariz.	Sept. 22, 1873	H. W. Henshaw	4. 63	3. 59	0. 48	1. 12
626	♀ jun.	..... do .....	..... do .....	..... do	4. 41	2. 80	0. 45	1. 02

CYRTONYX MASSENA (Lesson).

Massena Partridge.

Ortyx massena, LESSON, Cent. Zoöl., 1830, 189.

Cyrtonyx massena, WOODH., Sitgreave's Exp. Zuñi & Col. Riv., 1854, 94.—BD., U. S. & Mex. Bound. Surv., ii, pt. ii, 1859, Birds, 23.—HENRY, Proc. Acad. Nat. Sci. Phila., 1859, 108 (New Mexico).—COUES, Proc. Acad. Nat. Sci. Phila., 1866, 95 (Fort Whipple, Ariz.).—COOPER, Birds Cal., i, 1870, 558.—COUES, Key N. A. Birds, 1872, 239.—BD., BREW., & RIDG., N. A. Birds, iii, 1874, 492, pl. 64, figs. 3, 6.—YARROW, Rep. Orn. Specs., 1871, Wheeler's Exped., 1874, 36.—HENSHAW, Rep. Orn. Specs., 1873, Wheeler's Exped., 1874, 143.—COUES, Birds Northwest, 1874, 443.

This beautiful partridge is a common resident in the White Mountains near Camp Apache, Ariz., where, in summer, it seems to shun the open valleys, and keeps in the open pine woods, evincing a strong preference for the roughest, rockiest localities, where its stout feet and long, curved, strong claws are admirably adapted to enable it to move with ease.

August 10, while riding with a party through a tract of pine woods, a brood of eight or ten young, accompanied by the female, was discovered. The young, though but about a week old, rose up almost from between the feet of the foremost mule, and after flying a few yards dropped down, and in a twinkling were hidden beneath the herbage. At the moment of discovery, the parent bird rose up, and then, tumbling back helplessly to the ground, imitated so successfully the actions of a wounded and disabled bird that, for a moment, I thought she must have been trodden upon by one of the

mules. Several of the men, completely deceived, attempted to catch her, when she gradually fluttered off, keeping all the time just beyond the reach of their hands, till she had enticed them a dozen yards away, when she rose and was off like a bullet, much to their amazement. From Camp Apache southward, the species appeared to be quite numerous, always showing its predilection for rocky hills and rough cañons. In the cañons of the Gila River, toward its sources in New Mexico, in October and November, they were met with frequently, and scarcely a day passed without three or four coveys being flushed. At this season, they keep in small coveys; I do not remember to have ever seen more than ten together, and usually from four to eight. Their tameness is remarkable, and the more so when contrasted with the wild, timid nature of Gambel's Partridge, which inhabits the same region. I have ridden so close to a covey sitting among the rocks that, leaning down, I could have almost touched them with my hand. When a covey is flushed, they usually separate, and fly strongly and swiftly in a straight line, dropping down into the first convenient cover. They lie well, requiring to be almost kicked up before taking wing. The species was found in New Mexico as far north as Fort Tulerosa.

Description of young male.—Upper parts pale brown, each feather with a median sharply defined streak of pale ochraceous, and barred with black across the webs; wing coverts ashy, with transverse oval or rounded spots of deep black on opposite webs; primaries and secondaries banded transversely with white spots; head grayish-white laterally and beneath; the whole throat unspotted; a dark-brown spot on the auriculars; the region above and below finely streaked with dusky; crown more brownish, spotted with black, and with whitish shaft streaks; lower parts pale gray, inclining to plumbeous on middle of breast; each feather with a terminal deltoid spot of white, bordered anteriorly by a narrow bar of black; abdomen tinged with ochraceous; anal region, tibiae, and crissum velvety black.

Chick.—Head above brownish, with an occipital patch of chestnut brown; a small black spot behind the eye; crest, of five feathers, just appearing, each feather streaked centrally with white, bordered by blackish-brown; upper parts brown, each feather streaked centrally with white, and with two to three transverse spots of black; under parts dull white, each feather with transverse spottings of blackish-brown.

No.	Sex.	Locality.	Date.	Collector.	Wing.	Tail.	Bill.	Tarsus.
.....	♂ ad.	Arizona.....	Nov. 18, 1871	F. Bischoff.....	.....	.....	.....	.....
565	♂ ad.	White Mountains, Ariz.	Aug. 12, 1873	H. W. Henshaw.....	4.87	2.55	0.55	1.16
94	♀ ad.	Camp Apache, Ariz. .	Sept. 13, 1873	Dr. C. G. Newberry...	4.60	2.07	0.59	1.12
965	♂ jun.	Gila River, N. Mex. .	Oct. 26, 1873	H. W. Henshaw.....	4.66	2.27	0.60	1.09
966	♀ jun.	..... do .....	..... do .....	..... do	4.52	2.20	0.55	1.04
969	♂ jun.	..... do .....	..... do .....	..... do	4.76	2.26	0.56	1.13
970	♂ jun.	..... do .....	..... do .....	..... do	4.93	2.00	0.58	1.09
979	♀ ad.	Fort Tulerosa, N. Mex.	Nov. 15, 1873	..... do	4.95	2.47	0.59	1.09
995	♀ ad.	Gila River, N. Mex. .	..... do .....	..... do	4.90	2.35	0.55	1.17
....	♂ ad.	South of Camp Apache, Ariz.	.....	Lieut. S. E. Tillman...	4.75	.....	0.60	1.15

ORDER LIMICOLAE: SHORE BIRDS.

FAM. CHARADRIIDAE: PLOVERS.

AEGIALITIS VOCIFERA (Linn.).

Killdeer Plover.

Charadrius vociferus, LINN., Syst. Nat., i, 1766, 253 (based on *Pluvialis vociferus*, CATES.).—BD., Stans. Rep. Exp. Great Salt Lake, 1852, 319.—WOODH., Sitgreave's Exp. Zuñi & Col. Riv., 1854, 96.—NEWB., P. R. R. Rep., vi, 1857, 97.—HEERM., P. R. R. Rep., x, 1859, pt. iv, 63.

Aegialitis vociferus, BD., Birds N. A., 1858, 692.—COOP. & SUCKL., P. R. R. Rep., xii, pt. ii, 1860, 230.—XANTUS, Proc. Acad. Nat. Sci. Phila., 1859, 192 (Fort Tejon, Cal.).—BD., U. S. & Mex. Bound. Surv., ii, pt. ii, 1859, Birds, 25.—KENNERLY, P. R. R. Rep., Whipple's Route, x, 1859, 34.—BD., Proc. Acad. Nat. Sci. Phila., 1859, 306 (Cape Saint Lucas).—HAYD., Trans. Am. Phil. Soc., xii, 1862, 173.—COUES, Proc. Acad. Nat. Sci. Phila., 1866, 96 (Fort Whipple, Ariz.).—*Id.*, *ib.*, 1868, 84.—STEV., U. S. Geol. Surv. Terr., 1870, 466.—ALLEN, Bul. Mus. Comp. Zool., 1872, 181.—COUES, Key N. A. Birds, 1872, 244, f. 156.—SNOW, Birds Kan., 1872, 13.—HOLD. *apud* AIKEN, Proc. Bost. Soc. Nat. Hist., xv, 1872, 209.—MERRIAM, U. S. Geol. Surv. Terr., 1872, 699.—YARROW & HENSHAW, Rep. Orn. Specs., 1872, Wheeler's Exped., 1874, 28.—HENSHAW, Rep. Orn. Specs., 1873, Wheeler's Exped., 1874, 68, 93, 144.—ALLEN, Proc. Bost. Soc. Nat. Hist., June, 1874, 16, 18, 36.—COUES, Birds Northwest, 1874, 452.

Oxyechus vociferus, HENRY, Proc. Acad. Nat. Sci. Phila., 1859, 108 (New Mexico).

There is little occasion to particularize localities inhabited by this plover, since it is found throughout North America. Throughout the

Middle and Southern Provinces, it occurs perhaps in greater numbers during the migrations than in summer, yet everywhere some remain to breed, passing the summer on the sandy shores of the large rivers, or of the small creeks where the supply of water, however small, is sufficient to last through the dry season, and thus furnish a home for the little crustaceans, worms, and insects which live only in such places, and which furnish sustenance for this plover, as well as others of its tribe. Unlike most of the plover tribe, it is not gregarious; although in the fall a dozen or more may often be seen frequenting the same locality, their association is only partial, and dependent upon the abundance of food. Upon being alarmed, the individuals scatter without regard to each other. Not offering any special attraction to the gunner in the West, they have as yet learned little of the fear which has grown to be instinctive in some others of the family, and in the wilderness appear to have no dread of man, but will run about within a few feet of any chance observer. It is quite different in Florida, where, having been much persecuted the gunners, like the other waders, they have learned the range of a gun to a nicety, and can always be trusted to look well after their own safety. They are very noisy, and easily angered, giving vent to their wrath in a great variety of harsh notes, of which the most common and best known are the syllables *kill-deer, kill-deer*, repeated as they run swiftly along the ground or fly about. The eggs are deposited usually in June, in a slight hollow, often scratched in the sand along a river bank. I have found the young just from the nest June 14. The old birds are devoted parents, and, when the safety of their offspring is threatened, will venture almost within the grasp of the pursuer, squatting in the sand, feigning a broken wing or leg, and thus endeavoring to lead away the enemy, all the while pleading in undertone for pity. They are resident in Utah and to the southward, though their migration is more or less complete, and perhaps the individuals found here in winter are not the same ones that occupy the region in summer, but are those reared farther north, whose hardier nature renders them able to endure a more rigorous winter climate.

No.	Sex.	Locality.	Date.	Collector.	Wing.	Tail.	Bill.	Tarsus.
45	♂ ad.	Provo, Utah.....	July 25, 1872	Dr. H. C. Yarrow and H. W. Henshaw.	.....	.....	.....	.....
46	♂ ad.	..... do .....	..... do .....	..... do .....	.....	.....	.....	.....
14	.....	.....	June —, 1873	Dr. J. T. Rothrock....	6.06	3.75	0.80	1.31

AEGIALITIS MONTANA (Towns.).

Rocky Mountain Plover.

- Charadrius montanus*, TOWNS., Jour. Acad. Nat. Sci. Phila., vii, 1837, 192.—*Id.*, NARR. 1839, 349.—HEERM., P. R. R. Rep., x, pt. ii, 64.
- Ægialitis montanus*, BD., Birds N. A., 1858, 693.—*Ægralites* (sic) *montanus*, BD., Ives' Col. Exped., 1857–58, pt. iv, 6.—COOP. & SUCKL., P. R. R. Rep., xii, pt. ii, 1860, 231.—HAYD., Trans. Am. Phil. Soc., xii, 1862, 173 (Upper Missouri).—ALLEN, Bul. Mus. Comp. Zoöl., 1872, 181 (Middle Kansas; plains of Colorado and Wyoming; South Park).—SNOW, Birds Kan., 1872, 13.—AIKEN, Proc. Bost. Soc. Nat. Hist., xv, 1872, 209.—HENSHAW, Rep. Orn. Specs., 1873, Wheeler's Exped., 1874, 93.—RIDG., Am. Nat., viii, 1874, 109.—ALLEN, Proc. Bost. Soc. Nat. Hist., June, 1874, 36.
- Podasocys montanus*, COUES, Proc. Acad. Nat. Sci. Phila., 1866, 96.
- Ægialitis asiaticus* var. *montanus*, COUES, Key N. A. Birds, 1872, 245.
- Eudromias montanus*, COUES, Check-List, app., No. 402.—COUES., Am. Nat., viii, 1874, 600 (Montana, breeding).—*Id.*, Birds Northwest, 1874, 456.
- Oxyechus montanus*, HENRY, Proc. Acad. Nat. Sci. Phila., 1859, 108 (New Mexico).

This species was met with but in one locality, on the dry plains near the Rio Grande, Colorado. It is to be regretted that lack of time did not allow a more careful examination of the habits of this little known species. While riding rapidly along in an ambulance, I saw quite a number, and shot three as they ran from before the horses and halted a few feet from the road. From their actions, I was certain that their eggs were near by; but a short search did not reveal them. Upon dissecting a female, June 10, I found an egg nearly ready to be deposited. They were very tame, running along the ground a few feet ahead, and uttering a low, croaking note. Mr. Aiken found this plover very numerous on the plains about Pueblo, Colo. In passing from this point to the south, I sometimes noticed one of this species along the road, as, alarmed by the passing coach, it hurried to one side, or flew a short distance, and then, alighting, turned to view the cause of its alarm with timid inquisitive eyes. By the last of June, the

young were hatched. The time for laying eggs probably varies considerably, as, during the month of July, the young were seen at various places in New Mexico.

No.	Sex.	Locality.	Date.	Collector.	Wing.	Tail.	Bill.	Tarsus.
305	♂ ad.	Rio Grande, Colo.	June 10, 1873	H. W. Henshaw.....	5.93	2.95	0.81	1.45
306	♀ ad.	..... do .....	..... do .....	..... do	5.80	2.75	0.89	1.48
307	♂ ad.	..... do .....	..... do .....	..... do	5.50	2.59	0.85	1.38
74	♂ jun.	Pueblo, Colo.	July 30, 1874	C. E. Aiken.....	5.82	2.73	0.80	1.52
75	♀ jun.	..... do .....	..... do .....	..... do	5.97	2.85	0.77	1.55
76	Jun.	..... do .....	..... do .....	..... do	5.75	2.92	0.82	1.52
77	Jun.	..... do .....	..... do .....	..... do	5.95	2.77	0.75	1.48
78	Jun.	..... do .....	..... do .....	..... do	5.72	2.85	0.82	1.49
80	Jun.	..... do .....	..... do .....	..... do	5.68	2.60	0.72	1.48
167	Jun.	..... do .....	..... do .....	..... do	5.80	2.65	0.84	1.54

FAM. RECURVIROSTRIDAE: STILTS AND AVOCETS.

RECURVIROSTRA AMERICANA, Gmel.

American Avocet.

Recurvirostra americana, GMEL., Syst. Nat., i, 1788, 693.—BD., Stans. Rep. Exp. Great Salt Lake, 1852, 320.—WOODH., Sitgreave's Exp. Zuñi & Col. Riv., 1854, 100 (Indian Territory; New Mexico).—BD., Ives' Col. Exped., 1857-58, pt. iv, 6.—*Id.*, Birds N. A., 1858, 703.—XANTUS, Proc. Acad. Nat. Sci. Phila., 1859, 192 (Fort Tejon, Cal.).—BD., U. S. & Mex. Bound. Surv., ii, pt. ii, 1859, Birds, 25.—COOP. & SUCKL., P. R. R. Rep., xii, pt. ii, 1860, 234.—HENRY, Proc. Acad. Nat. Sci. Phila., 1859, 108 (New Mexico).—HAYD., Rep., 1862, 173 (Yellowstone).—COUES, Proc. Acad. Nat. Sci. Phila., 1866, 97 (Arizona).—STEV., U. S. Geol. Surv. Terr., 1870, 466 (North Platte).—COUES, Proc. Acad. Nat. Sci. Phila., 1871, 33.—ALLEN, Bul. Mus. Comp. Zool., iii, 1872, 182 (Great Salt Lake).—COUES, Key N. A. Birds, 1872, 147, f. 159.—SNOW, Birds Kan., 1872, 13.—AIKEN, Proc. Bost. Soc. Nat. Hist., xv, 1872, 209 (Arkansas River).—MERRIAM, U. S. Geol. Surv. Terr., 1872, 701.—ALLEN, Proc. Bost. Soc. Nat. Hist., June, 1874, 36.—YARROW & HENSHAW, Rep. Orn. Specs., 1872, Wheeler's Exped., 1874, 29.—HENSHAW, Rep. Orn. Specs., 1873, Wheeler's Exped., 1874, 69, 93, 145.—COUES, Birds Northwest, 1874, 460.

Recurvirostra occidentalis, BD., Stans. Rep. Exp. Great Salt Lake, 1852, 326.—NEWB., P. R. Rep., 1857, vi, 99. (Young.)

In Utah and Colorado, the Avocet is a common summer resident, though occurring in these Territories in greater abundance during the migrations, when on the way in spring to more northern breeding resorts, and in fall

when pursuing their course to a congenial winter climate in the south. They live in summer on the borders of all the lakes and ponds of any considerable size.

In seeking food, they resort not to the marshes and soft spots, as do others of their fraternity; but to the water itself; their long legs being especially adapted to the purpose of wading, while their elongated bills and necks allow them to pick up the insects which they find on the bottom of the shallow pools, or the larvæ which are swimming freely about. In sections where they have not been molested, they are perfectly tame and unsuspicious, and will, with entire unconcern, continue their graceful efforts and motions, while subjected to a very close scrutiny. In parts of Utah, however, they had learned that man was to be dreaded as an enemy, and, though they were in large flocks, their numbers did not in the least re-assure them; but, on the contrary, they were always on the alert, and successfully baffled my efforts to stalk them. Many are shot in the spring about Denver, and exposed for sale in the markets under the name of "White Snipe".

Visiting some alkali lakes northwest of Fort Garland, Southern Colorado, I found them in great numbers June 21. I presume that nearly all their eggs had been hatched, and that the young were hidden about among the grasses; for not only was there an abundance of broken egg shells along the shores, but my presence caused the greatest commotion in the communities. As I successively visited one pond after another, I was met everywhere by troops of the old birds, who flew in wide circles about my head, while the shores resounded with their harsh cries. I shot several; but the others still continued their maneuverings, merely widening their course somewhat, but always keeping within gunshot. The death of their comrades appeared to excite little apprehension, though they occasionally flew close down to the body of a fallen comrade, or alighted beside it as though trying to comprehend the fate that had befallen him. Where the water is sufficiently deep to allow of swimming, they alight freely upon the surface, and as they move buoyantly about are particularly graceful and pleasing objects.

At this place, the crops of several examined were fairly filled with the larvæ of some insect with which the water was swarming. I found a single set of four eggs, which were placed in a slight hollow made for the purpose,

and lined nicely with weeds. They are of a dull olive-brown color blotched all over with black.

Dimensions: No. 1, 2.00 by 1.43; No. 2, 1.85 by 1.07; No. 3, 1.91 by 1.43; No. 4, 1.91 by 1.42.

No.	Sex.	Locality.	Date.	Collector.	Wing.	Tail.	Bill.	Tarsus.
441	♂	Provo, Utah.....	Nov. 26, 1872	Dr. H. C. Yarrow and H. W. Henshaw.	.....	.....	.....	.....
389	♂ ad.	Alkali Lakes, Colo.....	June 21, 1873	H. W. Henshaw.....	8.80	3.73	3.60	3.50
390	♂ ad.	..... do .....	..... do .....	..... do	8.90	3.97	3.76	3.40
391	♀ ad.	..... do .....	..... do .....	..... do	9.00	3.70	3.36	3.32

HIMANTOPUS NIGRICOLLIS, Vieill.

Black-necked Stilt.

Himantopus nigricollis, VIEILL., Nouv. Dict. d'Hist. Nat., x, 1817, 42.—NEWB., P. R. R. Rep., vi, 1857, 99 (California to the Columbia River).—BD., Birds N. A., 1858, 704.—HENRY, Proc. Acad. Nat. Sci. Phila., 1859, 108 (New Mexico).—COUES, Proc. Acad. Nat. Sci. Phila., 1866, 91 (Arizona).—ALLEN, Bull. Mus. Comp. Zool., iii, 1872, 172 (Great Salt Lake).—MERRIAM, U. S. Geol. Surv. Terr., 1872, 702 (Great Salt Lake).—COUES, Key N. A. Birds, 1872, 247, f. 160.—YARROW & HENSHAW, Rep. Orn. Specs., 1872, Wheeler's Exped., 1874, 29.—YARROW, Rep. Orn. Specs., 1871, Wheeler's Exped., 1874, 36.—HENSHAW, Rep. Orn. Specs., 1873, Wheeler's Exped., 1874, 69, 94.—COUES, Birds Northwest, 1874, 462.

Found in the same localities, at the same time, as the preceding bird, the two often breeding in the same neighborhood, while in general there is quite a close correspondence in their habits. At the lakes just referred to, the Stilts were present in nearly equal numbers with the Avocets; the two mingling and feeding within a few feet of each other on the best of terms. The Stilt is a true wader; and never, so far as I could learn, imitates its associate in its natatorial excursions from point to point. I found the young of this bird, too, had just been hatched, and the parents manifested the most extreme solicitude, flying about in a restless way, and accompanying my progress step by step, as though fearful of losing sight of me for an instant. Besides newly hatched young, so weak and helpless that they could scarcely totter about on their misshapen legs, I found a single clutch of eggs, four in

number, and, like the preceding, freshly laid. The nest was constructed precisely like that of the Avocet, while the eggs of the two birds are indistinguishable, except that those of the Stilt are smaller.

Dimensions: No. 1, 1.74 by 1.31; No. 2, 1.74 by 1.27; No. 3, 1.74 by 1.27.

No.	Sex.	Locality.	Date.	Collector.	Wing.	Tail.	Bill.	Tarsus.
.....	♀ ad.	.....	Sept. 3, 1871	F. Bischoff .....	.....	.....	.....	.....
C 7	.....	Fairfield, Utah	Aug. —, 1872	Dr. H. C. Yarrow .....	.....	.....	.....	.....
393	♂ ad.	Alkali Lakes, Colo....	June 21, 1873	H. W. Henshaw.....	9.25	3.42	2.60	4.48
398	♀ ad.	..... do .....	..... do .....	..... do	8.50	3.57	2.55	3.95
400	♀ ad.	..... do	June 22, 1873	..... do	8.60	3.28	2.48	3.94
404	♀ ad.	..... do .....	..... do .....	..... do	8.60	3.21	2.51	4.12

FAM. PHALAROPODIDAE: PHALAROPES.

STEGANOPUS WILSONI (Sab.).

Wilson's Phalarope.

Phalaropus wilsoni, SAB., App. Narr. Franklin's Journey, 1823, 691.—BD., Birds N. A., 1858, 705.—HAYD., Trans. Am. Phil. Soc., xii, 1862, 174 (Missouri up to Fort Rice).—ALLEN, Bull. Mus. Comp. Zool., 1872, 182 (Great Salt Lake).—SNOW, Birds Kan., 1872, 13.—MERRIAM, U. S. Geol. Surv. Terr., 1872, 701.

Steganopus wilsoni, COUES, Key N. A. Birds, 1872, 248, 161.—YARROW & HENSHAW, Rep. Orn. Specs., 1872, Wheeler's Exped., 1874, 29.—COUES, Birds Northwest, 1874, 467.

Dr. H. C. Yarrow saw numbers of Wilson's Phalarope about Great Salt Lake in July, where also Mr. Allen observed it, and adds that it is stated to breed on the islands in great numbers. It is most likely a summer resident on all of the ponds in this region. I have, however, met with it but on a single occasion, at the Cienega in Southeastern Arizona. It was here merely a migrant, and, in company with Baird's and Least Sandpipers, frequented certain little marshy spots, where its actions, as it moved nimbly about in quest of the insects which afford it sustenance, were so much like the Sandpiper's that I did not at first, when at a distance, recognize it. They were as tame and unsuspicious as the Peeps, and, when startled, got up with a *peet, peet*, not a little resembling the familiar notes of those birds. These

marshy places appeared to be the only resorts in the neighborhood; for after being absent for a few moments they invariably returned to the same spots, and resumed their feeding.

No.	Sex.	Locality.	Date.	Collector.	Wing.	Tail.	Bill.	Tarsus.
442	♂ jun.	Sienega, Ariz.....	Aug. 20, 1874	Dr. J. T. Rothrock....	4.60	2.17	1.13	1.24
443	♂ jun.	..... do .....	..... do .....	..... do	4.92	2.30	1.23	1.18
444	♂ jun.	..... do .....	..... do .....	..... do	4.62	1.93	1.19	1.16
445	♂ jun.	..... do .....	..... do	H. W. Henshaw.....	4.75	2.08	1.10	1.18
461	♂ jun.	..... do .....	..... do .....	..... do	4.87	2.21	1.17	1.17
462	♀ jun.	..... do .....	..... do .....	..... do	4.75	2.30	1.17	1.14
459	♀ jun.	..... do .....	..... do .....	..... do	5.07	2.27	1.35	1.34

FAM. SCOLOPACIDAE: SNIPES.

GALLINAGO WILSONI, (Temm.).

Wilson's Snipe.

Scolopax wilsoni, TEMM., Pl. Color., v, pl. lxxviii (in text).—NEWB. P. R. R. Rep., vi, 1857, 100.—HEERM., P. R. R. Rep., x, pt. iv, 1859, 66.

Gallinago wilsonii, BD., Ives' Col. Exped., 1857-58, pt. iv, 6.—*Id.*, Birds N. A., 1858, 710.—*Id.*, U. S. & Mex. Bound. Surv., ii, pt. ii, 1859, Birds, 25.—KENNERLY, P. R. R. Rep., Whipple's Route, x, 1859, 34.—XANTUS, Proc. Acad. Nat. Sci. Phila., 1859, 192 (Fort Tejon, Cal.).—HENBY, Proc. Acad. Nat. Sci. Phila., 1859, 108 (New Mexico).—COOP. & SUCKL., P. R. R. Rep., xii, pt. ii, 1860, 237.—HAYD., Trans. Am. Phil. Soc., xii, 1862, 174.—COUES, Proc. Acad. Nat. Sci. Phila., 1866, 97.—STEV., U. S. Geol. Surv. Terr., 1870, 466 (Wyoming).—COUES, Key N. A. Birds, 1872, 262, f. 163.—SNOW, Birds Kan., 1872, 13.—MERRIAM, U. S. Geol. Surv. Terr., 1872, 701.—YARROW & HENSHAW, Rep. Orn. Specs., 1872, Wheeler's Exped., 1874, 28.—ALLEN, Bul. Mus. Comp. Zoöl., 1872, 181.—COUES, Birds Northwest, 1874, 475.—RIDG., An. Lyc. Nat. Hist. N. Y., x, 1874, 383.—HENSHAW, Rep. Orn. Specs., 1873, Wheeler's Exped., 1874, 68, 144.

Wilson's Snipe is of common occurrence throughout the Middle Region, and also in New Mexico and Arizona. Mr. Ridgway found it in Parley's Park, Utah, all through the summer; and thus it seems likely that it breeds here, finding in this elevated district an equivalent for the higher latitudes it usually seeks for the purposes of reproduction. Farther south, I am inclined to think it occurs only as a migrant, or at least does not breed, though possibly it may find in the warm sheltered spots of these southern Territories favorable winter resorts. In the neighborhood of certain warm

springs, even as far north as Central Utah, it finds an abundance of food, and exists there under such circumstances during the winter. When found in the marshy coverts it so loves to frequent in the East, it has all the habits it there exhibits, living on worms which it finds below the surface by boring into the soft earth with its sensitive bill. In migrating, however, especially in Arizona and New Mexico, did it depend wholly upon its usual methods of obtaining sustenance, it would fare badly, since, in some sections, there is a total lack of meadow and marsh, and then it may be seen in broad mid-day running along the sandy borders of the streams, and picking up from among the pebbles and *débris* any tidbits in the shape of insects it can find. It retains, however, even under these adverse conditions, its habit of squatting, and, when approached closely, I have seen it lower its body close to the ground, shrink as it were into as little space as possible, and so remain till I was within a few feet, when it would get up with its well known *scaip*, *scaip*, and, following the turns and sinuosities of the stream, endeavor to find some little covered nook into which it could drop out of sight.

No.	Sex.	Locality.	Date.	Collector.	Wing.	Tail.	Bill.	Tarsus.
432	♂ ad.	Provo, Utah.....	Nov. 25, 1872	Dr. H. C. Yarrow and H. W. Henshaw.	.....	.....	.....	.....
433	♂ ad.	..... do .....	..... do .....	..... do .....	.....	.....	.....	.....
994	♀	Camp Apache, Ariz....	Oct. 10, 1874	H. W. Henshaw.....	.....	.....	.....	.....
995	♂	..... do .....	..... do .....	..... do .....	.....	.....	.....	.....
996	♂	..... do .....	..... do .....	..... do .....	.....	.....	.....	.....

MACRORHAMPHUS GRISEUS (Gmel.).

Red-breasted Snipe.

Scolopax grisea, GMEL., Syst. Nat., i, 1788, 658.—NEWB., P. R. R. Rep., vi, 1857, Birds, 100.

Macrorhamphus griseus, BD., Birds N. A., 1858, 712.—*Id.*, U. S. & Mex. Bound. Surv., ii, pt. ii, 1859, Birds, 25.—COOP. & SUCKL., P. R. R. Rep., xii, pt. ii, 1860, 238.—COUES, Proc. Acad. Nat. Sci. Phila., 1866, 97 (Arizona).—ALLEN, Bul. Mus. Comp. Zoöl., 1872, 181 (Utah).—SNOW, Birds Kan., 1872, 13.—COUES, Key N. A. Birds, 1872, 253, f. 164.—YARROW & HENSHAW, Rep. Orn. Specs., 1872, Wheeler's Exped., 1874, 29.—HENSHAW, Rep. Orn. Specs., 1873, Wheeler's Exped., 1874, 68, 144.—COUES, Birds Northwest, 1874, 477.

Scolopax noveboracensis, HEERM., P. R. R. Rep., x, 1859, pt. iv, 66.

Macrorhamphus scolopaceus, BD., Birds N. A., 1858, 712.—COUES, Ibis, 1866, 271 (California).—HENRY, Proc. Acad. Nat. Sci. Phila., 1859, 108 (New Mexico).—SNOW, Birds Kau., 1872, 13.

In Utah, the Red-breasted Snipe is an abundant migrant, frequenting the shores of the lakes and ponds in flocks exactly as it is found at the East along the shores of the harbors and inlets. At Denver, it was numerous in early May, pursuing its way to its northern breeding grounds.

Apparently an uncommon visitor in Arizona. A pair were taken at Mimbres by Dr. C. G. Newberry. They represent the form hitherto known as var. *scolopaceus*, which is now referred by Dr. Coues to the true *griseus*.

No.	Sex.	Locality.	Date.	Collector.	Wing.	Tail.	Bill.	Tarsus.
199	♀ jun.	Rush Lake, Utah	Oct. 1, 1872	Dr. H. C. Yarrow and H. W. Henshaw.	.....	.....	.....	.....
177	♂ ad.	Denver, Colo.	July 24, 1873	H. W. Henshaw .....	.....	.....	.....	.....
138	♂ ad.	Mimbres, Ariz.	Oct. 22, 1873	Dr. C. G. Newberry...	5.80	2.70	2.50	1.50
137	♀ ad.	..... do .....	..... do .....	..... do	6.00	2.80	3.00	1.60

EREUNETES PUSILLUS (Linn.).

Semipalmated Sandpiper.

Tringa pusilla, LINN., Syst. Nat., i, 1766, 252.

Ereunetes pusillus, COUES, Proc. Acad. Nat. Sci. Phila., 1861, 177, 233.—COUES, Proc. Acad. Nat. Sci. Phila., 1866, 97.—ALLEN, Bul. Mus. Comp. Zool., iii, 1872, 182.—COUES, Key N. A. Birds, 1872, 254, f. 165.—YARROW & HENSHAW, Rep. Orn. Specs., 1872, Wheeler's Exped., 1874, 29.—HENSHAW, Rep. Orn. Specs., 1873, 144.—COUES, Birds Northwest, 1874, 481.

Ereunetes petrificatus, BD., Birds N. A., 1858, 724.—XANTUS, Proc. Acad. Nat. Sci. Phila., 1859, 192 (Fort Tejon, Cal.).—HAYD., Rep., 1862, 174.—SNOW, Birds, Kan., 1873, 10.

Tringa semipalmata, NEWB., P. R. R. Rep., vi, 1857, 100.

Only known in the West as a migrant, in which character it has been detected by our parties in various parts of Utah, Colorado, New Mexico, and Arizona. It is rarely seen in as large flocks as may be met with at any time during the fall passage to the south, along the eastern beaches and marshes, but is scattered over the country at large on the borders of the streams, in any spot sufficiently marshy to afford it a supply of the minute crustacea and worms which satisfy its cravings.

No.	Sex.	Locality.	Date.	Collector.	Wing.	Tail.	Bill.	Tarsus.
E	Sevier Lake, Utah	Sept. —, 1872	G. K. Gilbert .....	.....	.....	.....	.....
644	Camp Apache, Ariz	Aug. 28, 1873	H. W. Henshaw	3.63	1.84	0.88	0.83
81 do	Aug. 29, 1873	Dr. C. G. Newberry ...	3.74	1.78	1.05	0.88

ACTODROMAS MINUTILLA (Vieill.).

Least Sandpiper.

Tringa minutilla, VIEILL., Nouv. Dict. d'Hist. Nat., xxxiv, 1819, 452.—COUES, Key N. A. Birds, 1872, 254.

Actodromas minutilla, COUES, Proc. Acad. Nat. Sci. Phila., 1861, 191, 230.—ID., *ibid.*, 1866, 97.—ALLEN, Bul. Mus. Comp. Zoöl., iii, 1872, 182.

Tringa pusilla, WOODH., Sitgreave's Exp. Zuñi & Col. Riv., 1854, 100.

Tringa wilsonii, BD., Birds N. A., 1858, 721.—XANTUS, Proc. Acad. Nat. Sci. Phila., 1859, 192 (Fort Tejon, Cal.).—HEERM., P. R. R. Rep., x, pt. iv, 1859, 65.—COOP. & SUCKL., P. R. R. Rep., xii, pt. ii, 1860, 240.—HAYD., Trans. Am. Phil. Soc., xii, 1862, 174.—SNOW, Birds Kan., 1872, 14.

Actodromas wilsonii, HENRY, Proc. Acad. Nat. Sci. Phila., 1859, 108 (New Mexico).

The same remarks apply as well to this as to the preceding species. The two are frequently found together, the time of their migration being the same.

No.	Sex.	Locality.	Date.	Collector.	Wing.	Tail.	Bill.	Tarsus.
82	♂ ad.	Utah Lake	July 26, 1872	Dr. H. C. Yarrow and H. W. Henshaw.	.....	.....	.....	.....
645	♀	Camp Apache, Ariz ...	Aug. 28, 1873	H. W. Henshaw	3.36	1.77	0.73	0.73

ACTODROMUS BAIRDI, Coues.

Baird's Sandpiper.

Actodromas bairdii, COUES, Proc. Acad. Nat. Sci. Phila., 1861, 194.—ID., *ibid.*, 1866, 97.—STEV., U. S. Geol. Surv. Terr., 1870, 466 (Wyoming).—ALLEN, Bul. Mus. Comp. Zoöl., 1872, 182 (western edge of plains).—SNOW, Birds Kan., 1872, 14.—MERRIAM, U. S. Geol. Surv. Terr., 1872, 700 (Wyoming).—HENSCHAW, Rep. Orn. Specs., 1873, Wheeler's Exped., 1874, 145.

Tringa bairdii, COUES, Key N. A. Birds, 1872, 255.—ALLEN, Proc. Bost. Soc. Nat. Hist., June, 1874, 36.—COUES, Birds Northwest, 1874, 484.

Tringa schinzii, WOODH., Sitgreave's Exp. Zuñi & Col. Riv., 1854, 100.

Tringa bonapartii, BD., Birds N. A., 1858, 722.—HAYD., Trans. Am. Phil. Soc., xii, 1862, 174.

Actodromas bonapartei, HENRY, Proc. Acad. Nat. Sci. Phila., 1859, 108 (New Mexico).

During the spring and fall migrations, Baird's Sandpiper occurs over most of the interior of North America. It may yet be found to migrate in small numbers with the other waders over the whole region east of the Mississippi to the Atlantic coast. It is found in various parts of South America, and has been recorded from Africa.

Since attention was directed to its presence on this coast by the capture of a single specimen by myself in Boston Harbor, I have heard of the authentic capture of six or eight more on the Massachusetts coast and on Long Island, N. Y., so that it may not perhaps be too much to assume that the Atlantic coast is in reality a part of the regular highway for the species, at least in moving south in fall; their numbers, however, being comparatively very small.

In Colorado, New Mexico, and Arizona, it is quite evenly distributed, making its appearance from the north toward the latter part of August, and becoming tolerably common in September. I have never seen it in large flocks, usually not more than five and six being found together, often the number being swelled by the addition of a few of the other species of Peeps. They are entirely unsophisticated, and I have often walked up to within a dozen feet of a little flock, as they scattered about with hasty steps in search of food. They are not so partial to the vicinity of water as most of the other members of the wading family, but share in general their habits. I have not infrequently observed them about the stock corrals, and even in yards close to the houses.

No.	Sex.	Locality.	Date.	Collector.	Wing.	Tail.	Bill.	Tarsus.
618	♂ jun.	Camp Apache, Ariz....	Aug. 26, 1873	H. W. Henshaw	4.60	2.28	0.92	0.83
619	♀ jun.	..... do .....	..... do .....	..... do	5.00	2.33	0.90	0.87
619A	♂ jun.	..... do .....	..... do .....	..... do	4.65	2.02	0.90	0.83
643	♂	..... do	Aug. 28, 1873	..... do	4.62	2.05	0.86	0.83
80	♀	..... do	Aug. 29, 1873	Dr. C. G. Newberry...	4.68	2.13	0.91	0.93
589	♀	Camp Crittenden, Ariz.	Sept. 2, 1874	H. W. Henshaw .....	.....	.....	.....	.....
591	♂	..... do .....	..... do .....	..... do .....	.....	.....	.....	.....
231	♂	Lake Piedra, Colo.....	Sept. 12, 1874	C. E. Aiken .....	.....	.....	.....	.....
232	♀	..... do .....	..... do .....	..... do .....	.....	.....	.....	.....
233	♂	..... do .....	..... do .....	..... do .....	.....	.....	.....	.....
235	♀	..... do .....	..... do .....	..... do .....	.....	.....	.....	.....
236	♀	..... do .....	..... do .....	..... do .....	.....	.....	.....	.....

LIMOSA FEDOA (Linn.).

Great Marbled Godwit.*Scolopax fedoa*, LINN., Syst. Nat., i, 1766, 244.*Limosa fedoa*, NEWB., P. R. R. Rep., vi, 1857, 100.—CASS., Birds N. A., 1858, 740.—HEERM., P. R. R. Rep., x, 1859, pt. vi, 65.—COOP. & SUCKL., Nat. Hist. Wash. Terr., 1860, 245.—HAYD., Rep. 1862, 175.—COUES, Key N. A. Birds, 1872, 257.—SNOW, Birds Kan., 1873, 10.—COUES, Birds Northwest, 1874, 492.

In its range westward, this bird appears to be restricted by the great plains. It is given by Professor Snow as a bird of Kansas, but "rare". Mr. Aiken obtained a single specimen at the San Luis Lakes, Colorado, the past season; this being the first note of its occurrence in Colorado, or indeed west of the plains.

No.	Sex.	Locality.	Date.	Collector.	Wing.	Tail.	Bill.	Tarsus.
316	San Luis Lakes, Colo..	Oct. 1, 1874	C. E. Aiken .....	.....	.....	.....	.....

TOTANUS SEMIPALMATUS (Gmel.).

Willet; Semipalmated Tatler.*Scolopax semipalmata*, GMEL., Syst. Nat., i, 1788, 659.*Totanus semipalmatus*, WOODH., Sitgreave's Exp. Zuñi & Col. Riv., 1854, 99 (New Mexico).—HEERM., P. R. R. Rep., x, 1859, pt. vi, 65.—COUES, Key N. A. Birds, 1872, 258.—*Id.*, Birds Northwest, 1874, 494.*Symphemia semipalmata*, BD., Stans. Rep. Exp. Great Salt Lake, 1852, 320.—*Id.*, P. R. R. Rep., Beckwith's Route, x, 1859, 15.—*Id.*, Birds N. A., 1858, 729.—HENRY, Proc. Acad. Nat. Sci. Phila., 1859, 108 (New Mexico).—COOP. & SUCKL., Nat. Hist. Wash. Terr., 1860, 240.—COUES, Proc. Acad. Nat. Sci. Phila., 1866, 97 (Arizona).—SNOW, Birds Kan., 1873, 10.—MERRIAM, U. S. Geol. Surv. Terr., 1872, 700 (Utah and Idaho).—YARROW, Rep. Orn. Specs., 1871, Wheeler's Exped., 1874, 36.

The Willet has been found in summer at many points in the Middle Region, and is mentioned by Dr. Coues as undoubtedly breeding in New Mexico and Arizona. My own experience has been that it is quite rare in the sections visited by our survey, though perhaps this has resulted more from the accident that the localities where it might be expected to occur were visited at inopportune times, rather than from the actual absence of the birds. At Denver, Colo., in May, I noticed quite a number for sale in the

markets, and on the 10th took a male in the breeding dress on the shores of the Platte. By this time, the species appeared to have passed this latitude on their way north, and those remaining would doubtless have found their summer homes not far away. None were found breeding at the Alkali Lakes, Southern Colorado, a place to all appearance well adapted to attract it.

No.	Sex.	Locality.	Date.	Collector.	Wing.	Tail.	Bill.	Tarsus.
....	Ad.	Arizona	May 5, 1871	F. Bischoff.....	.....	.....	.....	.....
45	♂ ad.	Denver, Colo.....	May 10, 1873	H. W. Henshaw .....	.....	.....	.....	.....

TOTANUS MELANOLEUCUS (Gmel.).

Great Yellowlegs.

Scolopax melanoleucus, GMEL., Syst. Nat., i, 1788, 659.

Totanus melanoleucus, WOODH., Sitgreave's Exp. Zuñi & Col. Riv., 1854, 99.—NEWB., P. R. R. Rep., vi, 1857, 98.—HEERM., P. R. R. Rep., x, 1859, pt. ii, 65.—COUES, Key N. A. Birds, 1872, 258.—HENSHAW, Rep. Orn. Specs., 1873, Wheeler's Exped., 1874, 68.—ALLEN, Proc. Bost. Soc. Nat. Hist., June, 1874, 36.—COUES, Birds Northwest, 1874, 496.

Gambetta melanoleuca, BD., Birds N. A., 1858, 731.—*Id.*, U. S. & Mex. Bound. Surv., ii, pt. ii, 1859, Birds, 25.—KENNERLY, P. R. R. Rep., Whipple's Route, x, 1859, 34.—XANTUS, Proc. Acad. Nat. Sci. Phila., 1859, 192 (Fort Tejon, Cal.).—HENRY, Proc. Acad. Nat. Sci. Phila., 1859, 118 (New Mexico).—COOP. & SUCKL., P. R. R. Rep., xii, pt. ii, 1860, 242.—HAYD., Trans. Am. Phil. Soc., xii, 1862, 174.—COUES, Proc. Acad. Nat. Sci. Phila., 1866, 98 (Colorado River).—STEV., U. S. Geol. Surv. Terr., 1870, 466.—ALLEN, Bul. Mus. Comp. Zoöl., 1872, 182.—SNOW, Birds Kan., 1872, 14.—MERRIAM, U. S. Geol. Surv. Terr., 1872, 700.—YARROW & HENSHAW, Rep. Orn. Specs., 1872, Wheeler's Exped., 1874, 29.

It is unnecessary to mention special localities with reference to the occurrence of this bird during the spring and fall migrations, as it passes in great numbers through the Middle and Southern Regions, being absent only where there are no bodies of water, while it may be seen on many of the smallest streams, and even pools of water; and in the neighborhood of any marsh of magnitude it is sure to be present in great numbers.

TOTANUS FLAVIPES (Gmel.).

Lesser Yellowlegs.

- Scolopax flavipes*, GMEL., Syst. Nat., i, 1788, 659.
Totanus flavipes, WOODH., Sitgreave's Exp. Zuni & Col. Riv., 1854, 99.—NEWB., P. R. R. Rep., vi, 1857, 98 (California and Oregon).—COUES, Key N. A. Birds, 1872, 259.—HENSHAW, Rep. Orn. Specs., 1873, Wheeler's Exped., 1874, 68.—COUES, Birds Northwest, 1874, 497.
Gambetta flavipes, BD., Birds N. A., 1858, 732.—*Id.*, U. S. & Mex. Bound. Surv., ii, pt. ii, 1859, Birds, 25.—HENRY, Proc. Acad. Nat. Sci. Phila., 1859, 108 (New Mexico).—STEV., U. S. Geol. Surv. Terr., 1870, 466 (Wyoming).—ALLEN, Bul. Mus. Comp. Zool., 1872, 182.—SNOW, Birds Kan., 1872, 14.

The same remarks apply equally well to this and to the preceding species, except perhaps in regard to abundance; the Lesser Yellowlegs not usually being found in as considerable numbers as its near relative.

TOTANUS SOLITARIUS (Wils.).

Solitary Tattler; Wood Tattler.

- Tringa solitaria*, WILS., Am. Orn., vii, 1813, 53, pl. 58, f. 3.
Totanus solitarius, COUES, Key N. A. Birds, 1872, 259.—HENSHAW, Rep. Orn. Specs., 1873, Wheeler's Exped., 1874, 69, 145.—ALLEN, Proc. Bost. Soc. Nat. Hist., June, 1874, 36.—COUES, Birds Northwest, 1874, 498.
Rhyacophilus solitarius, BD., Birds N. A., 1858, 733.—HENRY, Proc. Acad. Nat. Sci. Phila., 1859, 108 (New Mexico).—COOP. & SUCKL., P. R. R. Rep., xii, pt. ii, 1860, 242.—HAYD., Trans. Am. Phil. Soc., xii, 1862, 174.—COUES, Proc. Acad. Nat. Sci. Phila., 1866, 98 (Fort Whipple, Ariz.).—ALLEN, Bul. Mus. Comp. Zool., iii, 1872, 182 (Kansas; Colorado; Wyoming).—SNOW, Birds Kan., 1872, 14.—STEV., U. S. Geol. Surv. Terr., 1870, 466 (Wyoming).

The appropriateness of the name of Wood Tattler is often seen in the West, where this bird is frequently found in mountainous localities on the borders of small ponds that may be wholly surrounded by dense forests growing almost to the water's edge. During the migratory seasons, this wader occurs abundantly on the shores of all the rivers, and frequents in fact all localities suited to the wants and tastes of birds of its nature. It is very far from being a solitary bird at these seasons, and rarely will be seen alone; little companies of six or seven being quite usual, and not infrequently more gather together. We have not found it breeding, yet I have little doubt that it actually does so in parts of Utah, Colorado,

and to the southward. Mr. Aiken took adult birds near Pueblo, Colo., July 27, which had undoubtedly spent the summer there, and presumably were breeding.

No.	Sex.	Locality.	Date.	Collector.	Wing.	Tail.	Bill.	Tarsus.
84	♀	Camp Apache, Ariz....	July 29, 1873	Dr. C. G. Newberry...	5.29	2.47	1.24	1.24
509	♂	Cave Spring, Ariz.....	Aug. 1, 1873	H. W. Henshaw.....	5.50	2.66	1.20	1.23
510	♂	..... do .....	..... do .....	..... do	5.22	2.32	1.25	1.24
541	♀	Near Camp Apache, Ariz	Aug. 9, 1873	..... do	5.25	2.27	1.20	1.20
546	.....	..... do	Aug. 10, 1873	..... do	5.12	2.33	1.29	1.26
548	♀	..... do .....	..... do .....	..... do	5.23	2.35	1.17	1.20
650	.....	..... do	Aug. 28, 1873	..... do	5.35	2.55	1.20	1.16
45	♂ ad.	Pueblo, Colo	July 27, 1874	C. E. Aiken .....	.....	.....	.....	.....
46	♀ ad.	..... do .....	..... do .....	..... do .....	.....	.....	.....	.....
460	♀ jun.	Sienega, Ariz	Aug. 22, 1874	H. W. Henshaw.....	.....	.....	.....	.....

TRINGOIDES MACULARIUS (Linn.).

Spotted Sandpiper.

Tringa macularia, LINN., Syst. Nat., i, 1766, 249.

Tringoides macularius, WOODH., Sitgreave's Exp. Zuñi & Col. Riv., 1853, 99.—BD., Birds N. A., 1858, 735.—XANTUS, Proc. Acad. Nat. Sci. Phila., 1859, 192 (Fort Tejon, Cal.).—HENRY, Proc. Acad. Nat. Sci. Phila., 1859, 108 (New Mexico).—COOP. & SUCKL., P. R. R. Rep., xii, pt. ii, 1860, 244.—HAYD., Trans. Am. Phil. Soc., xii, 1862, 174.—COUES, Proc. Acad. Nat. Sci. Phila., 1866, 98 (Colorado River).—STEV., U. S. Geol. Surv. Terr., 1870, 466.—ALLEN, Bul. Mus. Comp. Zool., 1872, 182.—SNOW, Birds Kan., 1872, 14.—COUES, Key N. A. Birds, 1872, 260, f. 172.—MERRIAM, U. S. Geol. Surv. Terr., 1872, 701.—AIKEN, Proc. Bost. Soc. Nat. Hist., 1872, 210.—YARROW & HENSHAW, Rep. Orn. Specs., 1872, Wheeler's Exped., 1874, 29.—HENSHAW, Rep. Orn. Specs., 1873, Wheeler's Exped., 1874, 69, 93, 145.—ALLEN, Proc. Bost. Soc. Nat. Hist., June, 1874, 36.—COUES, Birds Northwest, 1875, 501.

Totanus macularius, HEERM., P. R. R. Rep., x, pt. iv, 1859, 65.

This species, so common and well known at the East, possesses a very general distribution in the West; being found in about the same localities as the preceding bird, though its numbers are much less. It breeds along the shores of the lakes of the low regions, and not less frequently may be found in summer along the streams as they wind tortuous courses from their sources far up in the pine region.

ACTITURUS BARTRAMIUS (Wils.).

Upland Plover.

Tringa bartramia, WILS., Am. Orn., vii, 1813, 63, pl. 59, f. 2.
Actiturus bartramius, BD., Stans. Rep. Exp. Great Salt Lake, 1852, 326 (New Mexico, ABERT).—*Id.*, Birds N. A., 1858, 737.—HENRY, Proc. Acad. Nat. Sci. Phila., 1859, 108 (New Mexico).—HAYD., Trans. Am. Phil. Soc., xii, 1862, 174.—ALLEN, Bul. Mus. Comp. Zoöl., 1872, 182 (Kansas; Colorado).—TRIPPE, Proc. Bost. Soc. Nat. Hist., 1872, 241 (Iowa, breeding).—SNOW, Birds Kan., 1872, 14.—COUES, Key N. A. Birds, 1872, 260.—ALLEN, Proc. Bost. Soc. Nat. Hist., June, 1874, 16, 18, 37.—COUES, Birds Northwest, 1874, 502.
Tringoides bartramius, WOODH., Sitgreave's Exp. Zuñi & Col. Riv., 1854, 100.

Between the Rocky Mountains and the Mississippi this plover is numerous during the migrations; but west of the mountains its occurrence is quite rare. Mr. Ridgway noted it as rather common on the Kamas prairies of Utah in July; where it seemed probable it was about to breed. I find it given by Baird as contained in a collection of birds from New Mexico, made by Lieutenant Abert, as above quoted; to which I can add the capture of a single specimen in Southeastern Arizona in August, this being the only occasion the species was met with by our parties.

No.	Sex.	Locality.	Date.	Collector.	Wing.	Tail.	Bill.	Tarsus.
509	Sulphur Spring, Ariz..	Aug. 18, 1874	H. W. Henshaw.....	.....	.....	.....	.....

NUMENIUS LONGIROSTRIS, Wils.

Long-billed Curlew.

Numenius longirostris, WILS., Am. Orn., viii, 1814, 24, pl. 64, f. 4.—BD., Stans. Rep. Exp. Great Salt Lake, 1852, 320.—WOODH., Sitgreave's Exp. Zuñi & Col. Riv., 1854, 98.—NEWB., P. R. R. Rep., vi, 1857, 99.—BD., P. R. R. Rep., Beckwith's Route, x, 1859, 15.—KENNERLY, P. R. R. Rep., Whipple's Route, x, 1859, 34.—BD., U. S. & Mex. Bound. Surv., ii, pt. ii, 1859, Birds, 25.—HEERM., P. R. R. Rep., x, pt. ii, 1859, 66.—HENRY, Proc. Acad. Nat. Sci. Phila., 1859, 108 (New Mexico).—COOP. & SUCKL., P. R. R. Rep., xii, pt. ii, 1860, 245.—HAYD., Trans. Am. Phil. Soc., xii, 1862, 175.—COUES, Proc. Acad. Nat. Sci. Phila., 1866, 98 (Fort Whipple, Ariz.).—MERRIAM, U. S. Geol. Surv. Terr., 1872, 701.—ALLEN, Bul. Mus. Comp. Zoöl., 1872, 182.—SNOW, Birds Kan., 1872, 14.—COUES, Am. Nat., viii, 1874, 601 (Upper Missouri, breeding).—YARROW & HENSHAW, Rep. Orn. Specs., 1872, Wheeler's Exped., 1874, 29.—HENSHAW, An. Lyc. Nat. Hist. N. Y., 1874, 11.—ALLEN, Proc. Bost. Soc. Nat. Hist., June, 1874, 16, 37.—COUES, B. Northw., 1874, 508.

Numenius occidentalis, WOODH., Sitgreave's Exp. Zuñi & Col. Riv., 1854, 98 (Albuquerque, N. Mex.).

Very numerous in sloughs near Fairfield, Utah, and tolerably common in Eastern Nevada near small lakes. A wounded specimen was taken at Fillmore in November.

Mr. Aiken found it in Colorado during the past season, where also it breeds. I have not seen it in Arizona and New Mexico, though according to Dr. Coues it occurs in both Territories in the breeding season.

No.	Sex.	Locality.	Date.	Collector.	Wing.	Tail.	Bill.	Tarsus.
97	St. Charles River, Colo	Aug. 5, 1874	C. E. Aiken .....	.....	.....	.....	.....

FAM. TANTALIDAE: IBISES.

TANTALUS LOCULATOR, Linn.

Wood Ibis.

Tantalus loculator, LINN., Syst. Nat., i, 1766, 240.—BD., Ives' Col. Exped., 1857-58, pt. iv, 6.—HENRY, Proc. Acad. Nat. Sci. Phila., 1859, 108 (New Mexico).—BD., Birds N. A., 1858, 682.—*Id.*, U. S. & Mex. Bound. Surv., ii, pt. ii, 1859, Birds, 24.—COUES, Proc. Acad. Nat. Sci. Phila., 1866, 96 (Colorado River).—*Id.*, Key N. A. Birds, 1872, 262, f. 173.—YARROW, Rep. Orn. Specs., 1871, Wheeler's Exped., 1874, 36.—YARROW & HENSHAW, Rep. Orn. Specs., 1872, Wheeler's Exped., 1874, 30.—COUES, Birds Northwest, 1874, 513.

The Wood Ibis has fallen under my observation in but one locality, Rush Lake, Utah, in October. The species is not, strictly speaking, migratory, though I am inclined to think that they change their residences, often moving from one point to another in search of spots which shall afford them a plenteous supply of food. At Rush Lake, I saw several different flocks, none composed of more than ten individuals. As I remarked them usually taking to wing about nightfall, and others making their appearance in early morning, I concluded that the lake merely was used as a way station, where they alighted to spend the day in search of food and to recruit themselves for farther progress southward when night came on.

They spent the time in wading about in the shallow water with slow, deliberate steps, and seemingly found no little difficulty in satisfying their

voracious appetites. Toward noon I saw a flock of seven, that, having either become tired of their efforts, or having satisfied their hunger, had drawn themselves up into line, and were standing with their necks drawn down between the shoulders, the very pictures of contented indolence. They were by no means so fast asleep but that the little noise I made in crawling toward them now and then aroused their attention, when one or two would lazily turn about and inspect the quarter whence came the disturbance, but without catching sight of me. I finally reached a point where I risked a long shot, and succeeded in wing-breaking two of the number, when the rest took flight and left the locality. I had some little difficulty in securing my prizes, as, when I had overtaken them, each one threw himself back, and, supported on his outstretched legs and tail, made some very suggestive demonstrations with his formidable looking bill, bringing the mandibles together with a wicked snap that by no means encouraged any attempts at familiarity. A specimen was secured by Mr. F. Bischoff in Nevada in 1871, and Dr. Coues has found these birds in Arizona both on the Gila and Colorado Rivers. Noted also by Dr. W. J. Hoffman at Camp Mojave, where they were said to be "rather common".

No.	Sex.	Locality.	Date.	Collector.	Wing.	Tail.	Bill.	Tarsus.
.....	.....	Nevada	July —, 1871	F. Bischoff .....	.....	.....	.....	.....
201	♂ ad.	Rush Lake, Utah	Oct. 1, 1872	H. W. Henshaw .....	.....	.....	.....	.....
202	♀ ad.	..... do .....	..... do .....	..... do .....	.....	.....	.....	.....

IBIS GUARAUNA (Gmel.).

Glossy Ibis.

Ibis gurauna, RIDG., Am. Nat., viii, Feb., 1874, 110.—YARROW & HENSHAW, Rep. Orn. Specs., 1872, Wheeler's Exped., 1874, 30.—HENSHAW, Rep. Orn. Specs., 1872, Wheeler's Exped., 1874, 146.

This Ibis is well known to the gunners about Utah Lake under the name of "Black Snipe". It is said to be common in spring and fall, and may, I think, breed in this vicinity. A specimen was also brought to me at Camp Apache, Ariz., by an Indian, which he had just shot with a rifle.

IBIS THALASSINUS (Ridg.).

Glossy Ibis.

Ibis thalassinus, RIDG., Rep. U. S. Geol. Expl., 40th par. (in press).—*Id.*, Am. Nat., viii, Feb., 1874, 110.

Mr. Ridgway has identified as belonging to this species an Ibis taken at Camp Lowell, Ariz., by Dr. Rothrock.

No.	Sex.	Locality.	Date.	Collector.	Wing.	Tail.	Bill.	Tarsus.
660	♂ jun.	Camp Lowell, Ariz.	Sept. 10, 1874	Dr. J. T. Rothrock ....	.....	.....	.....	.....

ORDER HERODIONES: HERONS.

FAM. ARDEIDAE: HERONS.

ARDEA HERODIAS, Linn.

Great Blue Heron.

Ardea herodias, LINN., Syst. Nat., i, 1766, 237.—WOODH., Sitgreave's Exp. Zuñi & Col. Riv., 1854, 97.—NEWB., P. R. R. Rep., vi, 1857, 97.—BD., Birds N. A., 1858, 668.—*Id.*, U. S. & Mex. Bound. Surv., ii, pt. ii, 1859, Birds, 24.—HEERM., P. R. R. Rep., x, pt. iv, 1859, 63.—HENRY, Proc. Acad. Nat. Sci. Phila., 1859, 108 (New Mexico).—COOP. & SUCKL., P. R. R. Rep., xii, pt. ii, 1860, 228.—HAYD., Trans. Am. Phil. Soc., xii, 1862, 173.—COUES, Proc. Acad. Nat. Sci. Phila., 1866, 95 (Colorado River).—ALLEN, Bul. Mus. Comp. Zoöl., 1872, 182.—COUES, Key N. A. Birds, 1872, 267.—SNOW, Birds Kan., 1872, 13.—YARROW & HENSHAW, Rep. Orn. Specs., 1872, Wheeler's Exped., 1874, 30.—HENSHAW, Rep. Orn. Specs., 1873, Wheeler's Exped., 1874, 146.—ALLEN, Proc. Bost. Soc. Nat. Hist., June, 1874, 18, 37.—COUES, Birds Northwest, 1874, 517.

This heron is found as a summer resident in all suitable localities through the Middle Region, and in about equal numbers in Arizona and New Mexico. We saw it on the borders of Utah Lake as late as December, and it probably remains there through the winter. In Arizona, it appears to be resident.

No.	Sex.	Locality.	Date.	Collector.	Wing.	Tail.	Bill.	Tarsus.
689	Jun.	Camp Lowell, Ariz.	Sept. 11, 1874	Dr. J. T. Rothrock....	.....	.....	.....	.....

HERODIAS EGRETTE (Gmel.).

Great White Egret.

- Ardea egretta*, GMEL., Syst. Nat., i, 1788, 629.—WOODH., Sitgreave's Exp. Zuñi & Col. Riv., 1854, 97.—HEERM., P. R. R. Rep., x, pt. ii, 1859, 59.—COUES, Key N. A. Birds, 1872, 267.—*Id.*, Birds Northwest, 1874, 519.
- Herodias egretta*, BD., Birds N. A., 1858, 666.—COUES, Proc. Acad. Nat. Sci. Phila., 1866, 95 (Colorado River).—SNOW, Birds Kan., 1872, 13.—YARROW & HENSHAW, Rep. Orn. Specs., 1872, Wheeler's Exped., 1874, 30.
- Herodias alba* var. *egretta*, HENSHAW, Rep. Orn. Specs., 1873, Wheeler's Exped., 1874, 146.
- Herodias egretta* var. *californica*, BD., Birds N. A., 1858, 667.—XANTUS, Proc. Acad. Nat. Sci. Phila., 1859, 192.

A single individual observed near Beaver, Utah, but not secured. From information received, it is probably not common at Provo, though seen there.

A single individual was seen on a small creek at Camp Grant, Ariz., but was so wary that all attempts to capture it proved unavailing. One seen also on the San Pedro River.

BUTORIDES VIRESCENS (Linn.).

Green Heron.

- Ardea virescens*, LINN., Syst. Nat., i, 1766, 238.—WOODH., Sitgreave's Exp. Zuñi & Col. Riv., 1854, 96.—HEERM., P. R. R. Rep., x, pt. ii, 1859, 63.—COUES, Birds Northwest, 1874, 522.
- Butorides virescens*, BD., Birds N. A., 1858, 676.—XANTUS, Proc. Acad. Nat. Sci. Phila., 1859, 192 (Fort Tejon, Cal.).—BD., U. S. & Mex. Bound. Surv., ii, pt. ii, 1859, Birds, 24.—KENNERLY, P. R. R. Rep., Whipple's Route, x, 1859, 38.—HENRY, Proc. Acad. Nat. Sci. Phila., 1859, 108 (New Mexico).—COUES, Proc. Acad. Nat. Sci. Phila., 1866, 95.—ALLEN, Bul. Mus. Comp. Zool., 1872, 182 (Eastern Kansas).—COUES, Key N. A. Birds, 1872, 268.—SNOW, Birds Kan., 1872, 13.—HENSHAW, Rep. Orn. Specs., 1873, Wheeler's Exped., 1874, 146.

A specimen secured at Camp Grant, Ariz. Though this is the only occasion the species has been actually seen, it doubtless occurs throughout Utah and the Southern Region generally; its small size and skulking habits combining to render its detection a matter of mere chance.

NYCTIARDEA GRISEA (Linn.), var. NÆVIA, (Bodd).

Night Heron.

- Ardea nœvia*, BODD., Planch. Enlum. Tabl., 1784, pl. 939 (young).
Nyctiardea gardeni, BD., Birds N. A., 1858, 678.—XANTUS, Proc. Acad. Nat. Sci. Phila., 1859, 192 (Fort Tejon, Cal.).—HENRY, Proc. Acad. Nat. Sci. Phila., 1859, 108 (New Mexico).—COOP. & SUCKL., P. R. R. Rep., xii, pt. ii, 1860, 229.—COUES, Proc. Acad. Nat. Sci. Phila., 1866, 95.
Nyctiardea grisea var. *nœvia*, ALLEN, Bul. Mus. Comp. Zoöl., 1872, 182.—COUES, Key N. A. Birds, 1872, 269.—YARROW & HENSHAW, Rep. Orn. Specs., 1872, Wheeler's Exped., 1874, 30.—HENSHAW, Rep. Orn. Specs., 1873, Wheeler's Exped., 1874, 146.—COUES, Birds Northwest, 1874, 523.
Nyctiardea nœvia, YARROW, Rep. Orn. Specs., 1871, Wheeler's Exped., 1874, 36.

Appears to occur commonly in Utah about the large lakes and marshes. As it was seen about Utah Lake in December, it probably is resident. Found abundant on the Humboldt River, Nevada, by Dr. Hoffman. Several seen on the Colorado Chiquito, New Mexico, by Dr. C. G. Newberry; and in both this Territory and Arizona its distribution is probably general, the number of individuals, however, being limited, as the species is confined to the few localities which meet its requirements.

No.	Sex.	Locality.	Date.	Collector.	Wing.	Tail.	Bill.	Tarsus.
168	♀ jun.	Beaver, Utah.....	Sept. 24, 1872	Dr. H. C. Yarrow and H. W. Henshaw.	.....	.....	.....	.....

BOTAURUS MINOR (Gmel.).

Bittern.

- Ardea stellaris* var. *B. minor*, GMEL., Syst. Nat., i, 1788, 635.
Botaurus lentiginosus, BD., Stans. Rep. Exp. Great Salt Lake, 1852, 320.—*Id.*, U. S. & Mex. Bound. Surv., ii, pt. ii, 1859, Birds, 24.—HEERM., P. R. R. Rep., x, pt. ii, 1859, 63.—HENRY, Proc. Acad. Nat. Sci. Phila., 1859, 109 (New Mexico).—COOP. & SUCKL., P. R. R. Rep., xii, pt. ii, 1860, 228.—HAYD., Trans. Am. Phil. Soc., xii, 1862, 173.—COUES, Proc. Acad. Nat. Sci. Phila., 1866, 95.—ALLEN, Bul. Mus. Comp. Zoöl., 1872, 182 (Eastern Kansas; Great Salt Lake Valley).—SNOW, Birds Kan., 1872, 13.
Ardea minor, NEWB., P. R. R. Rep., vi, 1857, 98.

Botaurus minor, COUES, Key, 1872, 269.—*Id.*, Birds Northwest, 1874, 523.—YARROW, Rep. Orn. Specs., 1871, Wheeler's Exped., 1874, 36.—YARROW & HENSHAW, Rep. Orn. Specs., 1872, Wheeler's Exped., 1874, 30.

Not uncommon in Utah. Two specimens secured in Southern Utah. Not found by the expedition farther to the south.

No.	Sex.	Locality.	Date.	Collector.	Wing.	Tail.	Bill.	Tarsus.
167	♀ ad.	Panquitch, Utah	Sept. 17, 1872	H. W. Henshaw .....	.....	.....	.....	.....
300	♂ ad.	Beaver, Utah	Sept. 24, 1872	Dr. H. C. Yarrow and H. W. Henshaw.	.....	.....	.....	.....

ORDER ALECTORIDES: CRANES & RAILS.

FAM. GRUIDAE: CRANES.

GRUS CANADENSIS (Linn.).

Brown Crane; Sandhill Crane.

Ardea canadensis, LINN., Syst. Nat., i, 1766, 234.

Grus canadensis, BD., Stans. Rep. Exp. Great Salt Lake, 1852, 319.—WOODH., Sitgreave's Exp. Zuñi & Col. Riv., 1854, 96.—BD., P. R. R. Rep., Beckwith's Route, x, 1859, 14.—NEWB., P. R. R. Rep., vi, 1857, 97.—BD., Ives' Col. Exped., 1857-58, pt. iv, 6.—*Id.*, Birds N. A., 1858, 655.—*Id.*, U. S. & Mex. Bound. Surv., ii, pt. ii, 1859, Birds, 24.—HENRY, Proc. Acad. Nat. Sci. Phila., 1859, 108 (New Mexico).—COOP. & SUCKL., P. R. R. Rep., xii, pt. ii, 1860, 227.—HAYD., Trans. Am. Phil. Soc., xii, 1862, 173.—COUES, Proc. Acad. Nat. Sci. Phila., 1866, 95 (Colorado and Gila Rivers).—ALLEN, Bul. Mus. Comp. Zoöl., 1872, 182.—COUES, Key N. A. Birds, 1872, 271.—SNOW, Birds Kan., 1872, 13.—AIKEN, Proc. Bost. Soc. Nat. Hist., 1872, 209 (Colorado, common in migration).—MERRIAM, U. S. Geol. Surv. Terr., 1872, 702.—YARROW & HENSHAW, Rep. Orn. Specs., 1872, Wheeler's Exped., 1874, 30.—HENSHAW, Rep. Orn. Specs., 1873, Wheeler's Exped., 1874, 146.—ALLEN, Proc. Bost. Soc. Nat. Hist., June, 1874, 37.—COUES, Birds Northwest, 1874, 532.

Grus fraterculus, BD., Birds N. A., 1858, 656 (New Mexico).—KENNERLY, P. R. R. Rep., Whipple's Route, x, 1859, 33 (Albuquerque, N. Mex.).

First seen at Fish Springs, Utah, in August, 1872, by Dr. H. C. Yarrow. Companies of two or three were afterward observed on the plains later in the season.

A few seen in the valleys along the streams of Arizona. It is fond of frequenting the old stubble fields in the vicinity of settlements.

The banks of the Rio Grande in Colorado furnish an autumnal home for thousands of these birds. Farther down in New Mexico, late in November, we found the banks of the river at certain points between Fort Craig and Albuquerque dotted with the forms of these huge birds, which had assembled together in large flocks, drawn by the superior attractions of the region as a winter resort. They appeared very restless; now and then detachments of a dozen or twenty members separating themselves from the main body, as they fed among the marshy shallows, and shifting their ground from one point along the stream to another, or leaving it altogether, and wending their way in Indian file toward the stubble fields, a mile or so away.

FAM. RALLIDAE: RAILS.

RALLUS VIRGINIANUS, Linn.

Virginia Rail.

Rallus virginianus, LINN., Syst. Nat., i, 1766, 263.—WOODH., Sitgreave's Exp. Zuñi & Col. Riv., 1854, 107.—NEWB., P. R. R. Rep., vi, 1857, 96.—BD., Birds N. A., 1858, 748.—XANTUS, Proc. Acad. Nat. Sci. Phila., 1859, 192 (Fort Tejon, Cal.).—BD., U. S. & Mex. Bound. Surv., ii, pt. ii, 1859, Birds, 26.—HEERM., P. R. R. Rep., x, pt. iv, 1859, 62.—HENRY, Proc. Acad. Nat. Sci. Phila., 1859, 118 (New Mexico).—COOP. & SUCKL., P. R. R. Rep., xii, pt. ii, 1860, 247.—COUES, Proc. Acad. Nat. Sci. Phila., 1866, 98.—ALLEN, Bul. Mus. Comp. Zool., iii, 1872, 182 (Eastern Kansas).—COUES, Key N. A. Birds, 1872, 273.—SNOW, Birds Kan., 1872, 14.—AIKEN, Proc. Bost. Soc. Nat. Hist., 1872, 210 (Colorado, breeding).—YARROW & HENSHAW, Rep. Orn. Specs., 1872, Wheeler's Exped., 1874, 31.—HENSHAW, Rep. Orn. Specs., 1873, Wheeler's Exped., 1874, 69, 146.—ALLEN, Proc. Bost. Soc. Nat. Hist., June, 1874, 37.—COUES, Birds Northwest, 1874, 536.

The Virginia Rail appears to inhabit nearly or quite all the marshes and reedy borders of the ponds and lakes of Utah. It has been met with by our parties in Colorado, and also in Arizona. In fact, only the presence of a few yards of grassy swamp land by the side of pond or running stream is needed to insure the presence of this bird.

PORZANA CAROLINA (Linn.).

Carolina Rail.

Rallus carolinus, LINN., Syst. Nat., i, 1766, 253.
Ortygometra carolina, WOODH., Sitgreave's Exp. Zuñi & Col. Riv., 1854, 101.

Porzana carolina, BD., Birds N. A., 1858, 749.—HENRY, Proc. Acad. Nat. Sci. Phila., 1859, 108 (New Mexico).—BD., U. S. & Mex. Bound. Surv., ii, pt. ii, 1859, Birds, 25.—HAYD., Trans. Am. Phil. Soc., xii, 1862, 175.—COUES, Proc. Acad. Nat. Sci. Phila., 1866, 98 (Colorado River).—ALLEN, Bul. Mus. Comp. Zoöl., iii, 1872, 183 (Eastern Kansas; Great Salt Lake Valley).—SNOW, Birds Kan., 1872, 14.—COUES, Key N. A. Birds, 1872, 273.—MERRIAM, U. S. Geol. Surv. Terr., 1872, 702 (Ogden, Utah).—YARROW & HENSHAW, Rep. Orn. Specs., 1872, Wheeler's Exped., 1874, 31.—HENSHAW, Rep. Orn. Specs., 1873, Wheeler's Exped., 1874, 146.—COUES, Birds Northwest, 1874, 538.

Not so common as the preceding, but frequenting the same places. Observed by us both in Utah and Arizona.

FULICA AMERICANA, Gmel.

Coot.

Fulica americana, GMEL., Syst. Nat., i, 1788, 704.—WOODH., Sitgreave's Exp. Zuñi & Col. Riv., 1854, 101.—NEWB., P. R. R. Rep., vi, 1857, 96.—BD., P. R. R. Rep., Beckwith's Route, x, 1857, 15.—*Id.*, Birds N. A., 1858, 751.—*Id.*, Proc. Acad. Nat. Sci. Phila., 1859, 306 (Cape Saint Lucas).—XANTUS, Proc. Acad. Nat. Sci. Phila., 1859, 192 (Fort Tejon, Cal.).—HEERM., P. R. R. Rep., x, pt. ii, 1859, 61.—HENRY, Proc. Acad. Nat. Sci. Phila., 1859, 108 (New Mexico).—COOP. & SUCKL., P. R. R. Rep., xii, pt. ii, 1860, 247.—HAYD., Trans. Am. Phil. Soc., xii, 1862, 175.—COUES, Proc. Acad. Nat. Sci. Phila., 1866, 99 (Colorado River).—*Id.*, *ib.*, 1868, 84.—SNOW, Birds Kan., 1872, 14.—COUES, Key N. A. Birds, 1872, 275.—YARROW & HENSHAW, Rep. Orn. Specs., 1872, Wheeler's Exped., 1874, 31.—HENSHAW, Rep. Orn. Specs., 1873, Wheeler's Exped., 1874, 94, 146.—ALLEN, Proc. Bost. Soc. Nat. Hist., June, 1874, 37.—COUES, Birds Northwest, 1874, 541.

Very numerous at the Alkali Lakes, Southern Colorado. They breed in colonies among the rushes, the nests often being but a few feet apart. These are very bulky structures, composed of weeds and rushes raised to a height of several inches from the surface of the water, so that the eggs are kept perfectly dry, and are moored to the stems of the surrounding reeds. The greatest number of eggs found in one nest was eleven, and most contained from five to seven, showing that the birds were not through laying. This was June 22.

Their instincts appeared to be very social; for not only were the nests in close proximity to each other, but the birds themselves seemed to prefer when off duty to feed together, and thus made up little flocks, swimming

when undisturbed in and out of the rushes, and showing in their close fellowship the utmost good will to each other and the other occupants of their watery domain. They very quickly learned that certain demonstrations made by our party boded no good to themselves, and, quietly betaking themselves to the middle of the pond, they there swam about, viewing us with the utmost unconcern, always, however, taking good care that the interval between us should exceed by a little the range of our shot-guns. The lakes and ponds of Utah are sometimes in the fall fairly covered with the Coots that swarm in from their northern summer resorts, make a brief stay of one or two days, and then with renewed strength stretch their wings for the south. I think they always migrate by night.

ORDER LAMELLIROSTRES:

ANSERINE BIRDS.

FAM. ANATIDÆ: GEESE AND DUCKS.

ANSER HYPERBOREUS, Pall.

Snow Goose.

Anser hyperboreus, PALL., Spic. Zoöl., viii, 1767, 80, 25, pl. 65.—WOODH., Sitgreave's Exp. Zuñi & Col. Riv., 1854, 101.—NEWB., P. R. R. Rep., vi, 1857, 101 (California).—BD., Birds N. A., 1858, 760.—HEERM., P. R. R. Rep., x, pt. ii, 1859, 68.—COOP. & SUCKL., P. R. R. Rep., xii, pt. ii, 1860, 249.—COUES, Proc. Acad. Nat. Sci. Phila., 1866, 98 (Arizona).—ALLEN, Bul. Mus. Comp. Zoöl., 1872, 183.—SNOW, Birds Kan., 1872, 14.—COUES, Key N. A. Birds, 1872, 282.—YARROW & HENSHAW, Rep. Orn. Specs., 1872, Wheeler's Exped., 1874, 31.—COUES, Birds Northwest, 1874, 548.

Chen hyperboreus, HENRY, Proc. Acad. Nat. Sci. Phila., 1859, 109 (New Mexico).

Immense numbers of this goose were noticed at Rush Lake, Utah, in early November. They throng through the Territory during the fall months, retiring farther south only as the lakes become covered with ice. According to Dr. Coues, they winter in great numbers in Arizona along the Colorado; and, from all I could learn, I judged that the Upper Rio Grande in Colorado also attracted large numbers at this season.

BRANTA CANADENSIS (Linn.).

Canada Goose.

Anas canadensis, LINN., Syst. Nat., i, 1766, 198.

Bernicla canadensis, BD., Stans. Rep. Exp. Great Salt Lake, 1852, 321.—WOODH., Sitgreave's Exp. Zuñi & Col. Riv., 1854, 102.—NEWB., P. R. R. Rep., vi, 1857, 100.—BD., U. S. & Mex. Bound. Surv., ii, pt. ii, 1859, Birds, 26.—KENNERLY, P. R. R. Rep., Whipple's Route, 1859, 34.—HEERM., P. R. R. Rep., x, pt. iv, 1859, 66.—COOP. & SUCKL., P. R. R. Rep., xii, pt. ii, 1860, 250.—COUES, Proc. Acad. Nat. Sci. Phila., 1866, 98 (Colorado River).—HAYD., Trans. Am. Phil. Soc., xii, 1862, 175.—SNOW, Birds Kan., 1872, 15.—COUES, Key N. A. Birds, 1872, 283, f. 185^a.—ALLEN, Bul. Mus. Comp. Zool., 1872, 183.—STEV., U. S. Geol. Surv. Terr., 1872, 466 (Wyoming).—YARROW & HENSHAW, Rep. Orn. Specs., 1872, Wheeler's Exped., 1874, 31.—ALLEN, Proc. Bost. Soc. Nat. Hist., June, 1874, 37.—COUES, Birds Northwest, 1874, 553.

Bernicla (Leucoblepharon) canadensis, BD., Birds N. A., 1858, 764, pl. xlix.

The Canada Goose makes its appearance early in the fall on the waters of Utah, and in November the surface of many of the larger ponds and lakes are often covered with multitudes. The earlier comers appear to be migrants; but the species winters, at least till the extreme winter weather has entirely closed their watery resorts with ice. At nightfall, they retire to the water, sleeping on the surface in continuous masses. Long before dawn they are awake, and betray by their continuous honking the impatience with which they await the coming of the day. At the first streaks of dawn, they begin to move from the water in detachments, varying in number from ten or fifteen to several hundred.

Upon leaving the water, the hungry birds direct their course inland; at first their flight is quite low, affording now a most excellent opportunity to the enterprising gunner, who may be thus early abroad, and who has hidden himself in some one of the many thickets and reedy coverts which abound in the marshy ground. A few shots obtained in this way as the flocks pass within easy range are often productive of a good bag. No birds are, however, more wary than these geese, and a few lessons of this sort soon teach them their remedy. In November, after they had suffered much at the hands of the sportsmen, I found it impossible to entrap them in this way, as upon leaving their watery bed each flock took a few turns above the lake, and soon placing themselves at a height sufficient to be out of

range of shot-gun pursued their way to their feeding grounds. These they find either in the grassy benches that skirt the mountains, or the stubble fields, which at this season prove attractive resorts.

BRANTA BERNICLA (Linn.), var. NIGRICANS, Lawr.

Black Brant.

Anser nigricans, LAWR., An. Lyc. Nat. Hist. N. Y., iv, 1846, 171.

Bernicla nigricans, BD., Birds N. A., 1858, 757.—COOP. & SUCKL., P. R. R. Rep., 1860, 252.

Branta bernicla var. *nigricans*, COUES, Key N. A. Birds, 1872, 284, fig. 184^b.—YARROW & HENSHAW, Rep. Orn. Specs., 1872, Wheeler's Exped., 1874, 31.

Brant were seen at Rush Lake, Utah, supposed to be of this species.

ANAS BOSCHAS, Linn.

Mallard.

Anas boschas, LINN., Syst. Nat., i, 1766, 205.—BD., Stans. Rep. Exp. Great Salt Lake, 1852, 322.—WOODH., Sitgreave's Exp. Zuñi & Col. Riv., 1854, 103.—NEWB., P. R. R. Rep., vi, 1857, 102.—BD., P. R. R. Rep., Beckwith's Route, x, 1857, 15.—BD., Birds N. A., 1858, 744.—*Id.*, U. S. & Mex. Bound. Surv., ii, pt. ii, 1859, Birds, 26.—HEERM., P. R. R. Rep., x, pt. ii, 1859, 69.—XANTUS, Proc. Acad. Nat. Sci. Phila., 1859, 192, (Fort Tejon, Cal.).—HENRY, Proc. Acad. Nat. Sci. Phila., 1859, 109 (New Mexico).—COOP. & SUCKL., P. R. R. Rep., xii, pt. ii, 1860, 253.—HAYD., Trans. Am. Phil. Soc., xii, 1862, 175.—COUES, Proc. Acad. Nat. Sci. Phila., 1866, 98.—ALLEN, Bul. Mus. Comp. Zool., 1872, 183.—COUES, Key N. A. Birds, 1872, 285.—SNOW, Birds Kan., 1872, 15.—MERRIAM, U. S. Geol. Surv. Terr., 1872, 703.—YARROW & HENSHAW, Rep. Orn. Specs., 1872, Wheeler's Exped., 1874, 31.—HENSHAW, Rep. Orn. Specs., 1873, Wheeler's Exped., 1874, 69, 94, 147.—ALLEN, Proc. Bost. Soc. Nat. Hist., June, 1874, 18, 37.—COUES, Birds Northwest, 1874, 557.

During fall and winter, perhaps none of the ducks are so numerous and generally distributed in the West as the Mallard, while it is also found throughout Utah and Colorado as a common summer resident of the lakes and ponds. In the fall it appears to spend about as much of its time on the land as in the water, and frequents the stubble grain fields in flocks of greater or less number, gleaning there the scattered grain. It appears to care little at any time for the open water of the lakes, but resorts preferably to the little marshy pools of water surrounded by sedge and grass, where it wades as often as swims in and out among the roots where the water

insects and crustaceans abound. The species winters in great numbers in New Mexico along the Rio Grande.

No.	Sex.	Locality.	Date.	Collector.	Wing.	Tail.	Bill.	Tarsus.
171	♀ ad.	Fairfield, Utah	Aug. 3, 1872	Dr. H. C. Yarrow.....	.....	.....	.....	.....

ANAS OBSCURA, Gmel.

Black Duck.

Anas obscura GMEL., Syst. Nat., i, 1788, 541.—BD., Birds N. A., 1858, 775.—HENRY, Proc. Acad. Nat. Sci. Phila., 1859, 109 (New Mexico).—SNOW, Birds Kan., 1872, 15.—COUES, Key N. A. Birds, 1872, 285.—YARROW & HENSHAW, Rep. Orn. Specs., 1872, Wheeler's Exped., 1874, 31.—COUES, Birds Northwest, 1874, 560.

The Black Duck is quite restricted in its western range, and I am able to find no note of its occurrence farther west than Kansas. Upon Dr. Yarrow's authority, it appears to be a bird of Utah, he having seen a number of what he believed to be this species at Rush Lake in November.

DAFILA ACUTA (Linn.).

Sprig- or Pin-tail Duck.

Anas acuta, LINN., Syst. Nat., i, 1766, 202.

Dafila acuta, BD., Staus. Rep. Exp. Great Salt Lake, 1852, 323.—WOODH., Sitgreave's Exp. Great Salt Lake, 1854, 103 (New Mexico, Cal.).—NEWB., P. R. R. Rep., vi, 1857, 102 (California; Oregon).—BD., Birds N. A., 1858, 776.—KENNERLY, P. R. R. Rep., Whipple's Route, x, 1859, 34.—HEERM., P. R. R. Rep., x, pt. iv, 1859, 69.—BD., U. S. & Mex. Bound. Surv., ii, pt. ii, 1859, Birds, 26.—XANTUS, Proc. Acad. Nat. Sci. Phila., 1859, 195 (Fort Tejon, Cal.).—HENRY, Proc. Acad. Nat. Sci. Phila., 1859, 109 (New Mexico).—COOP. & SUCKL., P. R. R. Rep., xii, pt. ii, 1860, 253.—HAYD., Trans. Am. Phil. Soc., xii, 1862, 175.—COUES, Proc. Acad. Nat. Sci. Phila., 1866, 98.—SNOW, Birds Kan., 1872, 15.—ALLEN, Bul. Mus. Comp. Zoöl., 1872, 183.—MERRIAM, U. S. Geol. Surv. Terr., 1872, 703.—YARROW & HENSHAW, Rep. Orn. Specs., 1872, Wheeler's Exped., 1874, 31.—HENSHAW, Rep. Orn. Specs., 1873, Wheeler's Exped., 1874, 146.—COUES, Birds Northwest, 1874, 561.

During the fall, this duck is found in greater or less numbers among the throngs of the other species that visit this region on their way to the

south. On the San Pedro River, Arizona, I found it very numerous in October, and perhaps they may remain here for the winter. They are quite shy and timid, and among a promiscuous flock of swimmers are about the first to scent danger, and by their flight communicate the alarm to the others.

CHAULELASMUS STREPERUS (Linn.).

Gadwall.

Anas strepera, LINN., Syst. Nat., i, 1766, 200.—NEWB., P. R. R. Rep., vi, 1857, 102.
Chaulelasmus streperus, WOODH., Sitgreave's Exp. Zuñi & Col. Riv., 1854, 109.—BD., Birds N. A., 1858, 782.—*Id.*, U. S. & Mex. Bound. Surv., ii, pt. ii, 1859, Birds, 27.—KENNERLY, P. R. R. Rep., Whipple's Route, x, 1859, 35.—HEERM., P. R. R. Rep., x, pt. ii, 1859, 69.—COOP. & SUCKL., P. R. R. Rep., xii, pt. ii, 1860, 256.—COUES, Proc. Acad. Nat. Sci. Phila., 1866, 99 (Arizona).—ALLEN, Bul. Mus. Comp. Zoöl., 1872, 183.—SNOW, Birds Kan., 1872, 15.—COUES, Key N. A. Birds, 1872, 286.—AIKEN, Proc. Bost. Soc. Nat. Hist., xv, 1872, 240 (Colorado).—MERRIAM, U. S. Geol. Surv. Terr., 1872, 704.—YARROW & HENSHAW, Rep. Orn. Specs., 1872, Wheeler's Exped., 1874, 32.—HENSHAW, Rep. Orn. Specs., 1873, Wheeler's Exped., 1874, 95.—COUES, Birds Northwest, 1874, 563.

In 1872, a few of this species were found late in November in the sloughs and pools about Provo, Utah; but they were only the late stragglers from the great numbers which had already passed on to the south. From such information as I could gather I judge that the borders of Utah Lake afford a home in summer for very many of these ducks, and, as the species is southern in its distribution, or at least does not find it necessary to retire to the far north to pass the breeding period, their departure south is similarly early; and at a time when many other kinds are still abundant in Utah this duck has migrated. At the Alkali Lakes of Southern Colorado one or two Gadwalls were shot in worn plumage, and with all the other evidences of their being in the breeding state, while quite a number of others were seen.

No.	Sex.	Locality.	Date.	Collector.	Wing.	Tail.	Bill.	Tarsus.
449	♂ jun.	Provo, Utah.....	Nov. 27, 1872	Dr. H. C. Yarrow and H. W. Henshaw.	.....	.....	.....	.....
398	♂ ad.	Alkali Lakes, Colo....	June 24, 1873	H. W. Henshaw.....	.....	.....	.....	.....
997	♂ jun.	Zuñi, N. Mex.....	Nov. 19, 1873	..... do .....	.....	.....	.....	.....

MARECA AMERICANA (Gmel.).

American Widgeon.

Anas americana, GMEL., Syst. Nat., i, 1788, 526.

Mareca americana, BD., Stans. Rep. Exp. Great Salt Lake, 1852, 322.—WOODH., Sitgreave's Exp. Zuñi & Col. Riv., 1854, 102.—NEWB., P. R. R. Rep., vi, 1857, 102.—BD., Birds N. A., 1858, 783.—HEERM., P. R. R. Rep., x, 1859, pt. iv, 68.—XANTUS, Proc. Acad. Nat. Sci. Phila., 1859, 193 (Fort Tejon, Cal.).—BD., U. S. & Mex. Bound. Surv., ii, pt. ii, 1859, Birds, 27.—HENRY, Proc. Acad. Nat. Sci. Phila., 1859, 109 (New Mexico).—COOP. & SUCKL., P. R. R. Rep., 1860, 256.—HAYD., Trans. Am. Phil. Soc., xii, 1862, 176.—COUES, Proc. Acad. Nat. Sci. Phila., 1866, 99 (Arizona).—STEV., U. S. Geol. Surv. Terr., 1870, 466 (Wyoming).—ALLEN, Bul. Mus. Comp. Zoöl., 1872, 183.—SNOW, Birds Kan., 1872, 15.—COUES, Key N. A. Birds, 1872, 286.—HENSHAW, Rep. Orn. Specs., 1873, Wheeler's Exped., 1874, 69.—*Marcea* (sic) *americana*, YARROW & HENSHAW, Rep. Orn. Specs., 1872, Wheeler's Exped., 1874, 32.—COUES, Birds Northwest, 1874, 564.

The Widgeon occurs in great abundance on the waters of Utah during the fall, where it is found in considerable numbers even late in November, and, indeed, in the neighborhood of certain warm springs and sloughs about Provo, more or less may find sufficient inducement to keep them all winter.

QUERQUEDULA CAROLINENSIS (Gmel.).

Green-winged Teal.

Anas carolinensis, GMEL., Syst. Nat., i, 1788, 533.

Querquedula carolinensis, BD., Stans. Rep. Exp. Great Salt Lake, 1852, 322.—WOODH., Sitgreave's Exp. Zuñi & Col. Riv., 1854, 103.—NEWB., P. R. R. Rep., vi, 1857, 102.—HEERM., P. R. R. Rep., x, 1859, pt. iv, 69.—COUES, Birds Northwest, 1874, 565.

Nettion carolinensis, BD., P. R. R. Rep., x, Beckwith's Route, 1859, 16.—*Id.*, Birds N. A., 1858, 177.—*Id.*, U. S. & Mex. Bound. Surv., 1859, ii, pt. ii, Birds, 26.—KENNERLY, P. R. R. Rep., x, 1859, 35.—XANTUS, Proc. Acad. Nat. Sci. Phila., 1859, 193 (Fort Tejon, Cal.).—COOP. & SUCKL., P. R. R. Rep., xii, pt. ii, 1860, 254.—HAYD., Trans. Am. Phil. Soc., xii, 1862, 175.—COUES, Proc. Acad. Nat. Sci. Phila., 1866, 98 (Arizona).—STEV., U. S. Geol. Surv. Terr., 1870, 466 (Wyoming).—COUES, Key N. A. Birds, 1872, 287.—ALLEN, Bul. Mus. Comp. Zoöl., 1872, 183.—SNOW, Birds Kan., 1872, 15.—AIKEN, Proc. Bost. Soc. Nat. Hist., 1872, 210.—YARROW & HENSHAW, Rep. Orn. Specs., 1872, Wheeler's Exped., 1874, 31.—HENSHAW, Rep. Orn. Specs., 1873, Wheeler's Exped., 1874, 69, 95, 147.—ALLEN, Proc. Bost. Soc. Nat. Hist., June, 1874, 37.

The Green-winged Teal is one of the most abundant of its tribe, both in the Middle Region and to the southward in Arizona and New Mexico.

Over how much of the large area that constitutes its home in the migrations it may be found breeding I cannot definitely state. Our parties have, however, reported it in summer from Utah, Colorado, New Mexico, and Arizona, in which Territories it appears to be rather common at this season. In Southern Colorado, it was present in considerable numbers, and breeding June 24, though from several nests examined, of which the ownership could not be ascertained other than that they were Teal's, it was apparent from the small number of eggs contained in them that the birds were not yet through laying. A nest belonging to this species was found under a sage bush, perhaps thirty feet from the water's edge. A deep hollow had been scooped in the sand, and lined warmly with fine grasses and down, evidently taken from the bird's own breast, which was plucked nearly bare. The eggs are of a pale yellowish color, and average 1.81 in length by 1.31 in diameter. The hen bird was setting; in fact, so artfully was the nest placed that it was only when I had almost trodden upon it, and the old bird had shuffled out at my feet and made good her retreat behind some thick bushes, that I discovered it. Returning a couple of hours later, I found she had again taken possession of her treasures, nor did she leave till I had approached within three feet of her.

No.	Sex.	Locality.	Date.	Collector.	Wing.	Tail.	Bill.	Tarsus.
193	♂ jun.	Deep Creek, Utah	Aug. 12, 1872	Dr. H. C. Yarrow.....	.....	.....	.....	.....
124	♀ ad.	Thistle Valley, Utah...	Aug. 23, 1872	H. W. Henshaw.....	.....	.....	.....	.....
452	♂ ad.	Provo, Utah.....	Nov. 27, 1872	H. W. Henshaw and Dr. H. C. Yarrow.	.....	.....	.....	.....

QUERQUEDULA DISCORS, Steph.

Blue-winged Teal.

Anas discors, LINN., Syst. Nat., i, 1766, 205.

Querquedula discors, BD., Birds N. A., 1858, 779.—*Id.*, U. S. & Mex. Bound. Surv., ii, pt. ii, 1859, 26.—HENRY, Proc. Acad. Nat. Sci. Phila., 1859, 109 (New Mexico).—HAYD., Trans. Am. Phil. Soc., xii, 1862, 176.—ALLEN, Bul. Mus. Comp. Zoöl., 1872, 183.—COUES, Key N. A. Birds, 1872, 287.—AIKEN, Proc. Bost. Soc. Nat. Hist., xv, 1872, 210 (Colorado).—SNOW, Birds Kau., 1872, 15.—YARROW & HENSHAW, Rep. Orn. Specs., 1872, Wheeler's Exped., 1874, 31.—HENSHAW, Rep. Orn. Specs., 1873, Wheeler's Exped., 1874, 69, 94, 147.—ALLEN, Proc. Bost. Soc. Nat. Hist., June, 1874, 38.—COUES, Birds Northwest, 1874, 566.

LAMELLIROSTRES—ANATIDAE—QUERQUEDULA CYANOPTERA. 477

Pterocyanea discors, WOODH., Sitgreave's Exp. Zuñi & Col. Riv., 1854, 103.—NEWB., P. R. R. Rep., vi, 1857 (California; Oregon; perhaps refers to *Q. cyanoptera*).

Like the preceding species, this teal probably breeds in many localities of Utah, and to the southward, as it certainly does in Colorado. It was present at the same time and place as the preceding, and in about equal numbers. In the fall, immense numbers of this, like the Green-winged Teal, pass through the Central and Southern Regions on their way still farther south. They are by no means exclusively confined to the neighborhood of the lakes and large bodies of water; but wherever they can find sufficient water to float themselves, there they settle down, and are as well contented in the narrow brush lined streams, or some little pool of water a few feet in diameter, as their bigger brethren of the lakes. Dr. H. C. Yarrow speaks of finding immense flocks of these teal in all the bodies of water of Eastern Nevada in August, and here they form no inconsiderable share of the food of the Indians, who have little difficulty in obtaining them by means of their bows and arrows.

No.	Sex.	Locality.	Date.	Collector.	Wing.	Tail.	Bill.	Tarsus.
F 163	♂	Fairfield, Utah	Aug. 3, 1872	Dr. H. C. Yarrow.....	.....	.....	.....	.....
109	♀ ad.	Thistle Valley, Utah ..	Aug. 18, 1872	H. W. Henshaw.....	.....	.....	.....	.....

QUERQUEDULA CYANOPTERA (Vieill.).

Red-breasted Teal.

Anas cyanoptera, VIEILL., Nouv. Dict. d'Hist. Nat., v, 1816, 104.

Querquedula cyanoptera, CASS., U. S. N. Astr. Exp., ii, 1855, 202; Ill., 1855, 82, pl. 15 (Utah; California; Louisiana; Chili).—BD., Birds N. A., 1858, 780 (Rocky Mountains to Pacific) Mex. Bound. Surv., ii, pt. ii, 1859, Birds, 26.—KENNERLY, P. R. R. Rep., Whipple's Route, x, 1859, 35 (Arizona and California).—HEERM., P. R. R. Rep., x, ii, 1859, 69.—XANTUS, Proc. Acad. Nat. Sci. Phila., 1859, 193 (Fort Tejon, Cal.).—HENRY, Proc. Acad. Nat. Sci. Phila., 1859, 109 (New Mexico).—COOP. & SUCKL., P. R. R. Rep., xii, pt. ii, 1860, 254.—COUES, Proc. Acad. Nat. Sci. Phila., 1866, 98 (San Francisco, Colorado River).—*Id.*, *ib.*, 1868, 84.—STEV., U. S. Geol. Surv. Terr., 1870, 466 (Wyoming).—COUES, Key N. A. Birds, 1872, 288.—AIKEN, Proc. Bost. Soc. Nat. Hist., 1872, 210 (Colorado).—ALLEN, Bul. Mus. Comp. Zoöl., 1872, 183.—MERRIAM, U. S. Geol. Surv. Terr., 1872, 703.—YARROW & HENSHAW, Rep. Orn. Specs., 1872, Wheeler's Exped., 1874, 31.—HENSHAW, Rep. Orn. Specs., 1873, Wheeler's Exped., 1874, 69, 94.—COUES, Birds Northwest, 1874, 567.

Pterocyanea rafflesii, BD., Stans. Rep. Exp. Great Salt Lake, 1852, 322.

Pterocyanea cœruleata, WOODH., Sitgreave's Exp. Zuñi & Col. Riv., 1854, 103 (Texas, New Mexico; California).—NEWB., P. R. R. Rep., vi, 1857, 103 (Southern California).

As seen by the above references, the dispersion of this teal in the West is very general; it being found at varying seasons from the Rocky Mountains to the Pacific, and as far north as the Columbia River. In Utah, I learned from good authority that it breeds in great numbers, especially in the marshes of Utah Lake; making its appearance there in spring later than most of the ducks, while its departure south takes place at an earlier period than any other species. None remained at the lake in November. In Southern Colorado, it was breeding in June; though I did not succeed in finding any nests that I could with certainty refer to this species.

SPATULA CLYPEATA (Linn.).

Shoveler.

Anas clypeata, LINN., Syst. Nat., i, 1766, 200.

Spatula clypeata, WOODH., Sitgreave's Exp. Zuñi & Col. Riv., 1854, 104.—BD., Birds N. A., 1858, 781.—*Id.*, U. S. & Mex. Bound. Surv., ii, pt. ii, 1859, 27.—HEERM., P. R. R. Rep., x, pt. iv, 1859, 69.—COOP. & SUCKL., P. R. R. Rep., xii, pt. ii, 1860, 255.—HENRY, Proc. Acad. Nat. Sci. Phila., 1859, 109 (New Mexico).—HAYD., Trans. Am. Phil. Soc., xii, 1862, 176.—COUES, Proc. Acad. Nat. Sci. Phila., 1866, 99.—STEV., U. S. Geol. Surv. Terr., 1870, 466 (Wyoming).—ALLEN, Bul. Mus. Comp. Zoöl., 1872, 183.—COUES, Key N. A. Birds 1872, 288.—SNOW, Birds Kan., 1872, 15.—YARROW & HENSHAW, Rep. Orn. Specs., 1872, Wheeler's Exped., 1874, 31.—HENSHAW, Rep. Orn. Specs., 1873, Wheeler's Exped., 1874, 69, 95, 147.—ALLEN, Proc. Bost. Soc. Nat. Hist., June, 1874, 38.—COUES, Birds Northwest, 1874, 570.

Rhynchaspis clypeata, NEWB., P. R. R. Rep., vi, 1857, 103.

During the migrations, the Shoveler occurs in abundance through the Middle and Southern Regions, frequenting the ponds and lakes; while with the Teal it will often be found in the smallest sloughs, in fact wherever it can find an abundance of the minute insects and crustaceans, which its curious bill, with its net work of fine lamellæ specially adapted for this purpose, enables it to sift out from the water. Many appear to move well to the northward in search of breeding grounds; and Dr. Coues has fixed the fact of its breeding in Dakota by finding the scarcely fledged young on the Mouse River. It was a rather common species in Southern Colorado at the

Alkali Lakes, mentioned before, and presumably was breeding, as the case with the others found there.

No.	Sex.	Locality.	Date.	Collector.	Wing.	Tail.	Bill.	Tarsus.
197	♀	Rush Lake, Utah.....	Sept. 30, 1872	H. W. Henshaw.....	.....	.....	.....	.....
198	♀ ad.	..... do.....	Oct. 2, 1872	H. W. Henshaw and Dr. H. C. Yarrow.	.....	.....	.....	.....

FULIGULA MARILA (Linn.).

Greater Blackhead.

Anas marila, LINN., Syst. Nat., i, 1766, 196.

Fuligula marila, HEERM., P. R. R. Rep., x, pt. iv, 1859, 70.—COUES, Key N. A. Birds, 1872, 289.—YARROW & HENSHAW, Rep. Orn. Specs., 1872, Wheeler's Exped., 1874, 32.—COUES, Birds Northwest, 1874, 573.

Fulix marila, BD., Birds N. A., 1858, 791.—HENRY, Proc. Acad. Nat. Sci. Phila., 1859, 108 (New Mexico).—COOP. & SUCKL., P. R. R. Rep., 1860, 258.—ALLEN, Bul. Mus. Comp. Zool., iii, 1872, 183 (Kansas and Utah).—SNOW, Birds Kan., 1873, 11.

Among the hordes of ducks seen at Utah Lake in November, the presence of this species was recognized, and several were shot. Though not so numerous as certain other species, they were still quite common. They frequented to some extent the waters of the lake, but, when this became partially frozen over, followed the Provo River, and I saw many far up among the rapids and shallows of this stream as it pursued its swift course through the deep and narrow cañons. I did not secure any evidence of the presence at this time of the closely allied species *Fulix affinis*, though if not there then it had been a little earlier, as the gunners distinguish between them, and assured me of its abundance.

FULIGULA COLLARIS (Donov.).

Ring-necked Duck.

Anas collaris, DONOV., Br. Birds, vi, pl. 147 (England).

Fuligula collaris, COUES, Key N. A. Birds, 1872, 289.—*Id.*, Birds Northwest, 1874, 574.

Fulix collaris, BD., Birds N. A., 1858, 792.—*Id.*, U. S. & Mex. Bound. Surv., ii, pt. ii, 1859, Birds, 27.—HENRY, Proc. Acad. Nat. Sci. Phila., 1859, 109 (New Mexico).—YARROW & HENSHAW, Rep. Orn. Specs., 1872, Wheeler's Exped., 1874, 32.—STEV., U. S. Geol. Surv. Terr., 1870, 466.—AIKEN, Proc. Bost., Soc. Nat. Hist., xv, 1872, 210 (Colorado).—SNOW, Birds Kan., 1873, 11.

Single young female taken at Rush Lake in September. Probably migrates south comparatively early in the season.

FULIGULA FERINA (Linn.), var. AMERICANA, (Eyton).

Redhead.

Fuligula americana, EYTON, Monog. Anat., 1838, 155.

Nyroca ferina, WOODH., Sitgreave's Exp. Zuñi & Col. Riv., 1854, 104.

Aythya ferina var. *americana*, ALLEN, Bul. Mus. Comp. Zoöl., iii, 1872, 183 (Great Salt Lake).

Fuligula ferina var. *americana*, COUES, Key N. A. Birds, 1872, 289.—YARROW & HENSHAW, Rep. Orn. Specs., 1872, Wheeler's Exped., 1874, 32.—HENSHAW, Rep. Orn. Specs., 1873, Wheeler's Exped., 1874, 69.—COUES, Birds Northwest, 1874, 575.

Aythya erythrocephala, NEWB., P. R. R. Rep., vi, 1857, 103.

Nyroca erythrocephala, HEERM., P. R. R. Rep., x, pt. ii, 1859, 70.

Aythya americana, BD., P. R. R. Rep., Beckwith's Route, x, 1859, 16.—*Id.*, Birds N. A., 1858, 793.—*Id.*, U. S. & Mex. Bound. Surv., ii, pt. ii, 1859, Birds, 27.—XANTUS, Proc. Acad. Nat. Sci. Phila., 1859, 193 (Fort Tejon, Cal.).—SNOW, Birds Kan., 1872, 15.

We procured a number of the Redheads about Utah Lake, where individuals of the species were not numerous in November. As will be seen by the above quotations, this duck is of very general occurrence through the West, reaching to the Pacific coast, where Newberry gives it as common about San Francisco.

No.	Sex.	Locality.	Date.	Collector.	Wing.	Tail.	Bill.	Tarsus.
203	♂ jun.	Rush Lake, Utah	Oct. 1, 1872	H. W. Henshaw and Dr. H. C. Yarrow.	.....	.....	.....	.....
194	♂ jun.	Utah	Nov. 27, 1872	H. W. Henshaw .....	.....	.....	.....	.....

BUCEPHALA CLANGULA (Linn.).

Golden Eye.

Anas clangula, LINN., Syst. Nat., i, 1766, 201.

Bucephala clangula, COUES, Key N. A. Birds, 1872, 290.—YARROW & HENSHAW, Rep. Orn. Specs., 1872, Wheeler's Exped., 1874, 32.—COUES, Birds Northwest, 1874, 576.

Clangula americana, NEWB., P. R. R. Rep., vi, 1857, 504.

Bucephala americana, BD., P. R. R. Rep., Beckwith's Route, 1859, 16.—*Id.*, Birds N. A., 1858, 796.—COOP. & SUCKL., P. R. R. Rep., xii, pt. ii, 1860, 259.—SNOW, Birds Kan., 1872, 15.

The common Golden Eye visits the neighborhood of Utah Lake in great abundance during the fall, and is, I think, a winter resident. Upon leaving

the lake and ascending the river, this duck began immediately to replace in a great measure the other species, and following the stream up till it was inclosed on either side by the cañon's rocky sides, the Golden Eyes (perhaps both species) were still present in great numbers. They appeared to enjoy especially fishing in the midst of the rapids, and where the current was swiftest, allowing themselves to drift at will, and regaining their lost positions when so minded by flying up stream, their wings just skimming the surface of the water.

No.	Sex.	Locality.	Date.	Collector.	Wing.	Tail.	Bill.	Tarsus.
490	♂ ad.	Utah Lakes, Utah.....	Nov. 2, 1872	H. W. Henshaw and Dr. H. C. Yarrow.	.....	.....	.....	.....
190	♀ jun.	Conejos Cañon, Colo ..	Aug. 30, 1874	C. E. Aiken .....	.....	.....	.....	.....

BUCEPHALA ISLANDICA (Gmel.).

Barrow's Golden Eye.

Anas islandica, GMEL., Syst. Nat., i, 1788, 541.

Bucephala islandica, BD., Birds N. A., 1858, 796.—COUES, Key N. A. Birds, 1872, 290.—
YARROW & HENSHAW, Rep. Orn. Specs., 1872, Wheeler's Exped., 1874, 32.—
COUES, Birds Northwest, 1874, 577.

Barrow's Golden Eye has hitherto been known as a bird of the coast, principally from the Atlantic side, where in winter it reaches to New York. Even, however, on the Massachusetts coast it is rare, though a few find their way into the markets each winter. On the west coast, it is known from Sitka and the Yukon, Alaska. It was first obtained in the interior of the United States by Dr. Hayden; afterward by our party in 1872, and since then it has also been reported as a bird of the Rocky Mountains (lat. 49°) by Dr. Coues. I am inclined to regard it as a species occurring regularly and in considerable numbers on Utah Lake, where our specimens, a pair, were taken, and where the gunners assured us they shot more or less every winter, though they considered it less abundant than the preceding species, from which they distinguished it by its larger size.

No.	Sex.	Locality.	Date.	Collector.	Wing.	Tail.	Bill.	Tarsus.
430	♂ ad.	Provo, Utah.....	Nov. 11, 1872	H. W. Henshaw and Dr. H. C. Yarrow.	.....	.....	.....	.....
483	♀ ad.	..... do	Dec. 1, 1872	..... do .....	.....	.....	.....	.....

BUCEPHALA ALBEOLA (Linn.).

Butterball.

Anas albeola, LINN., Syst. Nat., i, 1766, 199.

Clangula albeola, BD., Stans. Rep. Exp. Great Salt Lake, 1852, 324.—NEWB., P. R. R. Rep., vi, 1857, 104.—HEERM., P. R. R. Rep., x, 1859, pt. iv, 70.

Bucephala albeola, BD., Birds N. A., 1858, 797.—*Id.*, U. S. & Mex. Bound. Surv., ii, pt. ii, 1859, Birds, 27.—KENNERLY, P. R. R. Rep., Whipple's Route, x, 1859, 35.—XANTUS, Proc. Acad. Nat. Sci. Phila., 1859, 193 (Fort Tejon, Cal.).—HENRY, Proc. Acad. Nat. Sci. Phila., 1859, 109 (New Mexico).—COOP. & SUCKL., P. R. R. Rep., xii, pt. ii, 1860, 259.—COUES, Proc. Acad. Nat. Sci. Phila., 1866, 99.—STEV., U. S. Geol. Surv. Terr., 1870, 466 (Wyoming).—AIKEN, Proc. Bost. Soc. Nat. Hist., xv, 1872, 210 (Colorado).—COUES, Key N. A. Birds, 1872, 290.—SNOW, Birds Kan., 1873, 11.—YARROW & HENSHAW, Rep. Orn. Specs., 1872, Wheeler's Exped., 1874, 32.—COUES, Birds Northwest, 1874, 577.

The Butterball occurs, as the above quotations show, in nearly every part of the West. By our parties it has been seen and obtained in various parts of Utah, Colorado, New Mexico, and Arizona. It is usually found not in large flocks, but in small companies, often mingling with other species, and usually feeds among the marsh grasses and sedge along the margins of the lakes and pools. Although in the fall it becomes very plump and fat, as its name implies, it is at all times of rather inferior quality for the table, although in the markets it is usually passed off for, and commands the price of, the more delicate teal. Its flesh is apt to have a very strong fishy flavor.

No.	Sex.	Locality.	Date.	Collector.	Wing.	Tail.	Bill.	Tarsus.
431	♀ jun.	Provo, Utah.....	Nov. 25, 1872	H. W. Henshaw and Dr. H. C. Yarrow.	.....	.....	.....	.....
457	♂ ad.	..... do .....	..... do .....	..... do .....	.....	.....	.....	.....

ERISMATURA RUBIDA (Wils.).

Ruddy Duck.

- Anas rubida*, WILS., Am. Orn., viii, 1814, 128, 130, pl. 71, figs. 5, 6.
Erismatura rubida, BD., Birds N. A., 1858, 811.—*Id.*, U. S. & Mex. Bound. Surv., ii, pt. ii, 1859, Birds, 27.—HEERM., P. R. R. Rep., x, 1859, pt. iv, 70 (California).—XANTUS, Proc. Acad. Nat. Sci. Phila., 1859, 193 (Fort Tejon, Cal.).—HENRY, Proc. Acad. Nat. Sci. Phila., 1859, 109 (New Mexico).—HAYD., Trans. Am. Phil. Soc., xii, 1862, 176.—STEV., U. S. Geol. Surv. Terr., 1870, 466.—ALLEN, Bul. Mus. Comp. Zoöl., 1872, 183 (Great Salt Lake, September).—COUES, Key N. A. Birds, 1872, 583.—SNOW, Birds Kan., 1872, 15.—YARROW & HENSHAW, Rep. Orn. Specs., 1872, Wheeler's Exped., 1874, 32.—HENSHAW, Rep. Orn. Specs., 1873, Wheeler's Exped., 1874, 147.—COUES, Birds Northwest, 1874, 583.
Erismatura "dominica" (err.), HOLD., Proc. Bost. Soc. Nat. Hist., xv, 1872, 210.

This species was present, though in small numbers, at Utah Lake in November. A specimen was also shot at the old crater south of Zuni, N. Mex. It probably occurs throughout the entire Middle and Southern Regions, at least during the migrations.

No.	Sex.	Locality.	Date.	Collector.	Wing.	Tail.	Bill.	Tarsus.
453	♂ jun.	Provo, Utah.....	Nov. 27, 1872	Dr. H. C. Yarrow and H. W. Henshaw.	.....	.....	.....	.....

MERGUS MERGANSER, Linn.

Sheldrake.

- Mergus merganser*, LINN., Syst. Nat., i, 1766, 208.—ALLEN, Bul. Mus. Comp. Zoöl., iii, 1872, 183.—COUES, Key N. A. Birds, 1872, 296.—*Id.*, Birds Northwest, 1874, 583.
Mergus americanus, CASS., Proc. Acad. Nat. Sci. Phila., 1853, 187.—BD., Birds N. A., 1858, 813.—HENRY, Proc. Acad. Nat. Sci. Phila., 1859, 109 (New Mexico).—COOP. & SUCKL., P. R. R. Rep., xii, pt. ii, 1860, 263.—HAYD., Trans. Am. Phil. Soc., xii, 1862, 176.—STEV., U. S. Geol. Surv. Terr., 1870, 466.—SNOW, Birds Kan., 1873, 11.
Mergus merganser var. *americanus*, HENSHAW, An. Lyc. Nat. Hist. N. Y., xi, 1874, 13.

I noticed quite a number of this species on a little stream in Northern New Mexico in November of the past season. It also occurs in Utah.

MERGUS SERRATOR, Linn.

Red-breasted Merganser.

Mergus serrator, LINN., Syst. Nat., i, 1766, 208.—NEWB., P. R. R. Rep., vi, 1857, 104.—BD., Birds N. A., 1858, 14.—HEERM., P. R. R. Rep., x, pt. iv, 1859, 71.—COOP. & SUCKL., P. R. R. Rep., xii, pt. xii, 1860, 264.—COUES, Key N. A. Birds, 1872, 296.—SNOW, Birds Kan., 1873, 11.—YARROW & HENSHAW, Rep. Orn. Specs., 1872, Wheeler's Exped., 1874, 32.—COUES, Birds Northwest, 1874, 584.

Rather common at Utah Lake in November, more so than either of its congeners. Apparently preferred the river to the open lake, doubtless finding in the former the smaller kinds of fish, a fishy diet being especially adapted to its tastes, and as a consequence its flesh is the poorest of all the ducks, being coarse and rank.

MERGUS CUCULLATUS, Linn.

Hooded Merganser.

Mergus cucullatus, LINN., Syst. Nat., i, 1766, 207.—NEWB., P. R. R. Rep., vi, 1857, 105.—HEERM., P. R. R. Rep., x, pt. ii, 1859, 71.—COUES, Key N. A. Birds, 1872, 296.—YARROW & HENSHAW, Rep. Orn. Specs., 1872, Wheeler's Exped., 1874, 32.—COUES, Birds Northwest, 1874, 584.

Lophodytes cucullatus, BD., Birds N. A., 1858, 816.—HENRY, Proc. Acad. Nat. Sci. Phila., 1859, 109 (New Mexico).—COOP. & SUCKL., P. R. R. Rep., xii, pt. ii, 1860, 265.—HAYD., Trans. Am. Phil. Soc., xii, 1862, 176.—STEV., U. S. Geol. Surv. Terr., 1870, 466.—ALLEN, Bul. Mus. Comp. Zoöl., 1872, 183.—SNOW, Birds Kan., 1872, 15.

Of common occurrence on the waters of Utah. Not met with by our parties elsewhere, though in fall its distribution is quite general, as is the case with its congeners.

ORDER STEGANOPODES:

TOTIPALMATE BIRDS.

FAM. PELECANIDÆ: PELICANS.

PELECANUS TRACHYRHYNCHUS, Lath.

American Pelican.

Pelecanus erythrorhynchus, GMEL., Syst. Nat., i, 1788, 571.—BD., Birds N. A., 1858, 868.—*Id.*, U. S. & Mex. Bound. Surv., ii, pt. ii, 1859, Birds, 27.—COOP. & SUCKL., P. R. R. Rep., xii, pt. ii, 1860, 265.—COUES, Proc. Acad. Nat. Sci. Phila., 1866, 100 (Gila and Colorado Rivers).—SNOW, Birds Kan., 1872, 15.—YARROW & HENSHAW, Rep. Orn. Specs., 1872, Wheeler's Exped., 1874, 33.

Pelecanus trachyrhynchus, BD., Stans. Rep. Exp. Great Salt Lake, 1852, 324.—WOODH., Sitgreave's Exp. Zuñi & Col. Riv., 1854, 105.—NEWB., P. R. R. Rep., vi, 1837, 109.—HEERM., P. R. R. Rep., x, pt. ii, 1859, 72.—ALLEN, Bul. Mus. Comp. Zoöl., iii, 1872, 183.—COUES, Key N. A. Birds, 1872, 300.—*Id.*, Birds Northwest, 1874, 586.

Cyrtopelecanus erythrorhynchus, HENRY, Proc. Acad. Nat. Sci. Phila., 1859, 109 (New Mexico).

In Stansbury's report of Great Salt Lake, mention is made of large numbers of these birds being seen in the lake, they breeding in the islands thereof. In July, but few were seen, and we are informed they no longer breed there. These birds were seen at Utah Lake late in July sparingly, and in September on the sloughs of the Sevier.

During the month of September, all leave this section for more southern winter resorts.

ORDER LONGIPENNES:

LONG-WINGED SWIMMERS.

FAM. LARIDAE: GULLS AND TERNs.

LARUS DELAWARENSIS, Ord.

Ring-billed Gull.

Larus delawarensis, ORD, Guthrie's Geog., 2d ed., ii, 1815, 319.—LAWR., Birds N. A., 1858, 846.—BD., U. S. & Mex. Bound. Surv., ii, pt. ii, 1859, Birds, 27.—HENRY, Proc. Acad. Nat. Sci. Phila., 1859, 109 (New Mexico).—COOP. & SUCKL., P. R. R. Rep., xii, pt. ii, 1860, 273.—HAYD., Trans. Am. Phil. Soc., xii, 1862, 176.—COUES, Proc. Acad. Nat. Sci. Phila., 1866, 99 (Colorado River).—ALLEN, Bul. Mus. Comp. Zoöl., iii, 1872, 183.—COUES, Key N. A. Birds, 1872, 313.—YARROW & HENSHAW, Rep. Orn. Specs., 1872, Wheeler's Exped., 1874, 33.—COUES, Birds Northwest, 1874, 636.

This gull is common on the larger bodies of water throughout Utah. Numbers were seen on the Provo River late in November, when the lake was frozen over. They are without doubt winter residents here. Mr. Allen speaks of it as abundant about Salt Lake, where it breeds on the islands.

No.	Sex.	Locality.	Date.	Collector.	Wing.	Tail.	Bill.	Tarsus.
467	♀	Provo, Utah	Nov. 30, 1872	Dr. H. C. Yarrow and H. W. Henshaw.	.....	.....	.....	.....

STERNA FORSTERI, Nutt.

Havell's Tern.

Sterna forsteri, NUTT., Man., ii, 1834, 274 (foot-note; based on *S. hirundo*, SWAINS. & RICH.).—LAWR., Birds N. A., 1828, 862.—COUES, Proc. Acad. Nat. Sci. Phila., 1866, 99 (Arizona).—*Id.*, Key N. A. Birds, 1872, 321.—SNOW, Birds Kan., 1872, 16.—YARROW & HENSHAW, Rep. Orn. Specs., 1872, Wheeler's Exped., 1874, 33.—COUES, Birds Northwest, 1874, 676.

This tern was quite common at Utah Lake in the summer, where it breeds along the shores. This is the only locality from which it has been reported by our parties; yet, as is well known, its distribution in the Interior Region is general, and its presence is to be expected on all the lakes and large streams in summer.

No.	Sex.	Locality.	Date.	Collector.	Wing.	Tail.	Bill.	Tarsus.
12	♀ ad.	Utah Lake, Utah.....	July 24, 1872	Dr. H. C. Yarrow and H. W. Henshaw.	.....	.....	.....	.....
13	♀ ad.	..... do .....	..... do .....	..... do .....	.....	.....	.....	.....
14	♂ ad.	..... do .....	..... do .....	..... do .....	.....	.....	.....	.....
15	♂ ad.	..... do .....	..... do .....	..... do .....	.....	.....	.....	.....
16	♂ ad.	..... do .....	..... do .....	..... do .....	.....	.....	.....	.....
17	♂ ad.	..... do .....	..... do .....	..... do .....	.....	.....	.....	.....
18	♀ ad.	..... do .....	..... do .....	..... do .....	.....	.....	.....	.....
19	♀ ad.	..... do .....	..... do .....	..... do .....	.....	.....	.....	.....

STERNA HIRUNDO, Linn.

Common Tern.

Sterna hirundo, LINN., Syst. Nat., i, 1766, 227.—HEERM., P. R. R. Rep., x, pt. ii, 1859, 73.—COUES, Key N. A. Birds, 1872, 320.—*Id.*, Check-List, No. 565.—HENSHAW, Rep. Orn. Specs., 1873, Wheeler's Exped., 1874, 147.—COUES, Birds Northwest, 1874, 680.

Sterna wilsoni, LAWR., Birds N. A., 1858, 861.—HENRY, Proc. Acad. Nat. Sci. Phila., 1859, 109 (Rio Grande, New Mexico).—SNOW, Birds Kan., 1872, 12 (Kansas, rare).

A single specimen was shot on the San Pedro River, Arizona, in September. The river at this point was but a small stream, perhaps twenty feet across, and the bird was flying slowly up this, closely scanning the water for fish.

Given in Dr. Henry's list of New Mexican Birds as common on the Rio Grande.

No.	Sex.	Locality.	Date.	Collector.	Wing.	Tail.	Bill.	Tarsus.
897	♀ jun.	San Pedro River, Ariz.	Sept. 3, 1872	H. W. Henshaw	9. 75	4. 83	1. 10	0. 70

HYDROCHELIDON LARIFORMIS (Linn.).

Black Tern.

Rallus lariformis, LINN., Syst. Nat., i, 10th ed., 1758, 153.

Hydrochelidon lariformis, COUES, Birds Northwest, 1874, 704.

Hydrochelidon plumbea, LAWR., Birds N. A., 1858, 864.—HAYD., Trans. Am. Phil. Soc., xii, 1862, 176.—SNOW, Birds Kan., 1872, 12.

Sterna nigra, HEERM., P. R. R. Rep., x, pt. ii, 1859, 73.—AIKEN, Proc. Bost. Soc. Nat. Hist., xv, 1872, 210 (Colorado).

Hydrochelidon fissipes, COUES, Proc. Acad. Nat. Sci. Phila., 1866, 99 (Colorado River).—ALLEN, Bul. Mus. Comp. Zoöl., iii, 1872, 183 (Eastern Kansas, May).—YARROW & HENSHAW, Rep. Orn. Specs., 1872, Wheeler's Exped., 1874, 33.

This species was present on Utah Lake in July, two individuals being seen. In Arizona, I noticed quite a number of these terns on a marsh at Sulphur Spring. They were flying in a very erratic way over the grasses, now keeping a few feet above the tops, now dropping suddenly down and picking off from the stems the insects, and especially the grasshoppers their sharp eyes had detected. There were several pools of water in the vicinity, which, however, they rarely visited, apparently finding in the manner described a sufficiency of food, which, as the dissection of several showed, consisted entirely of grasshoppers and insects.

ORDER PYGOPODES: DIVING BIRDS.

FAM. COLYMBIDAE: LOONS.

COLYMBUS TORQUATUS, Brunn.

Great Northern Diver.

Colymbus torquatus, BRUNN., Orn. Bor., 1764, No. 134.—XANTUS, Proc. Acad. Nat. Sci. Phila., 1859, 193 (Fort Tejon, Cal.).—LAWR., Birds N. A., 1858, 888.—HENRY, Proc. Acad. Nat. Sci. Phila., 1859, 109 (New Mexico).—COOP. & SUCKL., P. R. R. Rep., xii, pt. ii, 1860, 278.—COUES, Proc. Acad. Nat. Sci. Phila., 1866, 100.—SNOW, Birds Kan., 1872, 16.—COUES, Key N. A. Birds, 1872, 334.—YARROW & HENSHAW, Rep. Orn. Specs., 1872, Wheeler's Exped., 1874, 33.—COUES, Birds Northwest, 1874, 719.

Colymbus glacialis, BD., Stans. Rep. Exp. Great Salt Lake, 1852, 324.—HEERM., P. R. R. Rep., x, pt. iv, 1859, 76.

This diver was said by the fishermen of Utah Lake to be rather common, remaining in their waters till quite late in the fall.

FAM. PODICIPIDAE: GREBES.

PODICEPS OCCIDENTALIS, Lawr.

Western Grebe.

Podiceps occidentalis, LAWR., Birds N. A., 1858, 894.—NEWB., P. R. R. Rep., vi, 1857, 110.—COOP. & SUCKL., P. R. R. Rep., xii, pt. ii, 1860, 281, pl. xxxviii.—COUES, Key N. A. Birds, 1872, 336.—YARROW, Rep. Orn. Specs., 1871, Wheeler's Exped., 1874, 31.—YARROW & HENSHAW, Rep. Orn. Specs., 1872, Wheeler's Exped., 1874, 33.

Podiceps (*Aechmophorus*) *occidentalis*, COUES, Birds Northwest, 1874, 727.

This grebe is peculiar to the region west of the Rocky Mountains; its eastern limit, so far as known, being the waters of Utah. It is a common species of Utah Lake in summer, perhaps the most so of the family, and breeds here. In fall, its numbers are increased by arrivals from the north, and then three or four may often be seen in company disporting on the surface of the water or diving in pursuit of their finny prey. They are less timid than others of their family, and very little difficulty is experienced in approaching sufficiently near to kill them with the shot gun. We were told by the fishermen, that, when drawing their seines, these birds often swam up to the edges of the net in close proximity to the boats, and several times they had been so intent on their own fishing, finding their prey in such unusual abundance, that they had allowed the net to fairly inclose them, and in attempting to escape to the open water by diving had become entangled in the meshes, and, unable to extricate themselves, had been taken by the hands. A single individual was shot in the Gila River, New Mexico, in November, at a point where the river was not more than twenty-five feet wide and but a few feet deep.

No.	Sex.	Locality.	Date.	Collector.	Wing.	Tail.	Bill.	Tarsus.
....	♂ jun.	Nevada	Sept. 12, 1871	F. Bischoff .....	.....	.....	.....	.....
31	Ad.	Utah Lake, Utah.....	July 24, 1872	H. W. Henshaw and Dr. H. C. Yarrow.	.....	.....	.....	.....

PODICEPS CORNUTUS, Lath.

Horned Grebe.

Podiceps cornutus, LATH., Ind. Orn., ii, 1790, 783.—LAWR., Birds N. A., 1858, 895.—COOP. & SUCKL., P. R. R. Rep., xii, pt. ii, 1860, 281.—COUES, Proc. Acad. Nat. Sci. Phila., 1866, 101 (Arizona).—*Id.*, Key N. A. Birds, 1872, 337.—SNOW, Birds Kan., 1872, 16.—YARROW & HENSHAW, Rep. Orn. Specs., 1872, Wheeler's Exped., 1874, 33.—COUES, Birds Northwest, 1874, 731.

This grebe was present on Rush Lake, Utah, in September, but not apparently very numerous. Its distribution is very general; and, though probably the greater number retire farther north in summer to find breeding places, I think more or less remain at this season in Utah.

PODICEPS AURITUS (Linn.), var. CALIFORNICUS, (Heerm).

Eared Grebe.

Podiceps californicus, HEERM., Proc. Acad. Nat. Sci. Phila., 1854, 179.—*Id.*, P. R. R. Rep., x, 1859, 76, pl. 8 (young).—NEWB., P. R. R. Rep., vi, 1857, 110.—LAWR., Birds N. A., 1858, 896.—COOP. & SUCKL., P. R. R. Rep., xii, pt. ii, 1860, 282.—HAYD., Trans. Am. Phil. Soc., 1862, 176.—STEV., U. S. Geol. Surv. Terr., 1870, 466 (North Platte).
Podiceps (Proctopus) californicus, COUES, Proc. Acad. Nat. Sci. Phila., 1866, 100 (Arizona).
Podiceps auritus var. *californicus*, COUES, Key N. A. Birds, 1872, 337.—*Id.*, Am. Nat., vii, 1873, 745 (Dakota).—HENSHAW, Am. Nat., viii, 1874, 243.—SNOW, Am. Nat., 757 (Kansas).—ALLEN, Proc. Bost. Soc. Nat. Hist., June, 1874, 38.—COUES, Birds Northwest, 1874, 733.

The Eared Grebe was found quite numerous in the vicinity of Denver in May, as late as the 15th. They were seen occasionally in the river, but resorted mostly to certain small ponds, which were not, however, at all adapted to meet the necessities of a breeding ground, and I am inclined to think that those seen here were still migrating. Later, June 23, the species was found breeding in the alkali ponds of Southern Colorado, mentioned heretofore. I noticed the birds in several of the ponds, and presume in each case a small colony had established themselves therein. In the only instance I was able to inspect their domestic arrangement, a community of perhaps a dozen pairs had selected a bed of reeds in the middle of the pond, isolated from the land by a considerable interval of water.

The nests were slightly hollowed piles of decaying weeds and rushes just raised above the surface of the water, upon which they floated. Each nest contained three eggs, most of them being fresh, but a few were somewhat advanced. As in every case the eggs were entirely covered by a pile of vegetable material, and as in no case the birds were found incubating, even where the eggs contained slight embryos, it seems highly probable that their hatching is dependent more or less upon artificial heat, which must be induced by the effect of the hot sun.

The eggs vary little in shape, are considerably elongated, one end being slightly more pointed than the other. They vary in length from 1.70 to 1.80; in breadth, 1.18 to 1.33. Color a faint yellowish-white, usually much stained by contact with the nest. The texture is generally quite smooth; in others roughened by a chalky deposit.

No.	Sex.	Locality.	Date.	Collector.	Wing.	Tail.	Bill.	Tarsus.
414	♂ ad.	Alkali Lakes, Colo	June 23, 1873	H. W. Henshaw.....	5.33	.....	1.02	1.52

PODILYMBUS PODICEPS, Linn.

Carolina Grebe.

Colymbus podiceps, LINN., Syst. Nat., i, 1766, 223.

Podilymbus podiceps, LAWRE., Birds N. A., 1858, 898.—COOP. & SUCKL., P. R. R. Rep., xii., pt. ii, 1860, 283.—COUES, Proc. Acad. Nat. Sci. Phila., 1866, 101 (Colorado River).—ALLEN, Bul. Mus. Comp. Zool., iii, 1872, 183.—SNOW, Birds Kan., 1872, 16.—YARROW & HENSHAW, Rep. Orn. Specs., 1872, Wheeler's Exped., 1874, 33.

Podilymbus carolinensis, WOODH., Sitgreave's Exp. Zuñi & Col. Riv., 1854, 104.

Podilymbus lineatus, HEERM., P. R. R. Rep., x, pt. ii, 1859, 77, pl. ix.

Quite numerous at Rush Lake in September, where they swam about in small parties of five or six, generally when feeding keeping in the shallow water close to shore, and diving among the weeds.

LIST OF SPECIES ENUMERATED.

TURDIDÆ.

1. *Turdus migratorius*.
2. *Turdus pallasi* var. *auduboni*.
3. *Turdus pallasi* var. *nanus*.
4. *Turdus swainsoni*.
5. *Turdus fuscescens*.
6. *Oreoscoptes montanus*.
7. *Mimus polyglottus*.
8. *Galeoscoptes carolinensis*.
9. *Harporhynchus rufus*.
10. *Harporhynchus cinereus* var. *bendirei*.
11. *Harporhynchus curvirostris* var. *palmeri*.
12. *Harporhynchus crissalis*.

CINCLIDÆ.

13. *Cinclus mexicanus*.

SAXICOLIDÆ.

14. *Sialia mexicana*.
15. *Sialia arctica*.

SYLVIIDÆ.

16. *Regulus calendula*.
17. *Polioptila cærulea*.

PARIDÆ.

18. *Lophophanes inornatus*.
19. *Lophophanes wollweberi*.
20. *Parus montanus*.
21. *Parus atricapillus* var. *septentrionalis*.
22. *Psaltriparus minimus* var. *plumbeus*.
23. *Auriparus flaviceps*.

SITTIDÆ.

24. *Sitta carolinensis* var. *aculeata*.
25. *Sitta canadensis*.
26. *Sitta pygmæa*.

CERTHIIDÆ.

27. *Certhia familiaris* var. *americana*.

TROGLODYTIDÆ.

28. *Campylorhynchus brunneicapillus*.
29. *Salpinctes obsoletus*.
30. *Catherpes mexicanus* var. *conspersus*.
31. *Thryothorus bewicki* var. *leucogaster*.
32. *Troglodytes ædon* var. *parkmanni*.
33. *Cistothorus stellaris*.
34. *Cistothorus palustris* var. *paludicola*.

MOTACILLIDÆ.

35. *Anthus ludovicianus*.

SYLVICOLIDÆ.

36. *Helminthophaga ruficapilla*.
37. *Helminthophaga virginia*.
38. *Helminthophaga lucia*.
39. *Helminthophaga celata*.
40. *Dendroica æstiva*.
41. *Dendroica coronata*.
42. *Dendroica auduboni*.
43. *Dendroica maculosa*.
44. *Dendroica cærulea*.
45. *Dendroica gracia*.
46. *Dendroica striata*.
47. *Dendroica nigrescens*.
48. *Dendroica townsendi*.
49. *Dendroica occidentalis*.
50. *Peucedramus olivaceus*.
51. *Seiurus noveboracensis*.
52. *Geothlypis trichas*.
53. *Geothlypis macgillivrayi*.
54. *Icteria virens* var. *longicauda*.
55. *Myiodiotes pusillus*.
56. *Setophaga ruticilla*.
57. *Setophaga picta*.
58. *Cardellina rubrifrons*.

HIRUNDINIDÆ.

59. *Progne subis*.
60. *Petrochelidon lunifrons*.
61. *Hirundo horreorum*.
62. *Tachycineta bicolor*.
63. *Tachycineta thalassina*.
64. *Stelgidopteryx serripennis*.
65. *Cotyle riparia*.

VIREONIDÆ.

- 66. *Vireo gilvus* var. *swainsoni*.
- 67. *Vireo solitarius*.
- 68. *Vireo solitarius* var. (?) *cassini*.
- 69. *Vireo solitarius* var. *plumbeus*.
- 70. *Vireo belli*.
- 71. *Vireo pusillus*.
- 72. *Vireo vicinior*.

AMPELIDÆ.

- 73. *Ampelis cedrorum*.
- 74. *Phænopepla nitens*.
- 75. *Myiadestes townsendi*.

LANIIDÆ.

- 76. *Collurio borealis*.
- 77. *Collurio ludovicianus* var. *excubitoroides*.

TANAGRIDÆ.

- 78. *Pyranga ludoviciana*.
- 79. *Pyranga hepatica*.
- 80. *Pyranga æstiva* var. *cooperi*.

FRINGILLIDÆ.

- 81. *Hesperiphona vespertina*.
- 82. *Carpodacus frontalis*.
- 83. *Carpodacus cassini*.
- 84. *Chrysomitris tristis*.
- 85. *Chrysomitris psaltria*.
- 86. *Chrysomitris psaltria* var. *arizonæ*.
- 87. *Chrysomitris pinus*.
- 88. *Loxia curvirostra* var. *americana*.
- 89. *Loxia curvirostra* var. *mexicana*.
- 90. *Leucosticte australis*.
- 91. *Plectrophanes ornatus*.
- 92. *Plectrophanes maccowni*.
- 93. *Centronyx bairdi*.
- 94. *Passerculus savanna* var. *alaudinus*.
- 95. *Poocœtes gramineus* var. *confinis*.
- 96. *Coturniculus passerinus* var. *perpallidus*.
- 97. *Chondestes grammaca*.
- 98. *Zonotrichia leucophrys*.
- 99. *Zonotrichia leucophrys* var. *intermedia*.
- 100. *Junco hyemalis*.
- 101. *Junco hyemalis* var. *aikeni*.
- 102. *Junco oregonus*.

103. *Junco oregonus* var. *annectens*.
104. *Junco cinereus*.
105. *Junco cinereus* var. *caniceps*.
106. *Junco cinereus* var. *dorsalis*.
107. *Poospiza bilineata*.
108. *Poospiza belli* var. *nevadensis*.
109. *Spizella monticola*.
110. *Spizella socialis* var. *arizonæ*.
111. *Spizella pallida*.
112. *Spizella pallida* var. *breweri*.
113. *Melospiza melodia* var. *fallax*.
114. *Melospiza melodia* var. *heermanni*.
115. *Melospiza lincolni*.
116. *Melospiza palustris*.
117. *Peucæa cassini*.
118. *Peucæa ruficeps* var. *boucardi*.
119. *Peucæa carpalis*.
120. *Passerella townsendi* var. *schistacea*.
121. *Calamospiza bicolor*.
122. *Euspiza americana*.
123. *Hedymeles melanocephalus*.
124. *Guiraca cærulea*.
125. *Cyanospiza amœna*.
126. *Cyanospiza ciris*.
127. *Pyrrhuloxia sinuata*.
128. *Cardinalis virginianus* var. *igneus*.
129. *Pipilo maculatus* var. *megalonyx*.
130. *Pipilo fuscus* var. *mesoleucus*.
131. *Pipilo aberti*.
132. *Pipilo chlorurus*.

ALAUDIDÆ.

133. *Eremophila alpestris* var. *chrysolæma*.

ICTERIDÆ.

134. *Dolichonyx oryzivorus*.
135. *Molothrus pecoris*.
136. *Agelaius phœniceus*.
137. *Xanthocephalus icterocephalus*.
138. *Sturnella magna* var. *neglecta*.
139. *Icterus parisorum*.
140. *Icterus cucullatus*.
141. *Icterus bullocki*.
142. *Scolecophagus cyanocephalus*.
143. *Quiscalus purpureus* var. *æneus*.

CORVIDÆ.

- 144. *Corvus corax* var. *carnivorus*.
- 145. *Corvus cryptoleucus*.
- 146. *Corvus americanus*.
- 147. *Picicorvus columbianus*.
- 148. *Gymnokitta cyanocephala*.
- 149. *Pica melanoleuca* var. *hudsonica*.
- 150. *Cyanurus stelleri* var. *macrolopha*.
- 151. *Cyanocitta floridana* var. *woodhousei*.
- 152. *Cyanocitta ultramarina* var. *arizonæ*.
- 153. *Perisoreus canadensis* var. *capitalis*.

TYRANNIDÆ.

- 154. *Tyrannus carolinensis*.
- 155. *Tyrannus verticalis*.
- 156. *Tyrannus vociferans*.
- 157. *Myiarchus crinitus* var. *cinerascens*.
- 158. *Myiodynastes luteiventris*.
- 159. *Sayornis nigricans*.
- 160. *Sayornis sayus*.
- 161. *Contopus borealis*.
- 162. *Contopus pertinax*.
- 163. *Contopus virens* var. *richardsoni*.
- 164. *Empidonax trailli* var. *pusillus*.
- 165. *Empidonax minimus*.
- 166. *Empidonax flaviventris* var. *difficilis*.
- 167. *Empidonax obscurus*.
- 168. *Empidonax hammondi*.
- 169. *Mitrephorus fulvifrons* var. *pallascens*.
- 170. *Pyrocephalus rubineus* var. *mexicanus*.

ALCEDINIDÆ.

- 171. *Ceryle alcyon*.

CAPRIMULGIDÆ.

- 172. *Chordeiles popetue* var. *henryi*.
- 173. *Chordeiles acutipennis* var. *texensis*.
- 174. *Antrostomus nuttalli*.

CYPSELIDÆ.

- 175. *Panyptila saxatilis*.

TROCHILIDÆ.

- 176. *Stellula calliope*.
- 177. *Trochilus alexandri*.
- 178. *Calypte anna*.

- 179. *Selasphorus rufus*.
- 180. *Selasphorus platycercus*.
- 181. *Eugenes fulgens*.
- 182. *Circe latirostris*.
- 183. *Doricha enicura*.

CUCULIDÆ.

- 184. *Geococcyx californianus*.
- 185. *Coccygus americanus*.

PICIDÆ.

- 186. *Picus villosus* var. *harrisi*.
- 187. *Picus pubescens* var. *gairdneri*.
- 188. *Picus scalaris*.
- 189. *Picus stricklandi*.
- 190. *Picoides americanus* var. *dorsalis*.
- 191. *Sphyrapicus varius* var. *nuchalis*.
- 192. *Sphyrapicus thyroideus*.
- 193. *Centurus uropygialis*.
- 194. *Melanerpes torquatus*.
- 195. *Melanerpes erythrocephalus*.
- 196. *Melanerpes formicivorus*.
- 197. *Colaptes mexicanus*.

STRIGIDÆ.

- 198. *Otus vulgaris* var. *wilsonianus*.
- 199. *Otus* (*Brachyotus*) *brachyotus*.
- 200. *Scops asio* var. *maccalli*.
- 201. *Scops flammeola*.
- 202. *Bubo virginianus* var. *arcticus*.
- 203. *Glaucidium passerinum* var. *californicum*.
- 204. *Speotyto cunicularia* var. *hypugæa*.

FALCONIDÆ.

- 205. *Falco lanarius* var. *polyagrus*.
- 206. *Falco communis* var. *anatum*.
- 207. *Falco columbarius*.
- 208. *Falco femoralis*.
- 209. *Falco sparverius*.
- 210. *Pandion haliaëtus* var. *carolinensis*.
- 211. *Circus cyaneus* var. *hudsonius*.
- 212. *Nisus fuscus*.
- 213. *Nisus cooperi*.
- 214. *Asturina nitida* var. *plagiata*.
- 215. *Urubitinga anthracina*.
- 216. *Buteo swainsoni*.

- 217. *Buteo borealis* var. *calurus*.
- 218. *Archibuteo ferrugineus*.
- 219. *Archibuteo lagopus* var. *sanctijohannis*.
- 220. *Aquila chrysaetos* var. *canadensis*.
- 221. *Haliaeetus leucocephalus*.

CATHARTIDÆ.

- 222. *Pseudogryphus californianus*.
- 223. *Rhinogryphus aura*.

COLUMBIDÆ.

- 224. *Columba fasciata*.
- 225. *Melopelia leucoptera*.
- 226. *Zenaidura carolinensis*.
- 227. *Chamæpelis passerina*.

MELEAGRIDÆ.

- 228. *Meleagris gallopavo*.

TETRAONIDÆ.

- 229. *Canace obscura*.
- 230. *Centrocercus urophasianus*.
- 231. *Lagopus leucurus*.

PERDICIDÆ.

- 232. *Ortyx virginianus*.
- 233. *Lophortyx gambeli*.
- 234. *Callipepla squamata*.
- 235. *Cyrtonyx massena*.

CHARADRIIDÆ.

- 236. *Ægialitis vocifera*.
- 237. *Ægialitis montana*.

RECURVIROSTRIDÆ.

- 238. *Recurvirostra americana*.
- 239. *Himantopus nigricollis*.

PHALAROPODIDÆ.

- 240. *Steganopus wilsoni*.

SCOLOPACIDÆ.

- 241. *Gallinago wilsoni*.
- 242. *Macrorhamphus griseus*.
- 243. *Ereunetes pusillus*.
- 244. *Actodromas minutilla*.

- 245. *Actodromas bairdi*.
- 246. *Limosa fedoa*.
- 247. *Totanus semipalmatus*.
- 248. *Totanus melanoleucus*.
- 249. *Totanus flavipes*.
- 250. *Totanus solitarius*.
- 251. *Tringoides macularius*.
- 252. *Actiturus bartramius*.
- 253. *Numenius longirostris*.

TANTALIDÆ.

- 254. *Tantalus loculator*.
- 255. *Ibis guarauna*.

ARDEIDÆ.

- 256. *Ardea herodias*.
- 257. *Herodias egretta*.
- 258. *Butorides virescens*.
- 259. *Nyctiardea grisea* var. *nævia*.
- 260. *Botaurus minor*.

GRUIDÆ.

- 261. *Grus canadensis*.

RALLIDÆ.

- 262. *Rallus virginianus*.
- 263. *Porzana carolina*.
- 264. *Fulica americana*.

ANATIDÆ.

- 265. *Anser hyperboreus*.
- 266. *Branta canadensis*.
- 267. *Branta bernicla* var. *nigricans*.
- 268. *Anas boschas*.
- 269. *Anas obscura*.
- 270. *Dafila acuta*.
- 271. *Chaulelasmus streperus*.
- 272. *Mareca americana*.
- 273. *Querquedula carolinensis*.
- 274. *Querquedula discors*.
- 275. *Querquedula cyanoptera*.
- 276. *Spatula clypeata*.
- 277. *Fuligula marila*.
- 278. *Fuligula collaris*.
- 279. *Aythya ferina* var. *americana*.
- 280. *Bucephala clangula*.
- 281. *Bucephala islandica*.

- 282. *Bucephala albeola*.
- 283. *Erismatura rubida*.
- 284. *Mergus merganser*.
- 285. *Mergus serrator*.
- 286. *Mergus cucullatus*.

PELECANIDÆ.

- 287. *Pelecanus trachyrhynchus*.

LARIDÆ.

- 288. *Larus delawarensis*.
- 289. *Sterna forsteri*.
- 290. *Sterna hirundo*.
- 291. *Hydrochelidon lariformis*.

COLYMBIDÆ.

- 292. *Colymbus torquatus*.

PODICIPIDÆ.

- 293. *Podiceps occidentalis*.
- 294. *Podiceps cornutus*.
- 295. *Podiceps auritus* var. *californicus*.
- 296. *Podilymbus podiceps*.

LIST OF ALCOHOLIC SPECIMENS OF BIRDS.

No.	Name.	Locality.	Date.	Collector.
TURDIDÆ.				
A 1	<i>Turdus migratorius</i>	Utah	— —, 1872	H. W. Henshaw and Dr. H. C. Yarrow.
A 2	<i>Oreoscoptes montanus</i>	do	do	Do.
PARIDÆ.				
A 3	<i>Parus montanus</i>	Utah	— —, 1872	H. W. Henshaw and Dr. H. C. Yarrow.
A 4	do	do	do	Do.
A 5	<i>Psaltiriparus minimus</i>	do	do	Do.
A 6	do	do	do	Do.
1412	<i>Lophophanes inornatus</i>	Santa Fé, N. Mex	June —, 1873	H. W. Henshaw.
CERTHIIDÆ.				
.....	<i>Certhia familiaris</i> var. <i>americana</i> ..	Mount Graham, Ariz ..	Aug. —, 1873	H. W. Henshaw.
TROGLODYTIDÆ.				
1374	<i>Campylorynchus brunneicapillus</i> ..	Camp Lowell, Ariz ...	Sept. —, 1874	H. W. Henshaw.
A 8	<i>Salpinctes obsoletus</i>	Utah	— —, 1872	H. W. Henshaw and Dr. H. C. Yarrow.
1344	<i>Thryothorus bewicki</i> var. <i>leucogaster</i> .	Arizona	Oct. —, 1874	H. W. Henshaw.
MOTACILLIDÆ.				
A 9	<i>Anthus ludovicianus</i>	Utah	— —, 1872	H. W. Henshaw and Dr. H. C. Yarrow.
SYLVICOLIDÆ.				
A 10	<i>Dendroica æstiva</i>	Utah	— —, 1873	H. W. Henshaw and Dr. H. C. Yarrow.
A 11	do	do	do	Do.
A 12	<i>Geothlypis trichas</i>	do	do	Do.
A 13	<i>Geothlypis philadelphia</i> var. <i>macgillivrayi</i> .	do	do	Do.
HIRUNDINIDÆ.				
1390	<i>Progne subis</i>	Camp Apache, Ariz ...	July —, 1874	H. W. Henshaw.
1413	<i>Hirundo horreorum</i>	San Ildefonso, N. Mex.	Aug. —, 1874	Dr. H. C. Yarrow.
1414	do	do	do	Do.
1395	<i>Stelgidopteryx serripennis</i>	Arizona	do	H. W. Henshaw.
A 14	do	Utah	— —, 1872	H. W. Henshaw and Dr. H. C. Yarrow.

LIST OF ALCOHOLIC SPECIMENS.

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List of alcoholic specimens of birds—Continued.

No.	Name.	Locality.	Date.	Collector.
	VIREONIDÆ.			
596	Vireo gilvus var. swainsoni	Fort Garland, Colo....	— —, 1873	H. W. Henshaw.
	LANIIDÆ.			
A 15	Collurio ludovicianus var. excubitoroides.	Utah	— —, 1872	H. W. Henshaw and Dr. H. C. Yarrow.
	TANAGRIDÆ.			
1371	Pyranga æstiva var cooperi	Camp Lowell, Ariz....	Sept. —, 1874	H. W. Henshaw.
1372	Pyranga hepatica	Camp Bowie, Ariz	do	J. M. Rutter.
	FRINGILLIDÆ.			
A 20	Carpodacus frontalis	Utah	— —, 1872	H. W. Henshaw and Dr. H. C. Yarrow.
1366	do	Taos, N. Mex	Aug. —, 1874	Dr. H. C. Yarrow.
A 16	Chrysomitris tristis	Utah	— —, 1872	H. W. Henshaw and Dr. H. C. Yarrow.
A 17	do	do	do	Do.
A 18	do	do	do	Do.
A 19	do	do	do	Do.
B 8	Poœcetes gramineus var. confinis	do	do	Dr. H. C. Yarrow and H. W. Henshaw.
1342	Zonotrichia leucophrys var. intermedia.	Camp Apache, Ariz....	Oct. —, 1874	H. W. Henshaw.
B 6	do	Utah	— —, 1872	Do.
B 7	do	do	do	Do.
B	do	Colorado	— —, 1873	H. W. Henshaw.
B 4	Spizella monticola	Utah	— —, 1872	Do.
B 2	Spizella pallida var. breweri	do	do	Do.
B 3	do	do	do	Do.
1368	do	San Ildefonso, N. Mex.	Aug. —, 1874	Dr. H. C. Yarrow.
1406	do	Santa Fé, N. Mex.	June —, 1874	Dr. J. T. Rothrock.
B 5	Melospiza melodia var. fallax	Utah	— —, 1872	Dr. H. C. Yarrow and H. W. Henshaw.
A 20	Cyanospiza amcena	do	do	Do.
B 9	Pipilo megalonyx	do	do	Do.
B 10	do	do	do	Do.
	ALAUDIDÆ.			
B 11	Eremophila alpestris	Utah	— —, 1872	Dr. H. C. Yarrow and H. W. Henshaw.
	ICTERIDÆ.			
B 12	Sturnella magna var. neglecta	Utah	— —, 1872	Dr. H. C. Yarrow and H. W. Henshaw.
B 13	do	do	do	Do.
B 14	Dolichonyx oryzivorus	do	do	Do.

List of alcoholic specimens of birds—Continued.

No.	Name.	Locality.	Date.	Collector.
ICTERIDÆ—Continued.				
B 15	Xanthocephalus icterocephalus .....	.....	.....	Dr. H. C. Yarrow and H. W. Henshaw.
1365	..... do	Colorado	— —, 1874	Dr. H. C. Yarrow.
B 16	Scolecophagus cyanocephalus	Utah	— —, 1872	Dr. H. C. Yarrow and H. W. Henshaw.
CORVIDÆ.				
B P	Picicorvus columbianus	Rio Grande, Colo	June —, 1873	H. W. Henshaw.
B R	..... do .....	..... do .....	..... do	Do.
TYRANNIDÆ.				
B 17	Tyrannus verticalis	(?)	(?)	(?)
1369	Contopus virens var. richardsoni	Tierra Amarilla, N. Mex	Sept. —, 1874	Dr. H. C. Yarrow.
1370	..... do .....	..... do .....	..... do	Do.
B 18	Empidonax pusillus	Utah	— —, 1871	Dr. H. C. Yarrow and H. W. Henshaw.
ALCEDINIDÆ.				
B 19	Ceryle alcyon	Utah	— —, 1871	Dr. H. C. Yarrow and H. W. Henshaw.
CYPSELIDÆ.				
1402	Panyptila melanoleuca	San Ildefonso, N. Mex.	Aug. —, 1874	Dr. H. C. Yarrow.
TROCHILIDÆ.				
1415	Selasphorus rufa	San Ildefonso, N. Mex.	Aug. —, 1874	Dr. H. C. Yarrow.
1416	..... do .....	..... do .....	..... do	Do.
1417	..... do	Tierra Amarilla, N. Mex	Sept. —, 1874	Do.
1418	..... do .....	..... do .....	..... do	Do.
1419	..... do	Southern Arizona	Aug. —, 1874	H. W. Henshaw.
1420	..... do .....	..... do .....	..... do	Do.
1421	..... do .....	..... do .....	..... do	Do.
B B	..... do (15 specimens)	Camp Apache, Ariz	July —, 1873	Do.
1426	Selasphorus platycercus	Taos, N. Mex	Aug. —, 1874	Dr. H. C. Yarrow.
1427	..... do .....	..... do .....	..... do	Do.
1428	..... do	Arizona .....	..... do	Dr. J. T. Rothrock.
1429	..... do .....	..... do .....	..... do	Do.
R R	..... do (6 specimens)	Camp Apache, Ariz	Aug. 10, 1873	H. W. Henshaw.
1422	Trochilus alexandri	Southern Arizona	Aug. —, 1874	Dr. J. T. Rothrock.
1423	..... do .....	..... do .....	..... do	Do.
1424	..... do .....	..... do .....	..... do	Do.
1425	..... do .....	..... do .....	..... do	Do.
1430	Stellula calliope	Taos, N. Mex .....	..... do	Dr. H. C. Yarrow.
PICIDÆ.				
1392	Centurus uropygialis	Sienege, Ariz	Aug. —, 1874	H. W. Henshaw.
1373	Picus scalaris do do	J. M. Rutter.

LIST OF CRANIA.

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List of alcoholic specimens of birds—Continued.

No.	Name.	Locality.	Date.	Collector.
STRIGIDÆ.				
B 20	Otus vulgaris var. wilsonianus	Utah	— —, 1871	Dr. H. C. Yarrow and H. W. Henshaw.
C 1	..... do .....	..... do .....	..... do	Do.
FALCONIDÆ.				
C 2	Falco sparverius	Utah	— —, 1871	Dr. H. C. Yarrow and H. W. Henshaw.
PERDICIDÆ.				
C 4	Lophortyx gambeli	Utah	— —, 1871	Dr. H. C. Yarrow and H. W. Henshaw.
CHARADRIIDÆ.				
C 5	Ægialitis vociferus	Utah	— —, 1871	Dr. H. C. Yarrow and H. W. Henshaw.
C 6	..... do .....	..... do .....	..... do	Do.
SCOLOPACIDÆ.				
1363	Ereunetes pusillus	Sienege, Ariz.	Aug. —, 1874	H. W. Henshaw.
1364	..... do .....	..... do .....	..... do	Dr. J. T. Rothrock.
RECURVIROSTRIDÆ.				
D	Recurvirostra americana	Alkali Lakes, Colo	June —, 1873	H. W. Henshaw.
E	..... do .....	..... do .....	..... do	Do.
C	..... do .....	..... do .....	..... do	Do.
B 24	Himantopus nigricollis .....	..... do .....	..... do	Do.
PODICIPIDÆ.				
C 13	Podilymbus podiceps	Utah	— —, 1871	Dr. H. C. Yarrow and H. W. Henshaw.

LIST OF BIRD CRANIA.

No.	Name.	Locality.	Date.	Collector.
1399	Mimus polyglottus	Camp Bowie, Ariz	Aug. —, 1874	Dr. J. T. Rothrock.
1400	..... do .....	..... do .....	..... do	Do.
A 7	Salpinctes obsoletus .....	..... do .....	..... do	Do.
1411	Pyranga ludoviciana	Pueblo, Colo	July —, 1874	C. E. Aiken.
1397	Carpodacus frontalis	Tierra Amarilla, N. Mex	Sept. —, 1874	Dr. H. C. Yarrow.
1352	..... do	Camp Apache, Ariz	Nov. —, 1874	H. W. Henshaw.
1347	Junco cinereus	Mount Graham, Ariz ..	Aug. —, 1874	Do.
1405	..... do .....	..... do .....	..... do	Do.
1351	Chondestes grammaca	Arizona .....	..... do	Dr. J. T. Rothrock.
1391	..... do	Taos, N. Mex	Aug. —, 1874	Dr. H. C. Yarrow.

List of bird crania—Continued.

No.	Name.	Locality.	Date.	Collector.
1377	<i>Spizella pallida</i> var. <i>breweri</i>	Camp Lowell, Ariz....	Sept. —, 1874	H. W. Henshaw.
1378	..... do .....	..... do .....	..... do	Do.
1379	..... do	Sonoita Valley, Ariz....	Aug. —, 1874	Do.
1380	..... do .....	..... do .....	..... do	Do.
1358	<i>Hedymeles melanocephalus</i>	Arizona	— —, 1874	J. M. Rutter.
1388	..... do	Camp Apache, Ariz....	July —, 1874	H. W. Henshaw.
1403	<i>Pipilo mesoleucus</i>	Camp Bowie, Ariz....	Aug. —, 1874	J. M. Rutter.
1404	..... do .....	..... do .....	..... do	Do.
1356	<i>Icterus bullocki</i>	Pueblo, Colo	July —, 1874	C. E. Aiken.
1398	..... do .....	..... do .....	..... do	Do.
23	..... do .....	..... do .....	..... do	Do.
1365	<i>Xanthocephalus icterocephalus</i>	Colorado	— —, 1874	Dr. H. C. Yarrow.
1345	<i>Corvus corax</i> var. <i>carnivorus</i>	Camp Apache, Ariz....	July —, 1874	Dr. J. T. Rothrock.
1346	..... do	Black River, Ariz....	Aug. —, 1874	Do.
892	<i>Picicorvus columbianus</i>	Colorado	— —, 1873	H. W. Henshaw.
1408	<i>Cyanura steileri</i> var. <i>macrolopha</i> ..	Willow Spring, Ariz....	July 12, 1874	Do.
1393	<i>Geococcyx californianus</i>	Sonoita Valley, Ariz....	Aug. —, 1874	Do.
1394	..... do .....	..... do .....	..... do	Do.
1376	..... do .....	..... do .....	..... do	Dr. J. T. Rothrock.
1386	<i>Asyndesmus torquatus</i>	Fort Craig, N. Mex....	Nov. —, 1874	H. W. Henshaw.
1389	<i>Picus villosus</i> var. <i>harrisi</i>	Camp Apache, Ariz....	July —, 1874	Dr. J. T. Rothrock.
1409	..... do	Pueblo, Colo .....	..... do	C. E. Aiken.
1410	<i>Melanerpes erythrocephalus</i> .....	..... do .....	..... do	Do.
1385	<i>Speotyto cunicularia</i>	Arizona	Oct. —, 1874	Dr. J. T. Rothrock.
1382	<i>Buteo calurus</i>	Mount Graham, Ariz....	..... do	H. W. Henshaw.
1383	..... do .....	..... do .....	..... do	Do.
1384	..... do .....	..... do .....	..... do	Do.
1361	<i>Zenaidura carolinensis</i>	Camp Bowie, Ariz....	— —, 1874	J. M. Rutter.
1362	..... do .....	..... do .....	..... do	Do.
1381	<i>Columba fasciata</i>	Mount Graham, Ariz....	Oct. —, 1874	H. W. Henshaw.
1387	..... do .....	..... do	Nov. —, 1874	Do.
1401	<i>Meleagris gallopavo</i>	San Ildefonso, N. Mex....	Aug. —, 1874	Shedd.
893	..... do	New Mexico	Nov. —, 1873	H. W. Henshaw.
C 3	<i>Lophortyx gambeli</i>	Utah	— —, 1872	Dr. H. C. Yarrow and H. W. Henshaw.
C 4	..... do .....	..... do .....	..... do	Do.
1348	..... do	Gila River, Ariz....	Aug. —, 1874	Dr. J. T. Rothrock.
C 7	<i>Himantopus nigricollis</i>	Utah	— —, 1872	Dr. H. C. Yarrow and H. W. Henshaw.
C 8	<i>Recurvirostra americana</i> .....	..... do .....	..... do	Do.
1375	<i>Butorides virescens</i>	Camp Lowell, Ariz....	Sept. —, 1874	Dr. J. T. Rothrock.
1396	<i>Botaurus minor</i>	Tierra Amarilla, N. M....	..... do	R. J. Ainsworth.
C 11	<i>Larus delawarensis</i>	Utah	— —, 1871	Dr. H. C. Yarrow and H. W. Henshaw.

LIST OF BIRD SKELETONS.

No.	Name.	Sex.	Locality.	Date.	Collector.
1444	Meleagris gallopavo.....	♀ jun.	Gila River, N. Mex....	Oct. 10, 1874	H. W. Henshaw.
1445	..... do	♂ ad.	..... do .....	..... do	Do.
996	Cyrtonyx massena ..	♂	Tulerosa, N. Mex.....	Nov. 15, 1874	Do.
1446	Buteo montanus	♂ ad.	Gila River, N. Mex....	Oct. 10, 1874	Do.

LIST OF BIRD STERNA.

No.	Sex.	Name.	Locality.	Date.	Collector.
370	♀	Harporyhynchus crissalis.....	Camp Bowie, Ariz	Aug. 7, 1874	H. W. Henshaw.
655	♀	..... do	Camp Lowell, Ariz	Sept. 10, 1874	Do.
652	♀	Harporyhynchus curvirostris var. palmeri ..	..... do	Sept. 9, 1874	Do.
499	♀ ad.	Lophophanes wollweberi.....	Sonoita Valley, Ariz....	Aug. 27, 1874	Do.
326	.....	Sitta pygmaea.....	Fort Garland, Colo....	Oct. —, 1874	C. E. Aiken.
277	♂	Myiadestes townsendi .....	..... do	June 6, 1873	H. W. Henshaw.
369	♀ ad.	Collurio borealis	Pueblo, Colo	Oct. 17, 1874	C. E. Aiken.
332	.....	Zonot. leucophrys var. intermedia ..	..... do	July —, 1873	H. W. Henshaw.
503	♂	Calamospiza bicolor	Pescado, N. Mex.....	July 25, 1873	Do.
352	.....	Sturnella magna var. neglecta	Colorado	—, 1874	C. E. Aiken.
351	.....	..... do	Pueblo, Colo	Oct. 14, 1874	Do.
353	.....	..... do .....	..... do .....	..... do	Do.
180	.....	Xanthocephalus icterocephalus	Rio Grande, Colo	Aug. 22, 1874	Do.
90	.....	Scolecophagus cyanocephalus.....	Pueblo, Colo	July —, 1874	Do.
309	♂	Picicorvus columbianus	Rio Grande, Colo	June 10, 1873	H. W. Henshaw.
310	♂	..... do .....	..... do .....	..... do	Do.
190	♂	..... do	Fort Garland, Colo....	May 29, 1873	Do.
202	♂	Perisoreus canadensis var. capitalis ..	..... do	May 30, 1873	Do.
224	♀	..... do .....	..... do	June 3, 1873	Do.
223	♂ jun.	..... do .....	..... do	May 30, 1873	Do.
339	.....	Cyanocitta calif. var. woodhousei ..	..... do	Oct. 12, 1874	C. E. Aiken.
243	♀ ad.	Geococcyx californianus	Camp Grant, Ariz.	July 21, 1874	H. W. Henshaw.
298	♀ ad.	..... do	Camp Bowie, Ariz	Aug. 7, 1874	Do.
282	.....	Picoides americ. var. dorsalis	Pagosa, Colo	Sept. 9, 1874	C. E. Aiken.
221	.....	..... do	Fort Garland, Colo....	June 3, 1873	H. W. Henshaw.
296	.....	Picus villosus var. harrisi .....	..... do	June 19, 1873	Do.
220	♀ ad.	Sphyrapicus thyroideus .....	..... do	June 3, 1874	Do.
219	♂ ad.	..... do .....	..... do .....	..... do	Do.
235	♂ ad.	..... do .....	..... do .....	..... do	Do.
298	♂ ad.	..... do .....	..... do	May 20, 1874	Do.
234	♂ ad.	..... do .....	..... do	June 4, 1874	Do.
346	.....	Colaptes mexicanus	Pueblo, Colo	Oct. 14, 1874	C. E. Aiken.
612	♀ jun.	Antrostomus nuttalli	Camp Apache, Ariz....	Aug. 25, 1873	H. W. Henshaw.
90	♂	..... do	Denver, Colo	May 15, 1873	Do.
616	♀ jun.	Falco lanarius var. polyagrus	Camp Apache, Ariz ...	Aug. 26, 1873	Do.
64	.....	..... do	Denver, Colo	May 12, 1873	Do.
35	.....	Nisus fuscus.....	..... do	May 9, 1873	Do.

List of bird sterna—Continued.

No.	Sex.	Name.	Locality.	Date.	Collector.
682	♂	<i>Asturina nitida</i> var. <i>plagiata</i>	Camp Lowell, Ariz.....	Sept. 11, 1873	H. W. Henshaw.
639	♂	..... do	do	Sept. 9, 1873	Do.
244	♀ ad.	<i>Buteo swainsoni</i>	Camp Grant, Ariz.....	July 31, 1874	Do.
290	♀ ad.	<i>Buteo calurus</i>	Mount Graham, Ariz..	Aug. 3, 1874	Do.
390	♂ ad.	<i>Recurvirostra americana</i>	Alkali Lakes, Colo	June 21, 1873	Do.
391	♀ ad.	..... do	do	do	Do.
389	♂ ad.	..... do	do	do	Do.
398	♂	<i>Himantopus nigricollis</i>	do	June 22, 1873	Do.
306	♂ ad.	<i>Ægialitis montana</i>	Fort Garland, Colo....	June 10, 1873	Do.
307	♂	..... do	do	do	Do.
417	♂ ad.	<i>Querquedula cyanoptera</i>	Alkali Lakes, Colo....	June 23, 1873	Do.
190	.....	<i>Bucephala americana</i>	Conejos Cañon, Ariz ..	Aug. 30, 1874	C. E. Aiken.
414	♂ ad.	<i>Podiceps auritus</i> var. <i>californicus</i> ..	Alkali Lakes, Colo	June 23, 1873	H. W. Henshaw.

LIST OF BIRD NESTS.

No.	Name.	Locality.	Date.	Collector.
369	<i>Turdus</i> var. <i>auduboni</i>	Fort Garland, Colo....	June 7, 1873	H. W. Henshaw.
*151	<i>Turdus fuscescens</i>	do	June 19, 1873	H. W. Henshaw.
368	<i>Dendroica auduboni</i>	do	June 8, 1873	H. W. Henshaw.
396	<i>Dendroica æstiva</i>	do	June 22, 1873	Do.
381	..... do	do	June 20, 1873	Do.
.....	<i>Icteria virens</i> var. <i>longicauda</i>	Camp Grant, Ariz.....	July 29, 1874	Do.
.....	<i>Poospiza bilineata</i>	Gila River, Ariz	July 25, 1874	Do.
.....	<i>Junco cinereus</i>	Mount Graham, Ariz..	Aug. 1, 1874	Do.
82	<i>Poæcetes gramineus</i> var. <i>confinis</i> ..	South Park, Colo	July 1, 1873	Dr. J. T. Rothrock.
420	..... do	Fort Garland, Colo	July 19, 1873	H. W. Henshaw.
B 5	<i>Chondestes grammaca</i>	Colorado	July —, 1873	Dr. J. T. Rothrock.
397	<i>Pipilo</i> ———	Alkali Lakes, Colo	— —, 1873	H. W. Henshaw.
365	<i>Pipilo chlorurus</i>	Rio Grande River, Colo	June 15, 1873	Do.
406	<i>Agelaius phoeniceus</i>	Fort Garland, Colo....	June 21, 1873	Do.
156	<i>Scolecophagus cyanocephalus</i>	do	May 27, 1873	Do.
155	..... do	do	do	Do.
71	(Small Flycatcher)	South Park, Colo	June 30, 1873	Dr. J. T. Rothrock.
30	<i>Tyrannus verticalis</i>	Denver, Colo	June 10, 1873	Do.
31	..... do	do	do	Do.
.....	<i>Eugenes fulgens</i>	Mount Graham, Ariz ..	Aug. 3, 1874	H. W. Henshaw.
.....	<i>Selasphorus platycercus</i>	do	do	Do.
351	..... do	Rio Grande, Colo	June 14, 1873	Do.
365	..... do	Fort Garland, Colo....	June 19, 1873	Do.
.....	<i>Geococcyx californianus</i>	Camp Grant, Ariz.....	June 17, 1874	Do.
31	<i>Zenaidura carolinensis</i>	Denver, Colo	June 10, 1873	Dr. J. T. Rothrock.
C 4	..... do	do	June —, 1873	Do.

* Two nests built together.

LIST OF BIRD EGGS.

No.	Name.	Locality.	Date.	Collector.	No. of eggs.
155	<i>Turdus migratorius</i>	Fort Garland, Colo....	June —, 1873	H. W. Henshaw.....	2
149	<i>T. pallasi</i> var. <i>auduboni</i>	do	June 7, 1873	do	2
151	<i>Turdus fuscescens</i>	do	do	do	4
255	<i>Oreoscoptes montanus</i>	Alkali Lakes, Colo	June 22, 1873	do	4
34	do	Fort Wingate, N. Mex.	July 14, 1873	Dr. C. G. Newberry ..	2
254	<i>Galeoscoptes carolinensis</i>	Fort Garland, Colo	do	H. W. Henshaw	4
....	<i>Salpinctes obsoletus</i>	Santa Fé, N. Mex.	June 17, 1874	do	1
203	<i>Dendroica aestiva</i>	Alkali Lakes, Colo	June 22, 1873	do	5
....	<i>Icteria virens</i> var. <i>longicauda</i> ..	Camp Grant, Ariz.....	July 2, 1874	do	2
....	<i>Poospiza bilineata</i>	Gila River, Ariz.....	do	do	3
....	<i>Junco cinereus</i> var. <i>dorsalis</i> ..	Willow Spring, Ariz....	July —, 1874	do	4
....	<i>Junco cinereus</i>	Mount Graham, Ariz ..	Aug. 1, 1874	do	4
337	<i>Poecetes gram.</i> var. <i>confinis</i> ..	Fort Garland, Colo....	—, 1873	do	4
82	do	South Park, Colo.....	July 1, 1873	Dr. J. T. Rothrock	2
398	<i>Pipilo chlorurus</i>	Fort Garland, Colo....	June 10, 1873	H. W. Henshaw	6
271	<i>Troglod. aëdon</i> var. <i>parkmanni</i> ..	do	July —, 1873	do	2
268	<i>Telmatodytes palustris</i>	Alkali Lakes, Colo	—, 1873	do	1
B 5	<i>Chondestes grammaca</i>	Colorado	July —, 1873	Dr. J. T. Rothrock....	4
418	<i>Scolecophagus cyanocephalus</i> ..	Fort Garland, Colo.. {	June —, 1873 July —, 1873	{ H. W. Henshaw.....	30
404	<i>Xanthocephalus icterocephalus</i> ..	do	June 23, 1873	do	2
136	<i>Sayornis sayus</i>	do	June 19, 1873	do	3
226	<i>Petrochelidon lunifrons</i>	do	—, 1873	do	16
104	<i>Selasphorus platycercus</i>	do	{ June 14, 1873 June 19, 1873	{ do	4
....	<i>Geococcyx californianus</i>	Camp Grant, Ariz.....	June 17, 1874	do	2
451	<i>Zenaidura carolinensis</i>	Denver, Colo..... {	May 5, 1873 May 14, 1873	{ do	16
459	<i>Canace obscura</i>	Rio Grande, Colo	June 16, 1873	do	1
....	<i>Ægialitis vocifera</i>	San Mateo, N. Mex....	July 6, 1873	Dr. C. G. Newberry...	4
518	<i>Himantopus nigricollis</i>	Alkali Lakes, Colo	June 22, 1873	H. W. Henshaw.....	4
517	<i>Recurvirostra americana</i>	do	do	do	4
519	<i>Nettion carolinensis</i>	do	June 23, 1873	do	10
409	<i>Podiceps auritus</i> var. <i>californicus</i> .	do	do	do	23
559	<i>Fulica americana</i>	do	do	do	35

NOTE.—During the absence in the field of Mr. H. W. Henshaw the proofs have been revised by Dr. Elliott Coues and Dr. H. C. Yarrow.

CHAPTER IV.

REPORT

UPON

THE COLLECTIONS OF BATRACHIANS AND REPTILES

MADE IN PORTIONS OF

NEVADA, UTAH, CALIFORNIA, COLORADO, NEW MEXICO, AND ARIZONA,

DURING

THE YEARS 1871, 1872, 1873, AND 1874,

BY

DR. H. C. YARROW.

CHAPTER IV.

The collections of Batrachians and Reptiles upon which this report is based were made in the years 1871, 1872, 1873, and 1874, by the different naturalists of the expedition in California, Arizona, Nevada, New Mexico, Utah, and Colorado.

But a small number of new species has been discovered, but many secured of great rarity and value, and of much interest as increasing our knowledge of the geographical distribution of the reptilian fauna of Western North America.

The collection of 1871 was made principally in Arizona and Nevada by Mr. F. Bischoff, with the assistance of Dr. W. J. Hoffman and others of the party. Owing to Mr. Bischoff's sudden disappearance in Chicago, and the loss of his note books by fire, it is impossible to give more than a mere list of his specimens, which may possibly prove of interest as chronicling the occurrence of some species very rare and valuable.

The collection of 1872, while it embraces but five new species, is particularly rich in numbers, and affords good types of the characteristic reptiles of the localities visited.

It is a matter of some interest, as an established fact, that, as birds were found to be more numerous in the proximity of settlements, the same is true of serpents; very few, except the *Crotalus*, being found upon the barren plains, although occasionally an individual was encountered straggling along apparently in pursuit of food, or a more desirable dwelling place. The neighborhood of Provo and Utah Lake afforded nearly all the species enumerated in the list, and an almost entire absence of venomous serpents was noted at this place, although on the "benches", at the base of the Wahsatch Mountains, the *Crotalus* is met with sparingly. The beautiful *Eutania vagrans*, rightly called from its wide range, is exceedingly abundant, and *Pityophis sayi* var. *bellona* equally so. *Bascanium* var. *flaviventre*, called

"Blue Chaser" by the settlers, and greatly dreaded, for what reason we were unable to ascertain, is quite common on marshy ground near the lake, and *Bascanium laterale* is also of frequent occurrence, although not as numerous as the preceding varieties. A singular fact was noticed in regard to the serpents of this region, and the same observation will equally apply to the lizards, viz: the extraordinary mimicry of color, depending in a great measure upon the hue and tint of the surrounding objects; those specimens seen upon the grassy meadows of the marshes being brilliant in color, assimilating closely to the general tint of the herbage, while those found upon alkaline plains were lighter, approaching the neutral tint of the ground and sage brush. This fact was particularly noticeable in those serpents and lizards found near red sandstone deposits, the normal colors being so much altered and resembling the tint of the rock to such an extent as to lead to grave doubts of the species under observation. In the course of a single day's ride, we have noticed the little *Phrynosoma*, or "Horned Toad", of the same species, bearing three different solid body tints in as many different localities: on the plain the prevailing color being greenish gray; on a stretch of white alkaline flat nearly white; and on red sandstone rocks so nearly red as to almost escape notice. The most peculiar circumstance of this mimicry is, that after removal from the localities where found, the normal colors invariably return in twenty-four or forty-eight hours. This statement is not merely conjecture, as the experiment was tried with a number of *Phrynosoma* of different tints, and found to be as represented.

As already mentioned in the preliminary report, the rattle of the *Crotalus* was frequently mistaken for the noise made by the Cicadas, although after a short experience they were readily distinguishable by the difference of rhythm; that made by the Cicada being shorter and more uneven. The rattling of this serpent was frequently heard without any apparent cause of provocation, and may have been a sexual call for aught we know. In one instance, a large rattlesnake was discovered beneath an "aparejo", or pack saddle, coiled for a blow, but it had given not the slightest indication of its presence by rattling.

It is thought, with good reason, that the *Crotalus* is rapidly decreasing in numbers on the western plains, or else that stories as to their former

number are the grossest exaggerations, as very few were met with during the expedition of 1872 (although in 1873 many were found along the Gila in Arizona); probably not more than twenty individuals being observed during a ride of over two thousand miles. Our experience also goes to show that the rattlesnake is naturally timid and retiring instead of aggressive, as efforts were frequently made to provoke them to strike without success, they invariably gliding away if permitted. The collection of lizards is rich not only in numbers but species, over one hundred specimens being secured, embracing some twelve species, among which are three new ones belonging to the genus *Sceloporus*. The collection of *Batrachia* is also numerous, and contains some interesting individuals new to the localities visited as well as new species.

The collection of 1873 was made chiefly in Arizona, New Mexico, and Colorado, and from its size and value reflects great credit upon those engaged in securing it. Some of the specimens secured are extremely rare, and many new facts in regard to distribution have been evolved from a study of the material.

During the season's work, it may be interesting to mention the finding of *Crotalus lucifer*, the Black Rattlesnake of Southern California and Arizona, as far north as the White Mountains of Arizona, in which locality it abounds, and *Heterodon nasicus*, the "Hog-nosed Sand Viper", as far south as Mineral Springs, Arizona. The coloration of this species of *Heterodon*, peculiar to the West, is much deeper and more brilliant than its eastern congener. This serpent, which is entirely harmless, curiously enough (for there are no facts to warrant the belief) is esteemed as venomous, and greatly dreaded by settlers, who ruthlessly destroy it when occasion offers. This belief doubtless has originated from the fact of the presence of two fangs in the posterior part of the upper jaw, which, however, have no poison sacs attached. From the general appearance of this reptile, with its narrow, contracted neck, flat, broad head, stumpy tail, and peculiar teeth, we may readily infer the cause of the dislike exhibited by the settlers. *Eutania vagrans* was everywhere found exhibiting the same diversity of coloration and markings as heretofore, and the same remark will apply equally well to *Pityophis sayi* var. *bellona*.

A curious fact in regard to the distribution of the lizards is that, while in 1872 *Crotaphytus wislizenii* was found to be very abundant in Utah and Nevada, *C. collaris* being extremely scarce; in 1873 in Colorado, New Mexico, and Arizona, the latter was the characteristic Saurian of the localities mentioned, *C. wislizenii* being seldom seen.

The *Phrynosoma*, or "Horned Toads", were very numerous; and some of the specimens of *P. douglassii* collected exhibit exaggerated examples of specific markings, very different from the more northern forms. Among those secured are two fine examples of *P. planiceps*, so called by Hallowell many years ago, but since that time lost sight of.

A very beautiful lizard, new to science and the fauna, was discovered through the exertion of Mr. H. W. Henshaw in Southern Arizona, to which Professor Cope has assigned the name *Sceloporus jarrovi*, and which probably belongs exclusively to the Sonoran fauna; and two other new species belonging to the same family have also been discovered.

The *Batrachia* are well represented in the collection; many species having been obtained, as well as some new to science. The occurrence of *Chorophilus triseriatus*, at Pagosa, in Colorado, is interesting; this being the first time it has been discovered so far west.

The observations of this year, it may be mentioned, fully confirm those of Dr. Elliott Coues, U. S. A., to whom American Herpetologists are greatly indebted for his interesting researches in this region, and to whom we owe our sincere thanks for the very interesting and valuable chapter which follows this report, the result of personal observation while stationed in Arizona, and which is given for the reason that a lengthened stay in a portion of the Territory visited by this expedition enabled him to furnish biographies of the species observed by our collectors, who, in their rapid marches, could do but little besides collecting specimens. This chapter enumerates some species not observed by the expedition.

In 1874, owing to the fact that two special Natural History parties were organized to operate in most favorable localities for Herpetological work, a very large collection was made of interest and value. In addition to these parties, the services of Mr. C. E. Aiken as collector were made

available, and his collections, as well as those of others, have added largely to the number of specimens secured.

The first party, in charge of Dr. J. T. Rothrock, operated in New Mexico and Arizona, proceeding as far south as old Fort Crittenden, near the Mexican boundary line; the second, in charge of the writer, in New Mexico and Colorado; and Mr. Aiken's work was for the most part performed in the same regions.

Of serpents, the most characteristic of Arizona and New Mexico were found to be the different species of *Crotalidæ*,—*Eutania cyrtopsis*, *E. marciana*, *E. ornata*, and *Heterodon nasicus*. In Southern Arizona, Mr. Henshaw was fortunate enough to discover a serpent for which Prof. E. D. Cope has erected a new genus, calling it *Chilopoma rufipunctatum*. In Rock Creek Cañon, Arizona, an extremely rare turtle was secured, *Cinosternum henrici*, LeConte, which was taken upon the hook of a fishing line. Of lizards, the usual variety of species was obtained, no new ones being discovered.

In Colorado, serpents were not so numerous, although lizards and frogs abounded; *Eutania vagrans*, *Pityophis sayi* var. *bellona*, and *Bascanium flaviventre* being common. At the Hot Springs, Pagosa, Colo., *P. sayi* var. *bellona* was unusually numerous; hundreds having their dens in the holes of the lime concretion formed by the water of these springs. Three individuals were captured, over six feet in length.

In the identifications of the species, and for the descriptions of new ones, we are under great obligations to Prof. E. D. Cope, who has not only assisted in this regard, but kindly criticised and revised the manuscript of this report, and permitted the use of his new Check-List of North American Batrachia and Reptilia, shortly to be published by the Smithsonian Institution. It will be found that the nomenclature of the report is mostly the same as adopted by this gentleman. We are also under obligations to Prof. S. F. Baird for certain facilities afforded at the National Museum, and to Mr. G. Brown Goode for many favors. No inconsiderable amount of assistance has also been received from some of the members of the expedition in the presentation of specimens; and it is a source of great pleasure to be able to note the hearty coöperation and kindness of these gentlemen in assisting the zoölogical section of this survey.

BATRACHIA.

URODELA.

FAM. AMBLYSTOMIDAE.

Genus AMBLYSTOMA, Tschudi.

AMBLYSTOMA MAVORTIUM, Bd.

a. MAVORTIUM.

Amblystoma mavortium, BD., Jour. Acad. Nat. Sci. Phila., 2d ser., i, 1849, 284, 292 (New Mexico).—HALLOW., Jour. Acad. Nat. Sci. Phila., iii, 1858, 352.—BD., P. R. R. Rep., x, 1859, Gunnison's & Beckwith's Route, Reptiles, 20.—*Id.*, P. R. R. Rep., xii, 1862, pt. ii, 306.—COPE, Proc. Acad. Nat. Sci. Phila., 1867, 184.—MARSH, Am. Jour. Sci. & Arts, xlv, Nov., 1868.—COPE, Am. Jour. Sci. & Arts, i, Feb., 1871.—ALLEN, Proc. Bost. Soc. Nat. Hist., xvii, 1874, 70.—COPE, Check-List N. A. Batrach. & Rept., 1875, 25.

Amblystoma proserpine, BAIRD. & GIRARD, Proc. Acad. Nat. Sci. Phila., 1852, 173.—HALLOW., Jour. Acad. Nat. Sci. Phila., iii, 1858, 354.—BD., U. S. & Mex. Bound. Surv., pt. ii, 1859, Reptiles, 29, pl. xxxv, figs. 7-14.

Ambystoma maculatum, HALLOW., Proc. Acad. Nat. Sci. Phila., 1857, 215.—*Id.*, Jour. Acad. Nat. Sci. Phila., iii, 1858, 355.

Desmlostoma maculatum, SAGER, Penins. Jour. Med., 1853, 428.

Camarataxis maculata, HALLOW., Proc. Acad. Nat. Sci. Phila., 1852, 209.—COPE, Proc. Acad. Nat. Sci. Phila., 1859, 123.

Amblystoma nebulosum, HALLOW., Sitgreave's Exp. Zúñi & Col. Riv., 1853, 143, pl. 20.—*Id.*, Jour. Acad. Nat. Sci. Phila., iii, 1858, 352.

Amblystoma? nebulosum, HALLOW., Proc. Acad. Nat. Sci. Phila., 1866, 300.

b. CALIFORNIENSE.

Siredon lichenoides, BD., Stans. Rep. Exp. Great Salt Lake, 1852, 336, pl. i.

Amblystoma californiense, GRAY, Proc. Zoöl. Soc. Lond., 1853, 11, pl. 7 (Monterey).—HALLOW., Jour. Acad. Nat. Sci. Phila., iii, 1858, 355.

HAB.—United States in the Central, Sonoran, and Pacific Districts.

These interesting tailed *Batrachia* are quite common in the semi-stagnant pools and lakes of the Western States and Territories, and a glance at the list given will show that forty-three specimens were collected, not only in the adult state, but the larval; the list also shows the localities where collected.

The principal point of interest regarding them is the fact that within a few, years the larva and adult of these animals were referred to distinct genera and species, and so described under the names of *Siredon lichenoides* and *Amblystoma mavortium*; but Professor Duméril, in 1865, having secured a number of living specimens from the Southern Rocky Mountains, instituted a series of experiments, and proved beyond a doubt that they were one and the same species.

Professor Cope also, by a study of a large number of specimens of different ages, confirmed the statements of Duméril and Professor Marsh, and in the American Journal of Science and Arts, vol. xlv, November, 1868, published a paper to the same effect.

It is but fair to Professor Baird to state that he knew and believed in such a theory much earlier than any of these gentlemen. The following paper* by Professor Cope, being of great interest, is here reproduced:

“The late observations by various writers on the metamorphoses of *Amblystoma*, especially those of Mr. Tegetmeier, indicate that some of the principal facts in the history of the subject have been overlooked by all of them.

“In the first place, no one has seen any metamorphosis of true *Siredon*,—*Siredon mexicanus*, Shaw (*S. pisciformis*, *S. axolotl*, and *S. maculatus* Auctorum— which inhabits the lakes of Mexico, and of which the Smithsonian collections contain numerous specimens. Whether it undergoes a metamorphosis is entirely unknown to naturalists; though I would express the belief that it will be found to do so occasionally under suitable circumstances. No *Amblystomæ* have been brought from Mexico south of Tamaulipas and Chihuahua by any of the various naturalists collecting for the Government surveys.

“In the next place, Professor Baird was aware of the metamorphosis of all the North American species of *Siredons* many years before the observation of it in the Jardin des Plantes; although at first he named one of them *Siredon lichenoides*, treating it as a mature animal. He regarded these creatures as larvæ in his essay on the North American Salamanders, published in Philadelphia in 1847.

*From the American Journal of Science and Arts, vol. i, February, 1871, 89.

“Thirdly, the important observation of Duméril* established the fact that the Siredons reproduced as such; and his account of the subsequent loss of larval characters by the offspring is the first of a positive character which we possess on that point.

“After this, in 1867,† the writer recorded the various stages of metamorphosis in different structures, to be observed in reproducing individuals of two species of *Amblystoma*, viz,—*A. tigrinum* and *A. mavortium*. These embraced various *Siredon* characters of the dental, branchial, and dermal organs, and of coloration. It was suggested that the metamorphoses observed by Duméril were those of *A. mavortium*, which was confirmed by an examination of specimens sent to the writer, by Professor Duméril, ‡ a year afterward. At the same time, the periods of metamorphosis of eight other species of the genus were stated; and the Mexican *axolotl* was regarded as an *Amblystoma*, whether undergoing metamorphosis or not, owing to the irregularity of its occurrence in the most nearly allied species *A. mavortium*, or from its *Siredon* stage, *S. lichenoides*, Baird.

“In 1868, Professor Marsh, of Yale College, observed the metamorphosis of the *A. mavortium*, confirming the conclusions of previous writers. Since that time, the changes have been observed by Dr. Tegetmeier and others.

“The only point remaining to be determined is whether Siredons (*i. e.*, *Amblystoma mexicanum*) undergo a metamorphosis or not. Among our numerous specimens, I can find none that exhibit any tendency toward the change.

“I might add here that I have had for a time in a winter fernery, a large New Jersey specimen of *Amblystoma tigrinum* a foot in length. It is nocturnal in its habits, and remains during the day in its burrow. This extends through the long diameter of its prison, and has three outlets, which it keeps open. From one of them, as evening approaches, it projects its head, and watches with attention what is transpiring in the room.

“In the same case are specimens of the common *Plethodon cinereus* of

* Bulletin Société d'Acclimatation, 1865, ii, 348.

† Proceedings of the Academy of Natural Sciences of Philadelphia, 1866.

‡ Origin of Genera, 1863, 47.

both varieties. During this, as in former years, I observe that this species is nocturnal, and is a great climber. They will climb the rachis of a most slender fern or spear of grass, and lie in a coil on the end of a tall frond or other narrow support which may be sufficient to bear their weight at a height of a foot or eighteen inches above the ground. They climb a plate of glass with great ease by adhering closely to its smooth surface with their moist abdomen. When disturbed on some high perch among the herbage, they leap away by a sudden unbending of the coiled body, in the manner of some caterpillars."

No.	Locality.	Date.	Collector.
45 A*	South Park, Colo	June, 1873	Dr. J. T. Rothrock.
14	Denver, Colo	do	Do.
14, 1 A	do	do	Do.
34 A	South Park, Colo	do	Do.
4 P 2	Nutria, N. Mex.	July, 1873	Dr. C. G. Newberry.
572	do	July 22, 1873	H. W. Henshaw.
501 X	Pescao, N. Mex	Aug., 1873	Do.
501 A	do	do	Do.
501 B	do	do	Do.
501 C	do	do	Do.
70	White Mountains, Ariz	do	Do.
654	Fort Defiance, N. Mex	do	Dr. O. Loew.
197 F	San Luis Valley, Colo	Sept., 1873	Dr. J. T. Rothrock.
197 B	do	do	Do.
A 1098	Southern Arizona	Aug., 1874	Jas. M. Ruttér.

* Thirty specimens.

ANURA.

BUFONIFORMIA.

FAM. BUFONIDAE.

Genus BUFO, Laurenti.

BUFO LENTIGINOSUS, Shaw, subspecies FRONTOSUS, Cope.

Bufo frontosus, COPE, Proc. Acad. Nat. Sci. Phila., 1866, 301.

Bufo lentiginosus, SHAW, subspecies *frontosus*, COPE, Check-List N. A. Batrach. & Rept., 1875, 29.

HAB.—Sonoran Region.

Abundant in Eastern Utah, Nevada, Colorado, New Mexico, and Arizona, but, singularly enough, had not been seen until discovered by Dr. E. Coues, U. S. A., in New Mexico. Specimens were procured of all ages and sizes during the expeditions of 1872, 1873, and 1874.

Is most closely allied to *B. americanus*, but differs in having shorter and more elevated cranium, longer and larger hind limbs, and more acuminate parotoid glands. The specimen No. O differs from the type in having the tympanum one-half size of eye, the tarsus reaching to the end of the muzzle.

No.	Locality.	Date.	Collector.
A 1	Eastern Utah.....	Aug., 1872	H. W. Henshaw.
A 2	..... do .....	..... do	Do.
A 3	..... do .....	..... do	Do.
A 4	..... do .....	..... do	Do.
A 5	..... do .....	..... do	Do.
A 6	..... do .....	..... do	Do.
O	Camp Apache, Ariz.....	Aug., 1873	Do.
D D	Twin Lakes, Colo.....	..... do	Dr. J. T. Rothrock.
O X	..... do .....	..... do	Do.
A 1174	Camp Apache, Ariz.....	July, 1874	Jas. M. Rutter.
52 C	Nutria, N. Mex. ....	..... do	H. W. Henshaw.
51	Colorado Springs, Colo .....	..... do	John Yarrow.
278	Pueblo, Colo .....	..... do	C. E. Aiken.

ANURA—BUFONIDAE—BUFO LENTIGINOSUS WOODHOUSEI. 521

BUFO LENTIGINOSUS, Shaw, subspecies COGNATUS, Say.

Bufo cognatus, SAY, Long's Exped. Rocky Mts., ii, 1823, 90.—HOLBROOK, N. A. Herp., iv, pl. 5.—DE KAY, Nat. Hist. N. Y., pt. i, 1842, 68.—BD., U. S. & Mex. Bound. Surv. Rept., 1859, pt. ii, Rept., 27.

Bufo lentiginosus, SHAW, subspecies *cognatus*, SAY, COPE, Check-List N. A. Batrach. & Rept., 1875, 29.

HAB.—Texan District, Colorado and Arizona.

In some specimens, there are dark, oblique blotches on each side of the middle line of the back; metatarsal shovels a little larger.

Specimen No. 402 has the tympanum one-fifth the size of the eye.

Very abundant in Colorado; less so in Arizona.

No.	Locality.	Date.	Collector.
402	Fort Garland, Colo.....	June, 1873	H. W. Henshaw.
407	..... do .....	..... do	Do.
410	..... do .....	..... do	Do.
410 A	..... do .....	..... do	Do.
410 B	..... do .....	..... do	Do.
115	Ralston, Ariz.....	Oct., 1873	Dr. C. G. Newberry.
C 1285	Camp Crittenden, Ariz.....	Sept., 1874	H. W. Henshaw.

BUFO LENTIGINOSUS WOODHOUSEI, Girard.

Bufo dorsalis, HALLOW., Proc. Acad. Nat. Sci. Phila., vi, 1852, 181 (not of Spix).

Bufo woodhousei, GIRARD, Proc. Acad. Nat. Sci. Phila., vii, May, 1854, 86.—BD., U. S. & Mex. Bound. Surv., ii, 1859, Reptiles, 27.

Bufo lentiginosus (subspecies) *woodhousei*, COPE, Check-List N. A. Batrach. & Rept., 1875.

HAB.—Sonoran Region.

Is lighter than preceding species; the tubercles brown-tipped; a light vertebral band; metatarsal shovels a little smaller. Apparently numerous in New Mexico.

No.	Locality.	Date.	Collector.
39	Santa Fé, N. Mex	July, 1874	Dr. J. T. Rothrock and H. W. Henshaw.
55	Between Pueblo and Fort Garland, Colo.....	..... do	Dr. H. C. Yarrow.
55 A	..... do .....	..... do	Do.
L 91	New Mexico.....	Aug., 1874	Dr. O. Loew.
L 56	..... do .....	..... do	Do.
153	Plaza del Alcalde, N. Mex.....	..... do	Dr. H. C. Yarrow.
153 A	..... do .....	..... do	Do.
C 1285 B	Camp Crittenden, Ariz.....	Sept., 1874	H. W. Henshaw.

BUFO PICTUS, Cope, *sp. nov.*

PLATE XXV, FIGS. 4, 5.

Palmar and solar tubercles well developed, the larger or inner one of the latter not bearing a cutting edge. Cranium plane above; the muzzle produced, rather narrowed, and vertically truncate. Membrum tympani very small, externally invisible; ostia pharyngea exceedingly minute. Tongue large, oval, extensively free. Parotoids superior, broadly oval in form. Upper surfaces covered with large tubercles; inferior surfaces areolate. Limbs stout, especially the tarsus, which bears a longitudinal fold. The heel reaches to the middle of the parotoid gland, and the toes are only webbed at the base.

Color above brown; all the tubercles pink with a black border; a light vertebral band; below yellowish, closely spotted with brown blotches.

Length to vent.....	0.026
Length to axilla.....	0.012
Length of fore limb.....	0.015
Length of fore foot.....	0.007
Length of hind limb.....	0.030
Length of hind foot.....	0.017

From the collections of 1872.

I have long been familiar with this small and brightly-colored species, and have generally supposed it to be the young of the *B. microscaphus*, Cope. The reception of larger specimens enables me to learn that it differs from that species in many respects, among which may be mentioned the general reduction of the auditory apparatus. The species in this point and in style of coloration resembles the *Ollotis cærulescens*, Cope, from Costa Rica.

The plate exhibits a view of the dorsum and abdomen of the species.

BUFO MICROSCAPHUS, Cope.

Bufo microscaphus, COPE, Proc. Acad. Nat. Sci. Phila., 1866, 301.—*Id.*, Check-List N. A. Batrach. & Rept., 1875, 29.

HAB.—Sonoran Region.

Common near Utah Lake, Utah, and in Colorado and Arizona, but not as numerous as preceding species. Also discovered by Dr. E. Coues, U. S. A., in Arizona.

No.	Locality.	Date.	Collector.
Q 1	Provo, Utah.....	July, 1872	Dr. H. C. Yarrow and H. W. Henshaw.
Q 2	..... do .....	..... do	Do.
Q 3	..... do .....	..... do	Do.
Q 4	..... do .....	..... do	Do.
35	Southern Arizona	—, 1873	Dr. J. T. Rothrock.
45	South Park, Colo	June, 1873	Do.
X	Southern Arizona .....	..... do	Do.

BUFO PUNCTATUS, Baird & Girard.

Bufo punctatus, BAIRD & GIRARD, Proc. Acad. Nat. Sci. Phila., vi, Oct., 1852, 173.—
BD., U. S. & Mex. Bound. Surv., pt. ii, Rept. 1859, 25.—COPE, Check-
List N. A. Batrach. & Rept., 1875, 29.

HAB.—Sonoran and Lower Californian Regions.

The figure of this species in the United States and Mexican Boundary Survey, unlike that of the other toads, is very defective, not representing the most marked characters well, and adding two pairs of dorsal glands which do not exist.

Discovered in Texas by J. H. Clark. Apparently not common in regions visited, as but a single specimen was found in Arizona in 1871, and one other (No. C 1285 A) at Camp Crittenden, Ariz., in 1874, by H. W. Henshaw.

ARCIFERA.

FAM. HYLIDAE.

Genus CHOROPHILUS, Bd.

CHOROPHILUS TRISERIATUS subspecies TRISERIATUS, Wied.

Hyla triseriata, PR. VON WIED., Reise in Nord-America, 18—, p. —.

Chorophilus triseriatus subspecies *triseriatus*, COPE, Check-List N. A. Batrach. & Rept., 1875, 30.

HAB.—North America except Pacific and Sonoran Regions.

The occurrence of this species so far to the westward is noteworthy, as it has never been before seen in the localities mentioned. Apparently numerous.

No.	Locality.	Date.	Collector.
393 A	Fort Garland, Colo.....	June, 1873	H. W. Henshaw.
104	Fairplay, Colo.....	July, 1873	Dr. J. T. Rothrock.
104 A	..... do .....	..... do	Do.
104 B	..... do .....	..... do	Do.
104 C	..... do .....	..... do	Do.
364 B	Pagosa, Colo.....	Sept., 1874	C. E. Aiken and Dr. H. C. Yarrow.
271 G	..... do .....	..... do	Dr. H. C. Yarrow.

Genus *HYLA*, Laurenti.*HYLA EXIMIA*, Bd.

Hyla eximia, Bd., Proc. Acad. Nat. Sci. Phila., vii, April, 1854, 61.—*Id.*, U. S. & Mex. Bound. Surv., ii, Rept., 1859, 29.—COPE, Check-List N. A. Batrach. & Rept., 1875, 30.

HAB.—Sonoran Region.

Like the preceding, somewhat uncommon; one specimen secured (No. 52 B) is characterized by the absence of the scapular bars generally observed in the species.

No.	Locality.	Date.	Collector.
52 B	Nutria, N. Mex.	July, 1873	H. W. Henshaw.
A 110, 5	Santa Fé, N. Mex	June, 1874	Do.
B 52 B	Nutria, N. Mex	July, 1874	Do.

HYLA ARENICOLOR, Cope.

Hyla affinis, Bd., Proc. Acad. Nat. Sci. Phila., 1854, 61.—*Id.*, U. S. & Mex. Bound. Surv., Rept., ii, 1859, 29, (not of Spix.)

Hyla arenicolor, COPE, Jour. Acad. Nat. Sci. Phila., 1866, 84.—*Id.*, Proc. Acad. Nat. Sci. Phila., 301.—*Id.*, Check-List N. A. Batrach. & Rept., 1875, 31.

HAB.—Sonoran Region.

Uncommon in localities visited; the specimens noted below being the only ones seen.

No.	Locality.	Date.	Collector.
(?)	Utah	—, 1872	Dr. H. C. Yarrow.
R 1, 4	Santa Fé, N. Mex	June, 1873	Dr. O. Loew.

FAM. SCAPHIOPIDAE.

Genus SPEA, Cope.

SPEA STAGNALIS, Cope, *sp. nov.*

PLATE XXV, FIGS. 6, 7, 8.

Head wide; muzzle projecting beyond mouth; nostrils terminal. Loreal region oblique; top of head slightly convex or plane in profile. Membrum tympani invisible externally; ostia pharyngea exceedingly minute, much smaller than the choanæ. Vomerine teeth between the nares either anteriorly or posteriorly. Tongue round, extensively free, entire. No pectoral nor tibial glands; parotoids flat and thin. Tarsal shovel large; web of hind foot reaching middle of longest toe; the leg extended brings the heel to the middle of the parotoid gland.

Color light-brown, with a few dark speckles; a spot on canthus rostralis.

The very minute size of the ostia pharyngea of this species distinguishes it from the other Speas, and constitutes an approach to the rudimental condition of the auditory apparatus seen in the genus *Pelobates*.

"I found this species in temporary pools of rain water on the Eocene plateau of Northwest New Mexico, thirty miles from the nearest spring, and forty miles or more from running water. It is usually found in such localities, where it passes through its metamorphoses with great rapidity. As in other species of the group, the tadpoles reach a rather large size before the changes are completed. After these are effected, the frog remains in the pools as long as possible, swimming rather feebly from place to place when disturbed. As in other Batrachians inhabiting similar situations (*e. g.*, *Spea bombifrons*, *Amblystoma mavortium*), their existence is entirely dependent on the temporary pools remaining after rains, and their metamorphosis is necessarily rapid, and subject to many vicissitudes."—(Cope.)

The plate exhibits views of dorsum, abdomen, and mouth.

No.	Locality.	Date.	Collector.
(?)	——, Utah	——, 1872	Dr. H. C. Yarrow.
39	Santa Fé, N. Mex	July, 1874	Dr. J. T. Rothrock and H. W. Henshaw.
236 D	Alto dos Utas, N. Mex	Sept., 1874	E. D. Cope.

Genus **SCAPHIOPUS**, Holbrook.**SCAPHIOPUS COUCHII**, Bd.

Scaphiopus couchii, Bd., U. S. & Mex. Bound. Surv., ii, 1859, Rept., 28.—COPE, Proc. Acad. Nat. Sci. Phila., vii, 1863, 52.—Bd., Proc. Acad. Nat. Sci. Phila., vii, April, 1864, 62.—COPE, Check-List N. A. Batrach. & Rept., 1875, 32.

HAB.—Sonoran Region.

Rather uncommon in Utah.

No.	Locality.	Date.	Collector.
109	Provo, Utah.....	July, 1872	Dr. H. C. Yarrow and H. W. Henshaw.
109 a	..... do .....	..... do	Do.

SCAPHIOPUS COUCHII var. **VARIUS**, Cope.

Scaphiopus varius, COPE, Proc. Acad. Nat. Sci. Phila., vii, 1863, 52.

HAB.—Lower California; Utah.

Described from a specimen taken at Cape Saint Lucas, Lower California. Is with the preceding species uncommon in Utah; but one specimen being secured at Provo.

RANIFORMIA.FAM. **RANIDAE**.Genus **RANA**, Linn.**RANA HALECINA**, Kalm, subspecies **BERLANDIERI**, Baird.

Rana pipiens, GMEL., Syst. Nat., 13th ed., 1788, 1052 (not of authors generally).

Rana halecina, KALM, DAUDIN, Hist. Nat. Rept., viii, 1803, 122.—HOLBROOK, N. A. Herp., i, 89; iv, 1842, 91.—Bd., P. R. R. Rep., x, 1859, 45.—STORER, Mass. Rept., 2d ed., 1839, 237.—COOP. & SUCKL., Nat. Hist. Wash. Terr., 1860, 304.—HAYD., Trans. Am. Phil. Soc., xii, 1862, 177.—COPE, Proc. Acad. Nat. Sci. Phila., 1866, 301.—ALLEN, Proc. Bost. Soc. Nat. Hist., xvii, 1874, 70 (and of authors generally).—COPE, Check-List N. A. Batrach. & Rept., 1875, 32.

Rana utricularis, HARLAN, Am. Jour. Sci., x, 1825, 60.—*Id.*, Med. & Phys. Res., 112–224.

Shad Frog, BARTRAM'S Travels, 274.

Subspecies BERLANDIERI, Baird.

Rana berlandieri, BD., U. S. & Mex. Bound. Surv., ii, Reptiles, 1859, 27, pl. xxxvi, figs. 7-10.

Rana halecina, KALM, subspecies *berlandieri*, BAIRD.—COPE, Check-List N. A. Batrach. & Rept., 1875, 32.

HAB.—Entire Interior of North America; Mexico.

Tolerably common in New Mexico; also found in Utah in 1872.

This species is quite common and widely distributed, living in the vicinity of marshy ground. The specimen marked 445 in the collection of 1873 shows a very large and unusual development of size.

No.	Locality.	Date.	Collector.
P	Provo, Utah.....	July, 1872	Dr. H. C. Yarrow and H. W. Henshaw.
P 1	..... do .....	..... do	Do.
P 2	..... do .....	..... do	Do.
P 3	..... do .....	..... do	Do.
D	Ephraim City, Utah.....	Aug., 1872	H. W. Henshaw.
D 1	..... do .....	..... do	Do.
D 2	..... do .....	..... do	Do.
D 3	..... do .....	..... do	Do.
D 4	..... do .....	..... do	Do.
D 5	..... do .....	..... do	Do.
D 6	..... do .....	..... do	Do.
(?)	Provo, Utah .....	..... do	Dr. H. C. Yarrow.
T	Beaver, Utah	Sept., 1872	Dr. H. C. Yarrow and H. W. Henshaw.
14 A B	Denver, Colo.....	June, 1873	Dr. J. T. Rothrock.
14 A B C	..... do .....	..... do	Do.
197 E	San Luis Valley, Colo .....	..... do	Do.
455	Nutria, N. Mex	July, 1873	H. W. Henshaw.
455 A	..... do .....	..... do	Do.
197 D	San Luis Valley, Colo .....	..... do	Do.
14 A	Denver, Colo.....	Sept., 1873	Dr. J. T. Rothrock.
(?)	San Luis Valley, Colo .....	..... do	Do.
L 5 A	Abiquiu, N. Mex	Aug., 1874	Dr. O. Loew.
137	Taos, N. Mex .....	..... do	W. G. Shedd.
153	..... do .....	..... do	Dr. H. C. Yarrow.
153 A	..... do .....	..... do	Do.
153 B	..... do .....	..... do	Do.
153 C	..... do .....	..... do	Do.
157	..... do .....	..... do	Do.
157 A	..... do .....	..... do	Do.
153 D	Plaza del Alcalde, N. Mex .....	..... do	Do.
382	San Juan River, N. Mex	Sept, 1874	Lieut. R. Birnie.
L 63	Santa Fé, N. Mex .....	..... do	Dr. O. Loew.

RANA SEPTENTRIONALIS, Baird.

Rana septentrionalis, BD., Proc. Acad. Nat. Sci. Phila., 1854, 61 (*R. sinuata*, BD.).

HAB.—Canada to Montana and Utah.

Very numerous in the vicinity of Provo, Utah, which, as far as known, is its most southern and western limit.

No.	Locality.	Date.	Collector.
F 1	Provo, Utah.....	July, 1872	Dr. H. C. Yarrow.
F 2	..... do .....	..... do	H. W. Henshaw.
F 3	..... do .....	..... do	Do.

RANA ONCA, Cope, *sp. nov.*

PLATE XXV, FIGS. 1, 2, 3.

Head oval; muzzle sloping to the lip. Diameter of tympanic membrane equal distance between nares and between nostril and orbit, and three-fourths the diameter of the orbit or the distance from nares to margin of lip in front. Vomerine teeth in fasciculi behind the line connecting the posterior borders of the choanæ. A dermal fold on each side of the back, and a short one behind the angle of the mouth, with some scattered warts on the sides; skin otherwise entirely smooth. Toes obtuse, with wide webs reaching to the base of the penultimate phalange. One long metatarsal tubercle; no fold on the tarsus; a dermal border on outer toe. The heel extends beyond the end of the muzzle.

Light-brown above; below yellow. Three rows of rather distant, solid, small, black spots between the dorsal folds; two or three rows on each side; none of the spots yellow-bordered. Head unspotted; no band on the lip. A brown, vertical band on the front of the humerus. Scattered spots on tibia and femur; clouded spots on the posterior face of the femur. Size of *Rana clamata*.

This frog, of which a female specimen was obtained, combines characteristics of different groups; its coloration resembles somewhat that of the eastern or typical form of *Rana halecina*, but the full palmation of the hind

foot is that of *R. montezumæ* and *R. catesbiana*. It is also quite similar to the variety of *R. temporaria* from California, called *R. draytonii* by Baird and Girard, and *R. longipes* by Hallowell. The feet are shorter, the hind foot being twice as long as the head to the posterior border of the tympanum, while in *R. t. draytonii* it is 2.5 times as long. The *R. onca* lacks the black cheek-patch of the *R. temporaria*.

Specimen secured in 1872 in Utah by Dr. H. C. Yarrow.

The plate affords view of dorsum and mouth of this species.

OPHIDIA.

SOLENOGLYPHA.

FAM. CROTALIDAE.

Genus CROTALUS, Linn.

CROTALUS ADAMANTEUS, Beauvois, subspecies ATROX, Baird & Girard.

Crotalus atrox, BAIRD & GIRARD, Cat. N. A. Rept., pt. i, Serp., 1853, 5-156.—BD. P. R.

R. Rep., x, 1859, 39.—*Id.*, U. S. & Mex. Bound. Surv., ii, Rept., 1859, 14.

Caudisona atrox, COPE, Mitchell's Res., 1861, 121.—*Id.*, Proc. Acad. Nat. Sci. Phila., 1866, 309.

Crotalus adamanteus, subspecies *atrox*, COPE, Check-List N. A. Batrach. & Rept., 1875, 33.

HAB.—Indian Territory and Texas to Sonora and Southern and Lower California.

Rather uncommon.

No.	Locality.	Date.	Collector.
446	Fort Wingate, N. Mex	July 26, 1873	H. W. Henshaw.

CROTALUS LUCIFER, Baird & Girard.

Crotalus lucifer, BAIRD & GIRARD, Proc. Acad. Nat. Sci. Phila., vi, 1852, 171.—*Id.*,

Cat. N. A. Rept., pt. i, Serp., 1853, 6.—GIRARD, Herp., U. S. Exp. Exped.,

1858, 187.—BD., P. R. R. Rep., x, 1859, 10.—COOP. & SUCKL., Nat. Hist. Wash.

Terr., 1860, 1860, 295.—COPE, Check-List N. A. Batrach. & Rept., 1875, 33.

Caudisona lucifer, COPE, App. Mitchell's Res., 1861, 121.—*Id.*, Proc. Acad. Nat. Sci. Phila., 1866, 307-309.

HAB.—Pacific Subregion; mountains of Arizona.

Stated by Professor Cope to be numerous at some points in Arizona. During the expedition but one was seen, and Arizona is its most eastern range. In California it is very common.

No.	Locality.	Date.	Collector.
574	White Mountains, Ariz.	Aug. 10, 1873	H. W. Henshaw.

CROTALUS CONFLUENTUS, Say.

Crotalus confluentus, SAY, Long's Exped. Rocky Mts., ii, 1823, 48.—BAIRD & GIRARD, Cat. N. A. Rept., pt. i, Serp., 1853, 8.—BD., P. R. R. Rep., x, 1859, 40.—*Id.* U. S. & Mex. Bound. Surv., ii, Rept., 1859, 14.—COOP. & SUCKL., Nat. Hist. Wash. Terr., 1860, 295.—COPE, Check-List N. A. Batrach. & Rept., 1875, 33.

Caudisona confluenta, COPE, App. Mitchell's Res., 1861, 122.—*Id.*, Proc. Acad. Nat. Sci. Phila., 1866, 307.—ALLEN, Proc. Bost. Soc. Nat. Hist., xvii, 1874, 307-309.

Crotalus lecontei, HALLOW., Proc. Acad. Nat. Sci. Phila., vi, 1851, 180.—*Id.*, Sitgreave's Exp. Zuñi & Col. Riv., 1853, 139.—*Id.*, P. R. R. Rep., x, 1859, 18.—HEERM., P. R. R. Rep., x, 1859, 25.

Caudisona lecontei, COPE, App. Mitchell's Res., 1861, 121.—HAYD., Trans. Am. Phil. Soc., xii, 1862, 177.

Caudisona confluenta var. *lecontei*, COPE, Proc. Acad. Nat. Sci. Phila., 1866, 307.

Crotalus cineroeus (sic), LEC. *apud* HALLOW., Sitgreave's Exp. Zuñi & Col. Riv., 1853, 140.

NOTE.—De Kay in Nat. Hist. State of N. Y., 1842, pt. iii, 55, gives *C. durissus*, Linn., as a synonym, marked with an interrogation point.

HAB.—Central and Sonoran Regions, entering Texan District of the Austro-riparian.

This species is upon the western plains and mountains the most numerous of the *Crotalidæ*. It exhibits in a marked degree the mimicry of coloration so often seen in reptiles, varying from deep-brown to bright-gray. Specimen P 3 is a variety with the muzzle scutella much like *C. scutulatus*, Kenn.; No. 2 resembles it also, but in a less marked degree.

No.	Locality.	Date.	Collector.
59	Provo, Utah.....	July, 1872	Dr. H. C. Yarrow and H. W. Henshaw.
213	Snake Valley, Nev	Aug., 1872	Dr. H. C. Yarrow.
D	Antelope Springs, Nev	do	Do.
188	Rush Lake, Utah	do	H. W. Henshaw.
401	Deseret City, Utah.....	Oct., 1872	Dr. H. C. Yarrow.
P	Arizona	Nov., 1872	Francis Klett.
13	San Mateo, N. Mex.....	July 6, 1873	Dr. C. G. Newberry.
2	Fort Wingate, N. Mex	July, 1873	Do.
240	Camp Apache, Ariz.....	Aug., 1873	Do.
P 3	Arizona	do	H. W. Henshaw.
P P P 4	Southern Arizona	—, 1873	Do.

CROTALUS MOLOSSUS, Baird & Girard.

Crotalus molossus, BAIRD & GIRARD, Cat. N. A. Rept., pt. i, Serp., 1853, 10.—BD., U. S. & Mex. Bound. Surv., ii, Rept., 1859, 14, pl. 11.—COPE, Check-List N. A. Batrach. & Rept., 1875, 33.

Crotalus ornatus, HALLOW., Proc. Acad. Nat. Sci. Phila., vii, 1854, 192.—*Id.*, P. R. R. Rep., x, 1859, 23.

Caudisona molossus, MITCHELL'S Res., 1861, 124.—COPE, Proc. Acad. Nat. Sci. Phila., 1866, 307-308.

HAB.—Sonoran Region, entering Texas District.

Apparently as rare as the preceding species. Attains a large size.

No.	Locality.	Date.	Collector.
P P P 1	Southern Arizona	—, 1873	H. W. Henshaw.

Genus CAUDISONA, Laurenti.

CAUDISONA EDWARDSII, Baird & Girard.

Crotalophorus edwardsii, BAIRD & GIRARD, Cat. N. A. Rept., pt. i, Serp., 1853, 15.—BD., U. S. & Mex. Bound. Surv., ii, Reptiles, 1859, 15.

Caudisona edwardsii, COPE, Check-List N. A. Batrach. & Rept., 1875, 34.

HAB.—Sonoran District.

This beautiful species has been met with but in one instance by the collectors of the expedition.

No.	Locality.	Date.	Collector.
1307	Southern Arizona	Sept., 1874	H. W. Henshaw.

While in Arizona, Dr. Coues discovered a new and beautiful species of *Crotalus* (Plate xxii), which Professor Cope has described, and named *Crotalus pyrrhus*. It is the most brilliantly colored of its genus, and is allied to *C. mitchellii*. This serpent was not seen by the survey.

Through the investigation of this genus by Professor Cope, we are now acquainted with eighteen species in all belonging to it, although one or two still remain to be identified. From his paper on the subject, a list is given as follows; but this list has since been reduced according to his new Check-List of N. A. Batrachia and Reptilia, published by the Smithsonian Institution.

The intensity of the distribution of these serpents is the region of Lower California, Upper Sonora, and Arizona, which has seven peculiar species, and three which enter from the neighboring districts. As the literature on this genus is much scattered, it is deemed advisable to give a synopsis according to Professor Cope.

“The genus divides itself into two natural sections:

“I. *Top of muzzle covered by three pairs of symmetrical shields in contact; nasals distinct:*

“a. *Rattle acuminate:*

“*C. durissus*, Linn.—Scales in 29 rows; 4 rows scales below orbit: yellow, with two brown longitudinal bands on anterior part of body, remainder with black rhombs embracing yellow centers.—Sonora and Mexico, to Vera Cruz.

“*C. terrificus*, Laurenti.—4 rows of scales below orbit: brown, with two darker bands above anteriorly, and a series of large, darker dorsal rhombs, with yellow outlines.—Brazil, Mexico.

“*C. basiliscus*, Cope.—2 and 3 rows of scales below eye; rows on body 29; labials 14: yellow-brown, with large adjacent chestnut; red-yellow bordered dorsal rhombs, alternating with chestnut spots; no longitudinal bands anteriorly.—Western Mexico.

“aa. *Rattle parallelogrammic* :

“*C. molossus*, Baird and Girard.—29 rows of scales; 18 labials, separated by 5 rows from orbit: brownish sulphur above, with small, transverse, reddish, dorsal rhombs, the angles produced as lateral bands; no longitudinal bands on neck; tail black.—Arizona and New Mexico.

“II. *Nasal plates distinct; muzzle with small plates or numerous scales above* :

“a. *Muzzle with 2 marginal shields above each canthus rostralis* :

“b. *An elevated, narrow, cuneiform rostral* :*

“*C. polystictus*, Cope.—Scales 27 rows; superior labials 14, separated from orbit by 2 rows: gray-brown, with 7 longitudinal rows of brown spots; top of head variegated.—Mexico.

“*C. triseriatus*, Wagler.—Scales 23 rows; 2 pairs of large scales on top of muzzle; 6 rows between orbits: yellowish, with a dorsal series of subround brown spots.—Mexico.

“*C. confluentus*, Say.—Scales 25–7? (–9) rows; labials 15 to 18, separated from orbit by 4 rows; 6 to 10 rows between superciliaries: yellow line from superciliaries above angle of mouth; a median dorsal row of brown spots, emarginate before and behind, with alternating lateral series.—Central and South-west North America.

“*C. lucifer*, Baird and Girard.—Scales 25–7; labials 15–16, with 4 rows above them: numerous subround, blackish, dorsal spots, separated by narrow yellow lines; a light band from supercilia above angle of mouth.—Pacific Region of North America, Arizona.

“*C. scutulatus*, Kennicott.—Scales 25 rows; superior labials 16; 3 or 4 rows interorbital scales, bounded in front by two shields: yellow stripe from eyebrow above rictus oris: yellowish brown, with a dorsal series of truncate, brown, yellow edged rhombs; tail black ringed.—Arizona.

“NOTE.—Mr. Henshaw informs me he killed several serpents

* Professor Cope states that the former division of the species based on the acuminate or parallelogrammic form of the rattle must be abandoned, as several of them with acuminate rattle exhibit a parallelogrammic one when they reach a large size.

in Southern Arizona, which was probably this species, but he was unable to preserve them; the rattle and tail showing them to belong to this division of the genus.

"*C. atrox*, Baird and Girard.—Scales 25–7 rows; labials 15; muzzle with small scales above: yellowish, with a dorsal series of completely yellow edged, brown rhombs; yellow band from supercilian above angle of mouth; tail black ringed.—Texas and Sonora.

"*C. adamanteus*, Beauvois.—Scales 27 rows; labials 15–16; muzzle above with small scales, acuminate: brown, with three series of brown, yellow edged, complete rhombs, the median larger, only separated by their yellow margins; a yellow line from supercilian to angle of mouth.—Florida and Georgia.

"*C. horridus*, Linn.—Scales 23–5, all carinate; labials 12–14; 2 rows between them and the orbit: light line from superciliary plate to angle of mouth; two series of dorsal rhombs, confluent except on the anterior part of the body, forming transverse zigzag blotches; tail black.—Eastern District of North America.

"bb. *One equilateral broad or depressed rostral:*

"*C. enyo*, Cope.—Scales 23 rows; superior labials 13; superciliaries separated by 6 rows; scales on muzzle small: above yellow, with a median series of small transverse rhombs, which are prolonged into vertical lateral black bars; former median and longitudinal on neck; light line to above canthus oris.—Lower California.

"*C. tigris*, Kennicott.—Scales 21–3 rows, numerous smooth plates on top of muzzle, rostral lower; labials 14, separated by 2 rows from orbit; superciliary space wide: yellowish ash, with small dorsal blotches on anterior one-third, and cross bands on posterior two-thirds of body.—Deserts of Gila and Colorado.

"aa. *Upper margin of canthus rostralis, with small scales like the others:*

"d. *Prenasal in contact with rostral; superciliary prolonged into a horn:*

"*C. cerastes*, Hallowell.—2 elongate preorbitals; rostral broad

as high; rattle parallelogrammic; scales 21-3; labials 11-13: light yellowish, with several series small brown spots, median largest.—Deserts of the Gila and Colorado, Arizona.

“NOTE.—Lieutenant Wheeler informs me that during his boat trip up the Colorado in September, 1871, very many serpents presumably of this species were seen on the rocky and sandy banks of the river.

“The Indian guides and porters moved among them apparently fearless of their bite, as at the time they were shedding their skin, and blind. They were also seen in Arizona, and are called ‘side-winders’ by the settlers, owing to their peculiar lateral progressive motion.

“*dd. Prenasal separated from rostral by scales; superciliary not prolonged:*

“*C. mitchellii*, Cope.—Rostral broad as long; scales 25 rows; labials 16, separated from orbits by 3 rows; 2 elongate pre-orbitals; 1 loreal: yellowish-gray, with indistinct quadrate dorsal spots, separated by yellow, and becoming cross bands on posterior fourth; rattle parallelogrammic.—Lower California.

“*C. pyrrhus*, Cope.—Rostral broad as long; head very obtuse, rounded; scales 25 rows, 7 between superciliaries, 3 below orbit; labials 14; 2 very small preorbitals, and 4 loreals: pale vermilion, varied with yellow on the sides of the belly, with numerous large reddish-bay, transverse hexagons, which become transverse bands on posterior two-thirds of length, yellow below; rattle subacuminate.—Arizona.

“The *C. lepida* of Kennicott is the type of a genus formerly defined under the name of *Aploaspsis*, and characterized by the presence of a single large nasal shield, which is pierced by a small central nostril.

“I. *Muzzle with numerous smooth plates above:*

“*A. lepida*, Kennicott.—Rostral broad, low; scales of top of muzzle and vertex large, smooth; upper preorbital very small; loreals 3; labials 12, separated by one row from orbit; no post-ocular band.—Rio Grande, Texas.

"The following table shows how these are distributed :

"Regio Neotropica	5
"S. R. Brasiliana	2
"S. R. Mexicana	4
"Regio Nearctica	13
"S. R. Sonoriana	10
"S. R. Californiana	1
"S. R. Media	3
"S. R. Orientalis	2
	<hr/>
	18

Since this synopsis was published, Professor Cope, as already stated, has restudied the genera and species of this group, and made important changes, reducing the number of species from 18 to 15; some of the species formerly considered by him as valid being now characterized as subspecies. From his check-list, shortly to be published by the Smithsonian Institution, which he has kindly furnished me, I am enabled to give the following list of species :

CROTALIDAE.

Aploaspis lepida, KENNICOTT.

Crotalus pyrrhus, COPE.

Crotalus mitchellii, COPE.

Crotalus cerastes, HALLOW.

Crotalus tigris, KENNICOTT.

Crotalus enyo, COPE.

Crotalus horridus, LINN.

Crotalus adamanteus, BEAUV., subspecies *adamanteus*, BEAUV.

Crotalus adamanteus, BEAUV., subspecies *atrox*, BAIRD & GIRARD.

Crotalus adamanteus, BEAUV., subspecies *scutulatus*, KENNICOTT.

Crotalus lucifer, BAIRD & GIRARD.

Crotalus polystictus, COPE.

Crotalus confluentus, SAY.

Crotalus molossus, BAIRD & GIRARD.

Caudisona rava, COPE.

Caudisona miliaria, LINN.

Caudisona edwardsii, BAIRD & GIRARD.

Caudisona tergemina, SAY.

ASINEA.**FAM. COLUBRIDAE.****Genus CONTIA, Baird & Girard.****CONTIA ISOZONA, Cope.****PLATE XVIII, FIGS. 1, and 1, a.**

Contia isozona, COPE, Proc. Acad. Nat. Sci. Phila., 1866, 304.—*Id.*, Check-List N. A. Batrach. & Rept., 1875, 36.

HAB.—Utah, Nevada, Arizona.

Two specimens of this beautiful species were procured in Nevada in 1871. The description was based upon specimens procured in Arizona by Dr. E. Coues, U. S. A. It has also been taken in Kane County, Utah.

Genus OPHIBOLUS, Baird & Girard.**OPHIBOLUS DOLIATUS, Linn., subspecies ANNULATUS, Kenn.**

Lampropeltis annulata, KENN., Proc. Acad. Nat. Sci. Phila., 1860, 329.—COPE, Proc. Acad. Nat. Sci. Phila., 1860, 257.

Ophibolus doliatus, subspecies *annulatus*, COPE, Check-List N. A. Batrach. & Rept., 1875, 36.

HAB.—Kansas, Arkansas, Texas, Arizona.

Tolerably common in Arizona.

No.	Locality.	Date.	Collector.
P 2	Camp Apache, Ariz	July, 1873	H. W. Henshaw.
P 3	..... do .....	..... do	Do.

OPHIBOLUS PYRRHOMELAS, Cope.**PLATE XIX, FIGS. 1, 1, a, and 2.**

Ophibolus pyrrhomelanus, COPE, Proc. Acad. Nat. Sci. Phila., 1866, 305.

Ophibolus pyrrhomelas, COPE, Check-List N. A. Batrach. & Rept., 1875, 37.

HAB.—Arizona and California.

This species was discovered in Arizona by Dr. E. Coues, U. S. A., and in 1871 several specimens were secured by this expedition, from which it is

inferred to be tolerably common. Is closely allied to the succeeding species. From an examination of the plate, it will be seen that two individuals of the same species vary greatly in coloration and markings.

OPHIBOLUS GETULUS, Linn., subspecies **BOYLI**, Baird & Girard.

Ophibolus boylii, BAIRD & GIRARD, Cat. N. A. Rept., pt. i, Serp., 1853, 82.—BD. P. R. R. Rep., x, 1859, 2.—*Id.*, U. S. & Mex. Bound. Surv., ii, Rept., 1859, 20.—COPE, Proc. Acad. Nat. Sci. Phila., 1866, 315.

Lampropeltis boylii, COPE, Proc. Acad. Nat. Sci. Phila., 1860, 255.

Coronella balteata, HALLOW., Proc. Acad. Nat. Sci. Phila., 1853, 236.—*Id.*, P. R. R. Rep., x, 1859, 14.

Ophibolus getulus, LINN., subspecies *boylii*, COPE, Check-List N. A. Batrach. & Rept., 1875, 37.

HAB.—Pacific and Sonoran Regions.

This species is tolerably common in the more southern localities visited.

No.	Locality.	Date.	Collector.
54 A B	Southern Arizona	Oct., 1873	Dr. C. G. Newberry.

Genus DIADOPHIS, Baird & Girard.

DIADOPHIS PULCHELLUS, Baird & Girard.

Diadophus pulchellus, BAIRD & GIRARD, Cat. N. A. Rept., pt. i, Serp., 1853, 115.—BD. P. R. R. Rep., x, 1857, 11.

HAB.—Arizona.

A single specimen only secured in 1873, which has 17 rows of dorsal scales on the back instead of 15; no brown stripes on back.

Not abundant in regions visited.

No.	Locality.	Date.	Collector.
605	Camp Apache, Ariz	Aug. 25, 1873	H. W. Henshaw.

Genus PHIMOTHYRA, Cope (Salvadora).

PHIMOTHYRA GRAHAMIAE, Baird & Girard.

Salvadora grahamiae, BAIRD & GIRARD, Cat. N. A. Rept., pt. i, Serp., 1853, 104, 161.—BD., U. S. & Mex. Bound. Surv., ii, Rept., 1859, 21.

Phimothyra grahamiae, COPE, Proc. Acad. Nat. Sci. Phila., 1866, 310.—*Id.*, Check-List N. A. Batrach. & Rept., 1875, 38.

HAB.—Lower Californian and Sonoran Regions to Utah & Texas.

OPHIDIA—COLUBRIDAE—PITYOPHIS SAYI, MEXICANUS. 539

This species is very closely allied to *P. hexalepis*,* Cope, from Arizona, discovered by Dr. Coues, but has a larger tail, four times in length instead of three, besides other specific differences.

Is not common.

No.	Locality.	Date.	Collector.
R 4	Southeastern Arizona.....	Oct., 1873	H. W. Henshaw.

Genus CYCLOPHIS, Günther.

CYCLOPHIS VERNALIS, De Kay.

Coluber vernalis, DE KAY, MSS.—HARLAN, Jour. Acad. Nat. Sci. Phila., v, 1827, 361.—*Id.*, Med. & Phys. Res., 1835, 124.—STORER, Mass. Rept., 1839, 224.—HOLBROOK, N. A. Herp., iii, 1842, 79, pl. xvii.—DE KAY, N. Y. Fauna, Reptiles, 1842, 40, pl. xi, f. 22.—THOMP., Hist. Verm., 1842, 117.

Chlorosoma vernalis, BAIRD & GIRARD, Cat. N. A. Rept. pt. i, Serp., 1853, 108.

Herpetodryas vernalis, HALLOW., Proc. Acad. Nat. Sci. Phila., viii, Oct., 1856, 243.—TENNEY, Nat. Hist., 1866, 304.

Cyclophis vernalis, COPE, Check-List N. A. Batrach. & Rept., 1875, 38.

HAB.—Eastern and Austroriparian Regions; rare in the latter.

The specimen indicated below is the only one collected by the expedition, and is the first indication of the existence of the species in the Rocky Mountain region.

No.	Locality.	Date.	Collector.
Q L 5	Abiquiu, N. Mex	Aug., 1874	Dr. O. Loew.

Genus PITYOPHIS, Holbrook.

PITYOPHIS SAYI, Schlegel, subspecies MEXICANUS, Duméril & Bibron.

Pityophis mexicanus, DUMÉRIL & BIBRON, Exp. Gén., vii, 236.

Pityophis sayi SCHLEGEL, subspecies *mexicanus*, DUMÉRIL & BIBRON, COPE, Check-List N. A. Batrach. & Rept., 1875, 39.

HAB.—Sonoran and Central Regions, entering the Texan District.

Quite abundant, showing same diversity of coloration as following spe-

* *Phimothyra grahamiæ*, subspecies *hexalepis*, COPE, Check-List N. A. Batrach. & Rept., 1873, 38.

Phimothyra hexalepis, Proc. Acad. Nat. Sci. Phila., 1866, 305.

cies. The specimen marked Y Y Y has had the tail broken, and it is capped by a horny segment.

No.	Locality.	Date.	Collector.
63	Oak Orchard, Ariz	Aug., 1873	Dr. C. G. Newberry.
Y Y Y	San Ildefonso, N. Mex	Sept., 1874	Dr. H. C. Yarrow.

PITYOPHIS SAYI, Schlegel, subspecies BELLONA, Baird & Girard.

a. SAYI.

- Coluber melanoleucus* var. *sayi*, HARLAN, Jour. Acad. Nat. Sci. Phila., v, 1827, 360.—*Id.*, Med. & Phys. Res., 1835, 123.
Coluber sayi, SCHLEGEL, Ess. Physiog. Serp., 1837, 157 (not *Coronella sayi*, HOLBROOK, nor *Coluber sayi*, HARLAN, which are *Ophibolus*).—BAIRD & GIRARD, Cat. N. A. Rept., pt. i, Serp., 1853, 151.
Pityophis sayi, BAIRD & GIRARD, Cat. N. A. Rept., pt. i, Serp., 1853, 152 (in text).—KENNICOTT *apud* COOP. & SUCKL., Nat. Hist. Wash. Terr., 1860, 300.—HAYD., Trans. Philo. Soc. Phila., xii, 1862, 177 (not found in the Sonoran region.)

b. BELLONA.

- Churchillia bellona*, BAIRD & GIRARD, Stans. Rep. Exp. Great Salt Lake, 1852, 350.
Pityophis affinis, HALLOW., Proc. Acad. Nat. Sci. Phila., vi, 1852, 181.—HALLOW., Sitgreave's Rep. Zuñi & Col. Riv., 1853, 130, 146.
Pituophis bellona, BAIRD & GIRARD, Cat. N. A. Rept., pt. i, Serp., 1853, 66, 157.
Pityophis bellona, KENNICOTT *apud* BD., P. R. R. Rep., x, 1859, 42.—BD., P. R. R. Rep., x, 1859, 19.—KENNICOTT *apud* BD., U. S. & Mex. Bound. Surv., ii, Rept., 1859, 18.—COPE, Proc. Acad. Nat. Sci. Phila., 1866, 305.—ALLEN, Proc. Bost. Soc. Nat. Hist., xvii, 1874, 69.
Pityophis sayi, SCHLEGEL, var. *bellona*, BAIRD & GIRARD, COPE, Check-List N. A. Batrach. & Rept., 1875, 30.

HAB.—Sonoran and Pacific Subregions, with Nevada and Utah.

Abundant throughout the regions visited. A full *suite* of specimens secured; showing great diversity of coloration and variability of head shields, as alluded to by Professor Cope (Proc. Acad. Nat. Sci. Phila., 1866, 305).

No.	Locality.	Date.	Collector.
J	Provo, Utah.....	July, 1872	Dr. H. C. Yarrow and H. W. Henshaw.
203	Pymont, Nev.....	Aug., 1872	Dr. H. C. Yarrow.
204	..... do .....	..... do	Do.
E	Snake Creek, Nev.....	..... do	Do.
193	Rush Lake, Utah.....	Sept., 1872	H. W. Henshaw.
C	Fillmore, Utah.....	..... do	Dr. H. C. Yarrow.
C 1	..... do .....	..... do	Do.
A	Beaver, Utah.....	..... do	Dr. H. C. Yarrow and H. W. Henshaw.
C O	Fort Wingate, N. Mex.....	July 20, 1873	H. W. Henshaw.
E 7	Gila River, N. Mex.....	Aug., 1873	Dr. C. G. Newberry.
951	Fort Bayard, N. Mex.....	Oct. 22, 1873	H. W. Henshaw.
123	Willow Spring, Ariz.....	July, 1874	Dr. J. T. Rothrock.
55	Colorado Chiquito, N. Mex.....	..... do	H. W. Henshaw.
58	New Mexico.....	..... do	Do.
364	Pagosa, Colo.....	Sept., 1874	Dr. H. C. Yarrow and C. E. Aiken.
280	..... do .....	..... do	C. E. Aiken.
365	..... do .....	..... do	D. Mears.
W 1	..... do .....	..... do	Lieut. C. W. Whipple.

PITYOPHIS ELEGANS, Kennicott.

Arizona elegans, KENNICOTT, U. S. & Mex. Bound. Surv., ii, Rept., 1859, 18.—BD., P. R. R. Rep., x, 1859, 42, pl. xiii.—KENNICOTT *apud* BD., U. S. & Mex. Bound. Surv., ii, 1859, pl. xiii.

Pityophis elegans, COPE, Check-List N. A. Batrach. & Rept., 1875, 39.

HAB.—Sonoran Region.

Not nearly so abundant as the preceding species.

No.	Locality.	Date.	Collector.
R 4 A	Southeastern Arizona.....	Oct., 1873	H. W. Henshaw.
1200	Southern Arizona.....	Oct., 1874	Do.

Genus BASCANIUM, Baird & Girard.

BASCANIUM CONSTRICTOR, Linn., subspecies VETUSTUM, Baird & Girard.

Coluber flaviventris, SAY, Long's Exped. Rocky Mts., ii, 1823, 185.

Bascanion flaviventris, BAIRD & GIRARD, Cat. N. A., Rept., pt. i, Serp., Jan., 1853, 96.—BD., U. S. & Mex. Bound. Surv., ii, Rept., 1859, 20.

Coryphodon flaviventris, HALLOW., Proc. Acad. Nat. Sci. Phila., Oct., 1856, 241.

Bascanion vestutus, BAIRD & GIRARD, Cat. N. A., Rept., pt. i, Serp., 1853, 97.—GIRARD, Herp. U. S. Exp. Exped., 1858, 127.—COOPER, P. R. R. Rep., xii, pt. ii, 1860, 301.

Bascanium constrictor, LINN., subspecies *vestutum*, BAIRD & GIRARD.—COPE, Check-List N. A. Batrach. & Rept., 1875, 40.

HAB.—Pacific Region.

The only species of the former genus *Bascanium* met with in Utah in 1872, although we were informed that *B. constrictor* had been observed. This serpent is entitled "Blue Chaser" by the settlers, and appears to be dreaded, for what reason we were unable to ascertain.

Quite common.

No.	Locality.	Date.	Collector.
31	Provo, Utah	July, 1872	Dr. H. C. Yarrow and H. W. Henshaw.
262	Pueblo, Colo	July, 1874	C. E. Aiken.
236 O	Tierra Amarilla, N. Mex	Sept., 1874	Prof. E. D. Cope.

BASCANIUM FLAGELLIFORME, Catesby, subspecies TESTACEUM, Say.

Coluber testaceus, SAY, Long's Exped. Rocky Mts., ii, 1823, 48.—HARLAN, Jour. Acad. Nat. Sci. Phila., v, 1827, 348.—HOLBROOK, N. A. Herp., iii, 1842, 63.—HARLAN, Med. & Phys. Res., 1835, 113.

Masticophis testaceus, BAIRD & GIRARD, U. S. & Mex. Bound. Surv., ii, Rept., 1859, 20.—BD., P. R. R. Rep., x, 1859, 43.—COPE, Proc. Acad. Nat. Sci. Phila., 1866, 305.

Drymobius testaceus, COPE, Proc. Acad. Nat. Sci. Phila., 1860, 561.

Psammophis flavigularis, HALLOW., Proc. Acad. Nat. Sci. Phila., vi, 1852, 178.—*Id.*, Sitgreave's Exp. Zuñi & Col. Riv., 1853, 131-146.

Masticophis flavigularis, BAIRD & GIRARD, Cat. N. A. Rept., pt. i, Serp., 1853, 99, 159.

Herpetodryas flavigularis, HALLOW., P. R. R. Rep., x, 1859, 12.

Bascanium flagelliforme, CATESBY, subspecies *testaceum*, SAY, COPE, Check-List N. A. Batrach. & Rept., 1875, 40.

HAB.—Lower Californian and Sonoran Regions, with Nevada, Utah, and Texas.

Very abundant in regions visited, and particularly noticeable on account of diversity and mimicry of color, depending in a marked degree upon the character of locality where found.

No.	Locality.	Date.	Collector.
D 1	Middle Utah	Sept., 1872	H. W. Henshaw.
P	Camp Apache, Ariz	Aug., 1873	Do.
P 1	do	do	Do.
277	Pueblo, Colo	July, 1874	Dr. H. C. Yarrow.
L 7	New Mexico	Sept., 1874	Dr. O. Loew.

BASCANIUM TAENIATUM, Hallow., subspecies LATERALE, Hallow.

Leptophis taeniata, HALLOW., Proc. Acad. Nat. Sci. Phila., vi, 1852, 181.—*Id.*, Sitgreave's Exp. Zuni & Col. Riv., 1853, 133-146.

Masticophis taeniatus, BAIRD & GIRARD, Cat. N. A. Rep., pt. i, Serp., 1853, 103.—BD., P. R. R. Rep., x, 1859, 20, pl. ii.—*Id.*, P. R. R. Rep., 1859, x,—COOP. & SUCKL., Nat. Hist. Wash. Terr., 1860, 302.—COPE, Proc. Acad. Nat. Sci. Phila., 1866, 305.

Drymobius taeniatus, COPE, Proc. Acad. Nat. Sci. Phila., 1860, 561.

Masticophis schottii, BAIRD & GIRARD, Cat. N. A. Rept. pt. i, Serp., 1853, 160.—BD., U. S. & Mex. Bound. Surv., ii, 1859, 20.—(*Leptophis lateralis*, HALLOW., Proc. Acad. Nat. Sci. Phila., 1853, 237, and *Masticophis ornata*, BAIRD & GIRARD, Cat. N. A. Serp., should probably be added to this list as a synonym.)

Bascanium taeniatum, HALLOW., subspecies *laterale*, HALLOW., COPE, Check-List N. A. Batrach. & Rept., 1875, 40.

HAB.—Pacific and Sonoran Regions, Utah, and Nevada.

As numerous as the preceding species, and exhibiting the same peculiarities.

It should be mentioned the last two species were, until very recently, known as *Masticophis*; but Professor Cope, after a careful study of their generic characters has regarded this name as a mere synonym of *Bascanium*.

No.	Locality.	Date.	Collector.
234	Antelope Springs, Nev	Aug. 1, 1872	Dr. H. C. Yarrow.
205	Rush Lake, Utah	Sept., 1872	H. W. Henshaw.
X X X	Cave Spring, Ariz.....	Sept., 1873	Do.
P P P 2	Southern Arizona	Oct., 1873	Do.
52 A	Nutria, N. Mex.	July, 1874	Do.
737	Camp Grant, Ariz.....	Sept., 1874	Jas. M. Rutter.
H H	Southern Arizona	Oct., 1874	H. W. Henshaw.

The following genus is a new one erected by Professor Cope to receive a species of serpent found in Arizona. But a single specimen was secured.

Genus CHILOPOMA, Cope.

Teeth subequal; the last one or two on the maxillary bone a little stouter than the others, and separated from them by an interspace; not grooved. Cephalic scuta normal above; one nasal shield and one loreal, which enters the orbital border. Rostral obtuse, with prominent lateral and posterior borders. Scales keeled; anal scutum entire; subcaudal scutella divided. General form that of *Eutænia*.

The type of this genus displays a slight tendency to the form of rostral shield seen in *Phimothyræ*, while the lateral head shields remind one of *Cyclophis æstivus*. It is, however, more like *Eutænia* in general characters.

CHILOPOMA RUFIPUNCTATUM, Cope, *gen. et. sp. nov.*

PLATE XX, FIG. 1.

Rostral plate turned over on the superior face of the muzzle, and with a truncate posterior border; the transverse extent three times the length. Internasals a little longer than wide; the prefrontals decurved laterally. Nasal long and rather narrow; loreal elongate and with convex superior border. Preocular higher than wide, in contact with frontal. The latter plate elongate and obtuse behind. Parietals elongate, bounding the entire superior postocular behind. Postoculars three; temporals 1-3-3. Eight superior labials, the last very small; the fourth and fifth bounding the orbit below. Nine inferior labials; geneials elongate, the pairs subequal. The head is an elongate oval, narrowed anteriorly, and quite distinct from the neck. The tail is one-fourth the total length. Scales in twenty-one longitudinal rows, all strongly keeled, excepting the first and second on each side; all poreless. Gastrosteges 177; urosteges, entire 4, divided 83.

General color above light-brown, olive-shaded on the head. The anterior half of the body is marked with six rows of small, alternating bright rufous or orange spots, each of which occupies one, and sometimes an adjoining scale. They stand on the first and second, the fifth, and on the eighth rows respectively. On the posterior third of the length, they are wanting, and are indistinct posterior to the middle of the length. The lower surfaces are pale brownish-gray; the base of each gastrostegæ with blackish markings. Labial plates light; head without spots. There is an inferior preocular higher than long on one side of this specimen.

Total length, .257; to rictus oris, .010; to vent, .195. Diameter of eye, .003; of interocular space, .0035.

This species was found by Mr. H. W. Henshaw in Southern Arizona in 1874.

No.	Locality.	Date.	Collector.
1097	Southern Arizona	Oct., 1874	H. W. Henshaw.

Genus EUTAENIA, Baird and Girard.

A number of changes in the arrangement and nomenclature of the species of this genus have been made by Professor Cope, according to his new check-list; and, for the purpose of comparison, the new arrangement is here given with his permission, as well as his new synopsis.

Synopsis.

I. Lateral stripe on third and fourth rows of scales; rows 19:

A. Scales little or not spotted:

* Dorsal band complete, light-colored:

Tail more than 0.35 of total length; sides pale below lateral line;
to $3\frac{1}{4}$ *E. saurita*.

Tail less than 0.33 in length; black lateral band bordered by two
rows of black scales *E. faireyi*.

Tail $3\frac{1}{2}$ times or more in total length; light below last line,
..... *E. proxima*.

** Dorsal band incomplete; all the scales keeled *E. sackenii*.

AA. Scales above and below lateral band with quadrate black spots:

† Superior labials 7; 19 series scales *E. radix*.

†† Superior labials 8; 21 rows scales:

Three rows spots on each side on scales; belly cross-lined; a
black chevron on neck *E. macrostemma*.

Three rows minute spots not covering scales; no black chevron;
lateral band on third row of scales only var. *megalops*.

II. Lateral stripe on second and third rows of scales:

† 21 rows scales; 8 superior labials; one dorsal stripe weak or wanting:

Lateral spots obsolete; no dorsal band. Yellow bands on labials;
a black chevron on neck *E. hammondi*.

Lateral spots large, distinct; yellow bands as above. . . *E. marciana*.

Lateral spots small; no bands on head; belly variably plumbeous,
..... *E. vagrans*.

Muzzle a little longer (type nearly black) . . . subsp. *angustirostris*.

A broad dorsal band; no spots; no yellow band or chevron; sides
black to orbit *E. elegans*.

†† 19 rows scales; 8 superior labials:

Head short; eye large; two rows black lateral spots; a huge nuchal spot; spots below lateral band.....*E. cyrtopsis*.

Dorsal band not bordered, bands from eye; head narrower, no bands from eye; lateral band indistinct; dorsal bordered,
E. sirtalis subsp. *dorsalis*.

††† 19 rows scales; 7 superior labials:

Two series of spots between vertebral and lateral bands; no light band on head; belly green; lateral band little defined below,
E. sirtalis.

No dorsal band; spots scarcely visible on scales; lateral indistinct,
subsp. *ordinatus*.

a. Dorsal band:

Spots all distinct.....subsp. *sirtalis*.

Spots obscure; space between bands uniform brown,
subsp. *obscura*.

Spots large; of superior row united, forming a broad black band,
subsp. *parietalis*.

Spots small; a narrow line connecting superiors as border of band.....subsp. *dorsalis*.

Spots confluent into a dark band:

A lateral band (ac.).....subsp. *pickeringii*.

No lateral band.....subsp. *pickeringii*.

Spots minute; a black band on each side dorsal, and black band on fourth and fifth lateral rows.....subsp. *tetratenia*.

†††† Scales 17 rows:

Labials 7; two rows of spots distinct; none below the faint lateral.....*E. cooperii*.

Black, with a broad yellow dorsal band only.....*E. atrata*.

To assist in a proper recognition of the many species of this genus, the following synoptic table is added:

"A.—*Lateral stripe on third and fourth row of scales; dorsal rows 19.*

"* *Body very slender, elongated; tail very long.*

"*E. saurita*, B. and G.—*Very slender; color above light-chocolate;*

three stripes of uniform yellow; below the lateral stripes light-brown; abdomen greenish-white; average length of tail more than one-third total length.

"*E. sackenii*, Kennicott, Proc. Acad. Nat. Sci., 1859, 98.—Very slender; tail one-third total length; crown more elevated and convex anteriorly than in *E. saurita*. Olive-black above, not lighter below the greenish-yellow lateral stripe; very narrow in the third and fourth lateral rows; no dorsal stripe; abdomen uniformly greenish; resembles *E. saurita*, but has no dorsal stripe, simply a trace half an inch behind the head.

"*E. megalops*, Kennicott, Proc. Acad. Nat. Sci. Phila., 1860, 330.—Resembles *E. proxima*, but is shorter and stouter, having shorter tail, which is one-fourth the total length; eye much larger than *E. proxima*; dorsal stripe narrow, covering one and less than two half rows of scales; uniform brownish-ash, with three longitudinal stripes whitish-yellow; head olive-ash.

"*E. faireyi*, B. and G.—Stouter than *E. saurita*; head large; tail less than one-third total length; body above blackish brown, with 3 longitudinal stripes of uniform tint; abdomen greenish-white.

"*E. proxima*, B. and G., Catalogue.—Body stoutest of division; total length about three and a half times that of the tail; black above, 3 longitudinal stripes, the dorsal ochraceous, yellow, or brown; lateral greenish-white or yellow.

"***Body stouter; tail shorter.*

"*E. flavilabris*, Cope.—Form stout; head short, rounded; occipital regions convex; labials 7-8; temporal plate small; gastrostega 138-148; tail $\frac{1}{5}$ total length. Olive-brown, unspotted; dorsal and lateral stripes yellow; black-bordered tips, chin, and a posteral crescent to near occipitals, with occipital spots golden-yellow; 2 small, black, nuchal spots.—Mexico.

"*E. sumichrastii*, Cope.—Olive-brown, with 4 series of small, black spots and a trace of 2 anteriorly; 8 superior labials, last very small; no black margin on the sixth, or posterior margin of eighth, but a strong, black band from eye across posterior margin of seventh to mouth. Sides of head white, extending upward as two areas margining each occipital; behind each a black nuchal spot, separated by a narrow, white line from its fellow,

and extending over occipital plates and half of frontal; prefrontals transverse.—Mexico.

“*** *Dorsal rows 21 ; form stouter.*

“*E. radix*, B. & G.—Stout and compact; head medium, superior labials seven; ground color light olive-green, with 3 longitudinal yellow stripes, and 6 series of distinct black spots; lateral stripe on third and fourth rows not well defined.

“*E. macrostemma*, Kennicott.—Frontal plate longer than occipital suture; temporal small, margining only anterior part of penultimate labial; post-geneials larger than pre-geneials; superior labials 8; loreal higher than long, olivaceous, with one row of small, black spots below, and two rows above the lateral stripe. Two small, black, nuchal spots and a short post-oral pale crescent.

“B.—*Body stouter ; tail shorter ; lateral stripe on second and third row of scales.*

“1 *Dorsal rows 21.*

“*E. vagrans*, B. and G.—Frontal plates shorter than common occipital suture; temporal small; superior labials 8; post-geneials equal or shorter than pre-geneials. Ashy, sometimes brown, with narrow, unmarginal stripes, and very small lateral spots in two rows.

“In addition to these species, we have, according to Baird and Girard's catalogue, the following:

“*E. angustirostris*, Kennicott, Proc. Acad. Nat. Sci. Phila., 1860, 332.—Body rather stout; tail less than one-fourth total length, and very small; head more elongated and narrow than any of this genus; snout long, narrow, and pointed; crown place above eye large; dorsal stripe narrow, very indistinct; an indistinct, dull, whitish, lateral stripe on the second and third rows; above lateral stripes dark olive-brown or black; abdomen dark ashy-olive or black.

“*E. ordinoides*, B. and G., Catalogue.—Body stouter than most species; a dorsal and two lateral stripes; on each side two series of black spots, about 80 in number; between the lower series reddish-brown, between the upper olivaceous; extensive row of dorsal scales, the larger carinated; remaining scales nearly equal; caudal carinated.

"*E. hammondi*, Kennicott, Proc. Acad. Nat. Sci. Phila., 1860, 332.—Form slender; head long and narrow posteriorly; snout long, narrow, and obtuse; no dorsal stripe; lateral stripe olive-yellow on second and third rows; back uniform dark olive-brown or blackish, without distinct spots; abdomen whitish olive, lighter anteriorly, and a dark line along the middle posteriorly.

"*E. concinna*, B. and G., Catalogue.—Body stout; head small and reddish-yellow; scales all carinated; above black, with a dorsal, light stripe, and the usual lateral stripes replaced by a series of distinct salmon-colored spots.

"*E. elegans*, B. and G., Catalogue.—Resembles *E. proxima*. Head short and broad; black above, light beneath; a broad, ochraceous, dorsal stripe, with two lateral greenish-white.

"*E. marci*ana, B. and G., Catalogue.—Prominent color light-brown; a vertebral paler line, and one lateral on each side, more or less indistinct; 3 series of square black spots on each side, of about 50–60 in each series, from occiput to anus; sides of head black, with a crescentic patch of yellow posterior to the labial plates; 3 and sometimes 4 black vittæ radiating from the eye across the jaws; a double white spot with a black margin on the suture of occipital plates.

"*E. couchii*, Kennicott, vol. x, P. R. R. Rep., 10.—Body moderately stout; tail less than one-fourth total length, and very small; head very long and narrow; dorsal stripe narrow and very indistinct; an indistinct, dull, whitish, lateral stripe on second and third rows. Above dark olive-brown or black; abdomen dark ashy-olive or black.

2. 19 dorsal rows of scales.

"*E. phenax*, Cope, Proc. Acad. Nat. Sci. Phila., 1868, 134.—Resembles *E. sirtalis*, but is cross-banded. Head short, muzzle obtuse, eye large; above reddish-olive, crossed by 36 transverse spots, which are bright brownish-red, with a narrow black margin; no lateral stripes; abdomen strong green, unspotted.—Mexico.

"*E. scalaris*, Cope.—Form stout; temporal small, not attaining the reduced last upper labial; superior labials 7; nuchal blotches same color

as head; one series of numerous brown bars connecting the light stripes, none of which are black-edged.—Mexico.

"*E. cyrtopsis*, Kennicott.—Form slender; temporal large, margining the last 3 upper labials, none of which are reduced; superior labials 8 (7); general color brown; large nuchal blotches, and a double series of very small, lateral spots, black; latter forming continuous zigzag on stretched skin; no black margins.

"*E. ornata*, B. and G.—Form slender; tail 3 or $\frac{2}{5}$ in total; head narrow, elongate; loreal longer than high; 4 superior labials, temporal not extending beyond penultimate; above uniform, except on stretched skin, where there is a broad border to dorsal vittæ, and one lateral row of black spots separated by rufous.

"*E. infernalis*, B. and G., Catalogue.—More slender than any species of this section. Head and eye large; above black; a series of about 110 triangular, reddish-yellow spots, confluent with the indistinct lateral stripe, itself confluent with the greenish-white sides and abdomen.

"*E. pickeringii*, B. and G. Catalogue.—Body slender; black above, slate-color beneath; lateral stripe irregular, confluent with the light-colored intervals between the dark spots. This species exhibits great variation of color, principally in regard to black of abdomen.

"*E. leptcephala*, B. and G., Catalogue.—Scales on the greater portion of the tail scarcely carinated. The two exterior dorsal rows on each side unequal, but conspicuously larger than the rest, outer one not carinated; head slender, plain above; orbitals, 3 posterior, 2 anterior; above light olive-brown, with distinct, small, brown spots, 130 in a series; from head to anus beneath pale-greenish slate; little or no indication of a lateral stripe.

"*E. sirtalis*, B. and G., Catalogue.—Body among stoutest of their form; olive-brown, above the lateral stripes sometimes nearly black, beneath them greenish-white; dorsal stripe narrow, encroached upon by the spot; lateral stripes inconspicuous; two or three rows of small, indistinct spots, often not perceptible, especially the lower, about 70 from head to anus.

"*E. dorsalis*, B. and G., Catalogue.—Same size as preceding; outer row of scales emarginate; color olivaceous; dorsal stripe broad, yellow, margined with black; a row of spots above the lateral stripe.

"*E. ordinata*, B. and G., Catalogue.—Resembles *E. sirtalis*, the spotted variety; may be distinguished by the 3 regular series of tessellated, black spots on each side, their prominence, and their number about 85, not 70; olive, with 3 distinct rows of dark square spots, one on each side; lateral stripe wanting; dorsal very indistinct.

"3. *Dorsal rows* 17.

"*E. atrata*, Kennicott, part ii, vol. xii, P. R. R. Rep.—Body moderately stout; head small and narrow; eye very small; a very broad, deep, lemon-yellow; dorsal stripe covering nearly 3 rows, and distinct from head to tip of tail; the rest of the upper parts entirely deep, the black without a trace of the lateral stripe, or of light spots; abdomen uniform greenish slate; yellowish green under the head.

"*E. cooperi*, Kennicott, *loc. cit.*—Body stout, as in *E. radix*; head short, depressed anteriorly; above uniform blackish brown, without, spots or olivaceous brown, with two rows of black spots, as in *E. vagrans*, but which do not encroach upon the stripes; dorsal stripes yellowish, distinct on one or two half rows; lateral stripe usually distinct; abdomen slate color, sometimes lighter, frequently tinged with red.

EUTAENIA VAGRANS, Baird & Girard, subspecies VAGRANS, Baird & Girard.

Eutaenia vagrans, BAIRD & GIRARD, Cat. N. A. Serp., 1853, 35.—GIRARD, Herp. U. S. Exp. Exped., 1858, 154.—BD., P. R. R. Rep., x, 1859, 19.—COOP. & SUCKL., Nat. Hist. Wash. Terr., 1860, 297.—COPE, Proc. Acad. Nat. Sci. Phila., 1866, 305–307.

Eutaenia vagrans subspecies *vagrans*, BAIRD & GIRARD, COPE, Check-List N. A. Batrach. & Rept., 1875, 41.

HAB.—Central Pacific and northern parts of Sonoran Regions.

The most abundant species inhabiting the Western States and Territories; exhibiting, also, great diversity of coloration. The differences in some of the specimens captured, such as variation in number of side spots, head shields, &c., might almost entitle them to be classed as subspecies.

The specimen in the list marked E has on the right side three postorbitals, on the left four.

No.	Locality.	Date.	Collector.
I	Provo, Utah	July, 1872	Dr. H. C. Yarrow and H. W. Henshaw.
F	..... do .....	..... do	Do.
K	..... do .....	..... do	Do.
192	Willow Spring, Utah.....	Aug., 1872	Do.
202	Pymont, Nev .....	..... do	Dr. H. C. Yarrow.
214	Snake Valley, Nev .....	..... do	Do.
F 1	Rush Lake, Utah	Sept., 1872	H. W. Henshaw.
F 2	..... do .....	..... do	Do.
F 3	..... do .....	..... do	Do.
F 4	..... do .....	..... do	Do.
F 5	..... do .....	..... do	Do.
F 6	..... do .....	..... do	Do.
189	..... do .....	..... do	Do.
189 A	..... do .....	..... do	Do.
189 B	..... do .....	..... do	Do.
187	Camp Beaver, Utah .....	..... do	Dr. H. C. Yarrow and H. W. Henshaw.
B	..... do .....	..... do	Do.
B 1	..... do .....	..... do	Do.
B 2	..... do .....	..... do	Do.
294	..... do .....	..... do	Do.
312	North Creek, Utah.....	..... do	Do.
312 A	..... do .....	..... do	Do.
12	Willow Springs, N. Mex.	June 28, 1873	Dr. C. G. Newberry.
501 A	Pescado, N. Mex.	July 24, 1873	H. W. Henshaw.
526	Camp Apache, Ariz	Aug. 14, 1873	Do.
67 jun.	Mineral Springs, Ariz.....	Aug., 1873	Dr. C. G. Newberry.
52 A	Nutria, N. Mex. ....	..... do	H. W. Henshaw.
52 A 1	..... do .....	..... do	Do.
D	Twin Lakes, Colo. ....	..... do	Dr. J. T. Rothrock.
B	..... do .....	..... do	Do.
D 1	..... do .....	..... do	Do.
E	..... do .....	..... do	Do.
C	..... do .....	..... do	Do.
AA	..... do .....	..... do	Do.
AX	..... do .....	..... do	Do.
197 C	San Luis Valley, Colo.....	Sept., 1873	Do.
197 B	..... do .....	..... do	Do.
1 L 4	New Mexico	Aug., 1874	Dr. O. Loew.
108	Taos, N. Mex .....	..... do	Dr. H. C. Yarrow.
102	..... do .....	..... do	Do.
123	..... do .....	..... do	Do.
112	..... do .....	..... do	Do.
124	..... do .....	..... do	Do.
117	..... do .....	..... do	Do.
119	..... do .....	..... do	Do.
A 153	..... do .....	..... do	Do.
127	San Ildefonso, N. Mex .....	..... do	Do.

No.	Locality.	Date.	Collector.
208	Conejos, Colo	Aug., 1874	A. Barnes.
L 47	Sierra Blanca, N. Mex	Sept., 1874	Dr. O. Loew.
207 A	Pagosa, Colo .....	.... do	C. E. Aiken.
B 1	..... do .....	.... do	A. Barnes.
383	San Juan River, N. Mex.....	.... do	Lieut. R. Birnie.

This species is chiefly characteristic of the Central region, but occurs in Utah and Arizona, chiefly in the mountains. In our progress southward, in the valley of the Rio Grande, the last specimens were seen at Taos on the north side of the Picoris Mountains. On the south side of that range, the *Eutænia marciana* appeared for the first time. Here also I saw the first specimens of *Crotaphytus collaris*, although it extends north of that latitude on the east side of the Sangre de Cristo Mountains. The *Cnemidophorus tessellatus* began to be abundant in the valley of Taos. The third species of *Eutænia*, the *E. ornata*, began to appear in numbers at San Ildefonso, further south. This is a particularly graceful species, with elegant coloration; the clear olive is varied on each side by alternating quadrate red spots in two rows, and the dorsal band has a black border. It does not reach so large a size as the *E. marciana*, which also exceeds the *E. vagrans*. Although these species exhibit identical scale-formulæ, they are quite distinct in life, so that no person can confuse them. And although the *E. vagrans* is rather variable, the *E. ornata* and *E. marciana* maintain their characters in the region of country where they came under observation. The *E. cyrtopsis* was not seen.

EUTAENIA ORNATA, Baird.

Eutainia parietalis, SAY, BAIRD & GIRARD, Cat. N. A. Rept., pt. i, Serp., 1853, 28.

Eutænia ornata, BD., U. S. & Mex. Bound. Surv., ii, 1859, Rept., 16.—COPE, Proc. Acad.

Nat. Sci. Phila., 1866, 305-306.—Check-List N. A. Batrach. & Rept., 1875, 41.

HAB.—Valley of the Rio Grande del Norte.

This species was found tolerably common in Utah in 1872, but, curiously enough, has not since been collected by the expedition, until 1874,

when it was found to be very common in New Mexico. On dry, sandy ground, color is much fainter than in more moist localities.

No.	Locality.	Date.	Collector.
59	Provo, Utah.....	July, 1872	Dr. H. C. Yarrow and H. W. Henshaw.
65	do	do	Do.
(?)	do	do	Do.
(?)	do	do	Do.
G	Rush Lake, Utah	Sept., 1872	H. W. Henshaw.
L 52	Abiquiu, N. Mex	Aug., 1874	Dr. O. Loew.
1 L 52	do	do	Do.
2 L 52	do	do	Do.
3 L 52	do	do	Do.
Y Y 1	San Ildefonso, N. Mex	do	Dr. H. C. Yarrow.
176	do	do	Do.
176 A	do	do	Do.
1319	do	do	W. G. Shedd.
A 300	do	do	Dr. H. C. Yarrow.
166 D	do	do	Prof. E. D. Cope, Dr. H. C. Yarrow, and W. G. Shedd.

EUTAENIA SIRTALIS, Linn., subspecies **DORSALIS**, Baird & Girard.

Eutænia dorsalis, BAIRD & GIRARD, Cat. N. A. Serp., 1853, 31.—BD., P. R. R. Rep., x, 1859, 40.

Eutænia sirtalis, LINN., subspecies *dorsalis*, BAIRD & GIRARD, COPE, Check-List N. A. Batrach. & Rept., 1875, 41.

HAB.—Entire North America.

The specimens hereinafter enumerated closely resemble *E. dorsalis*, but have eight upper labial plates, and no black borders to dorsal vittæ; the lateral vittæ indistinct. Not abundant, but two specimens being secured.

No.	Locality.	Date.	Collector.
313	Rio Grande, Colo.	June, 1873	H. W. Henshaw.
313 A	do	do	Do.

EUTAENIA VAGRANS, Baird & Girard, subspecies **ANGUSTIROSTRIS**, Kenn.

Apparently rare; only one specimen being taken in Western Arizona in 1871 by Mr. F. Bischoff. Differs from *E. vagrans* in being uniform black

above, with only a trace of the lateral band in front, and having a red throat.

EUTAENIA MARCIANA, Baird & Girard.

Eutaenia marciana, BAIRD & GIRARD, Cat. N. A. Rept., pt. i, Serp., 1853, 36.—BD., U. S. & Mex. Bound. Surv., ii, Reptiles, 1855, 17.—COPE, Check-List N. A. Batrach. & Rept., 1875, 41.

HAB.—Arkansas, Texas, and entire Rio Grande Valley.

This beautiful species was found to be exceedingly abundant in the valley of the Rio Grande in New Mexico. When taken, it discharges from the small glands situated near the anus a secretion of a peculiarly unpleasant odor, and this fact has also been noticed in regard to all the serpents of this genus.

No.	Locality.	Date.	Collector.
Y Y	San Ildefonso, N. Mex.	Aug., 1874	Dr. H. C. Yarrow.
1 L 5	Abiquiu, N. Mex.	do	Dr. O. Loew.
2 L 5	do	do	Do.
3 L 5	do	do	Do.
109	Taos, N. Mex.	do	Dr. H. C. Yarrow.
L 53	New Mexico.	Sept., 1874	Dr. O. Loew.
362 E	Pueblo, Colo.	Oct., 1874	C. E. Aiken.
362 E 1	do	do	Do.

Genus HETERODON, Beauvois.

HETERODON SIMUS, Linn., subspecies **NASICUS**, Baird & Girard.

Heterodon nasicus, BAIRD & GIRARD, Stans. Rep. Exp. Great Salt Lake, 1852, 352.—*Id.*, Marcy's Rep. Exp. Red Riv., 1852, 208.—*Id.*, Cat. N. A. Rept., pt. i, Serp., 1853, 61–157.—HALLOW., Sitgreave's Rep. Zuñi & Col. Riv., 1853, 147.—*Id.*, Proc. Acad. Nat. Sci. Phila., 1856, 249.—BD., P. R. R. Rep., x, 1859, 41.—*Id.*, U. S. & Mex. Bound. Surv., ii, Rept., 1859, 18.—HAYD., Trans. Am. Phil. Soc., xii, 1862, 177.—COPE, Proc. Acad. Nat. Sci. Phila., 1866, 307.—ALLEN, Proc. Bost. Soc. Nat. Hist., xvii, 1874, 69.

Heterodon simus LINN., subspecies *nasicus*, BAIRD & GIRARD, COPE, Check-List N. A. Batrach. & Rept., 1875, 43.

HAB.—Sonoran and Central Subregions and Texas.

Very common, and greatly dreaded by the settlers in the West, who call them "Sand Vipers", notwithstanding they are entirely harmless. One specimen taken of unusually large size.

No.	Locality.	Date.	Collector.
66	Denver, Colo.	May 11, 1873	H. W. Henshaw.
A N 5	..... do	June 11, 1873	Dr. J. T. Rothrock.
P O 1	Mineral Springs, Ariz.	Aug. 4, 1873	Dr. C. G. Newberry.
M 5	Southern Arizona	—, 1873	H. W. Henshaw.
M 5, 1	..... do	—, 1873	Do.
178	Pueblo, Colo.	July, 1874	Prof. E. D. Cope.
2 L 14	New Mexico	Aug., 1874	Dr. O. Loew.
S 2	San Ildefonso, N. Mex. ....	..... do	Prof. E. D. Cope and Dr. H. C. Yarrow.
233	Santa Clara, N. Mex.	Sept., 1874	Dr. H. C. Yarrow.
L 8	Abiquiu, N. Mex. ....	..... do	Dr. O. Loew.
H H 1	Southern Arizona	Oct., 1874	H. W. Henshaw.

LACERTILIA.

PLEURODONTA.

LEPTOGLOSSA.

FAM. SCINCIDAE.

Genus EUMECES, Wiegmann.

EUMECES OBSOLETUS, Baird & Girard.

Plestiodon obsoletum, BAIRD & GIRARD, Proc. Acad. Nat. Sci. Phila., 1852, 129.—HALLOW., Sitgreave's Exp. Zuñi & Col. Riv., 1853, 111.

Plestiodon obsoletus, BD., U. S. & Mex. Bound. Surv., ii, 1859, Rept., 25.—*Id.*, P. R. R. Rep., x, 1859, 39.

Plistodon obsoletus, COPE, Proc. Acad. Nat. Sci. Phila., 1866, 304.

Eumeces obsoletus, COPE, Check-List N. A. Batrach. & Rept., 1875, 45.

HAB.—Sonoran Region, and borders of Central and Austroriparian.

Rather uncommon in Arizona, New Mexico, Colorado, and Utah.

EUMECES GUTTULATUS, Hallow.

Lamprosaurus guttulatus, HALLOW., Proc. Acad. Nat. Sci. Phila., 1852, 206.—*Id.*, Sitgreave's Exp. Zuñi & Col. Riv., 1853, 43.

Plestiodon guttulatus, HALLOW., Proc. Acad. Nat. Sci. Phila., 1857, 215.—BD., U. S. & Mex. Bound. Surv., ii, Rept., 1859, 12.—*Id.*, P. R. R. Rep., x, 1859, 18.

Plistodon guttulatus, COPE, Proc. Acad. Nat. Sci. Phila., 1866, 304.

Eumeces guttulatus, COPE, Check-List N. A. Batrach. & Rept., 1875, 45.

HAB.—Sonoran Region and Western Texas.

Tolerably common in regions visited.

No.	Locality.	Date.	Collector.
E 6 A	Gila River, Ariz	Aug., 1873	Dr. C. G. Newberry.
A 142 D	Cave Spring, Ariz	July, 1874	H. W. Henshaw.

FAM. TEIDAE.

Genus **CNEMIDOPHORUS**, Wiegmann.

CNEMIDOPHORUS SEX-LINEATUS, Linn.

Cnemidophorus sex-lineatus, LINN., Syst. Nat, 1766.—COPE, Check-List N. A. Batrach. & Rept., 1875, 45.

Ameiva sex-lineata, HOLBROOK, N. A. Herp., ii, 1842, 109.—DE KAY, Zoöl. N. Y., 1842, 30.

Cnemidophorus gularis, BAIRD & GIRARD, Proc. Acad. Nat. Sci. Phila., vi, 1852, 128.—*Id.*, Marcy's Rep. Red Riv., 1852, 227.—BD., U. S. & Mex. Bound. Surv., ii, Rept., 1859, 11.—*Id.*, P. R. R. Rep., x, 1859, 38.

Cnemidophorus guttatus, HALLOW., Proc. Acad. Nat. Sci. Phila., 1854, 192.—*Id.*, P. R. R. Rep., x, 1859, 23.

Cnemidophorus sex-lineatus var. *gularis*, COPE, Proc. Acad. Nat. Sci. Phila., 1866, 303.

HAB.—Sonoran and Austroriparian Regions to Southeastern Virginia.

In 1871, this species was observed to be quite common in Nevada, and a number were secured. In the following year, they were also observed in Utah, and, in 1873 and 1874, were found exceedingly abundant in Arizona and New Mexico, but were hard to catch, running with the greatest celerity over the sand and rocks. It is not at all arboreal in its habits. Dr. Coues mentions that, finding it impossible to capture them in the ordinary manner, he used a small load of shot in a horse-pistol. They can readily be taken with an ordinary butterfly-net.

No.	Locality.	Date.	Collector.
5 A 1	Colorado Chiquito, Ariz	July, 1873	Dr. C. G. Newberry.
5 A 2	..... do .....	..... do	Do.
528	White Mountains, Ariz	Aug., 1873	H. W. Henshaw.
528 A	..... do .....	..... do	Do.
A 151	Camp Apache, Ariz .....	..... do	Do.
656 A	..... do .....	..... do	Dr. O. Loew.
1106	Santa Fé, N. Mex.	June, 1874	H. W. Henshaw.
B 153	Plaza del Alcalde, N. Mex.	Aug., 1874	Dr. H. C. Yarrow.
1193	Camp Bowie, Ariz .....	..... do	H. W. Henshaw.
736 A	Camp Grant, Ariz	Sept., 1874	Jas. M. Rutter.
736 B	..... do .....	..... do	Do.
J 3	Abiquiu to Jemez, N. Mex .....	..... do	G. Thompson.
A 1014 A	Camp Lowell, Ariz	Oct., 1874	Jas. M. Rutter.

CNEMIDOPHORUS OCTO-LINEATUS, Bd.

Cnemidophorus octo-lineatus, Bd., Proc. Acad. Nat. Sci. Phila., ii, 1858, 255.—*Id.*, U. S. & Mex. Bound. Surv. ii, Reptiles, 1859, 10.—COPE, Check-List N. A. Batrach. & Rept., 1875, 45.

HAB.—Southern Sonoran Subregion.

First described from Pesquiera Grande, Nuevo Leon. Is seldom found in New Mexico. Resembles *C. inornatus*, but has eight equidistant light lines running down back.

No.	Locality.	Date.	Collector.
3 Y	San Ildefonso, N. Mex	Aug., 1874	Dr. H. C. Yarrow.

In our collection of 1874, there is a species of *Cnemidophorus* (No. B L 65) resembling *C. sex-lineatus* in every particular, but with the peculiarity of seven dorsal stripes instead of six.

DIPLOGLOSSA.

FAM. GERRHONOTIDAE.

Genus GERRHONOTUS, Wiegmann.

GERRHONOTUS NOBILIS, Baird & Girard.

Elegaria nobilis, BAIRD & GIRARD, Proc. Acad. Nat. Sci. Phila., 1852, 129.

Gerrhonotus nobilis, Bd., U. S. & Mex. Bound. Surv., ii, Rept., 1859, 2.—COPE, Check-List N. A. Batrach. & Rept., 1875, 46.

HAB.—Sonoran Region.

Apparently rare in Arizona; only one specimen having been secured in 1873.

No.	Locality.	Date.	Collector.
145	Ralston, Ariz.....	Nov., 1873	Dr. C. G. Newberry.

It may be mentioned, as a matter of some interest, that during the expeditions of 1871, 1872, and 1873, the lizard described as *Euphryne obesa*, a herbivorous one, by Professor Baird (Proc. Acad. Nat. Sci. Phila., 1858), was not met with, although we have probably evidence that it exists in considerable numbers in Utah and New Mexico. It is said to be abundant, according to Baird, in the cañons of Colorado, and was taken at Fort Yuma by Major Thomas, of the United States and Mexican boundary survey; but as yet we have failed to secure a specimen.

During the field season of 1872, the attention of Mr. Henshaw and myself was attracted to the occurrence of curious resinous looking deposits on the almost vertical cliffs of certain rocks in Southern Utah, many feet above the valley. A considerable portion was collected; and from its appearance we judged it to be a conglomerated mass of bat excrement.

In 1873, Dr. Oscar Loew, chemist of the expedition, discovered the same kind of deposit in a forest of juniper, within a rocky fissure, in the Territory of Colorado. He also supposed it to be the excrement of mammals; but, after a careful examination, the substance was found to be the excrement of herbivorous lizards, and as the only ones known to inhabit the region visited is the *Euphryne obesa*, Baird, it is probably from this one.

Dr. Loew's statement is here given:

"Observations on a peculiar and unique animal excretion.

"In Utah, Colorado, and New Mexico, there are frequently found black masses of resinous appearance, attached to rocks in positions which mammals, except bats, could not attain. These lumps vary in size from three to six inches in thickness. Distributed through the mass are always to be seen small pieces of feces, resembling greatly the dung of mice or bats, though much larger than the latter. These small masses, however, contain no ani-

mal or insect remains ; being exclusively composed of vegetable matter, consisting chiefly of the cellular tissue of plants ; and no traces of animal diet, like the undigested legs or wings of insects, can be detected, which fact leads to the supposition that neither bats nor mice could have made the deposit. The mass is brittle, sticky when moistened with water, swells up at a high temperature, and burns with a smoky flame. Heated in a tube, ammoniacal vapors are evolved, an empyreumatic substance is formed, and a voluminous charcoal remains.

“This substance contains—

“Hygroscopic moisture.....	7.25
“Organic matter.....	66.32
“Ash.....	26.43

“In one hundred parts of ashes were found—

“Sulphates, phosphates, chlorides, and carbonates of potassium and sodium.....	15.46
“Carbonate and phosphate of lime and magnesia, oxide of iron.....	66.54
“Insoluble in hydrochloric acid, principally fine sand.....	18.06

“NOTE.—The carbonic acid of the carbonates was produced by the incineration of the organic matter.

“As lithia had been so often found by me in soils and ashes of plants, I thought it worth while to make a spectroscopic test for it. The result was negative. The organic matter is partially soluble in water, less so in alcohol ; the aqueous solution having a neutral reaction. Upon boiling it, a very disagreeable odor is evolved, resembling that of earth mold and guano ; the taste of this solution is intensely bitter. A portion (*a*) was treated with a considerable quantity of boiling water, and the filtrate evaporated ; the evaporated residue treated with a little alcohol, and a small portion of it was dissolved. This gave, after evaporation and treatment with nitric acid, the characteristic crystals of urea. The undissolved portion was treated with a small quantity of water, when a substance remained easily soluble in hydrochloric acid, and precipitated therefrom on the addition of an equal volume of water. The portion separated from this by the treatment with water resembled somewhat a salt of glycocholic acid. The portion of

organic matter that remained entirely insoluble by treatment with a quantity of boiling water (*a*) received an addition of nitric acid, and was then evaporated; the evaporated residue extracted with cold water, when a small quantity of a yellow substance resulted that gave, with nitrate of silver and acetate of copper, the precipitates characteristic of xanthine. The portion undissolved was soluble in ammonia, and on evaporation of this solution there remained a yellow powder, little soluble in water.

“These reactions, as well as the decomposition of the hydrochloric acid solution of the organic matter on addition of water, show the presence of guanine. The murexid reaction for uric acid was very feeble, and tyrosin and leucin were searched for in vain. If the organic matter is treated with cold, concentrated sulphuric acid, a dark, blood-red solution results, the color of which is destroyed if water is added; this and several other reactions are very characteristic of bilious secretions. We have therefore, in this case, a mixture of urinary excretion, bilious secretion, and feces; and in no animals except the *Monotremata* are these products united in the cloaca.

“The question naturally arises: by what animals are these peculiar deposits made? always in the same spots, producing a continual increase of the discharged masses into little mounds in localities where, unless furnished with wings, small mammals could not climb; as, for instance, the almost vertical rock cliffs in Southern Utah.

“At the first thought, the idea presents itself that it must be some winged animal that is the cause, perhaps bats; but considering the absence of any signs of animal diet in the masses, and on comparing it with the excrement of bats, this theory becomes untenable, and must be abandoned: not only do the two substances differ in external appearance, but also in chemical composition. The excrements of bats are full of the remains of insects, and contain nothing soluble in water; but we find nothing of the kind in the substance under discussion. Moreover, there are no herbivorous bats in North America so far known; the existing species being natives of South Africa and the East Indies.

“Prof. S. F. Baird, assistant secretary of the Smithsonian Institution, to whom these excreta have been shown, and the chemical examination communicated, supposes them to have been deposited by herbivorous lizards, of

which there are several species in the Western Territories; and from the large size of the excrement scybala, the lizard is probably *Euphryne obesa*, Baird. Notwithstanding it remains a mystery (and if we accept this theory) why these deposits should be continuously added to!"

It is hoped that more careful observation will enable us at some not far distant day to solve this interesting problem.

(Note by Dr. Yarrow.)—As already stated (if the theory be a correct one), it is very singular that no individuals of this species of lizard were discovered; but our researches may perhaps reveal their existence later. The specimens of these excreta have been deposited in the National Museum at the Smithsonian Institution.

NOTE.—It may be mentioned that Professor Cope does not accept the theory that lizards produce these masses; believing them to be the excrement of small mammals, such as *Neotoma*.

FAM. HELODERMIDÆ.

Genus HELODERMA, Wiegmann.

HELODERMA SUSPECTUM, Cope.

Heloderma horridum, BD., U. S. & Mex. Bound. Surv., ii, Rept., 1859, 2 (not of Wiegmann).—*Id.*, P. R. R. Rep., x, 1859, 38.—COPE, Proc. Acad. Nat. Sci. Phila., 1866, 303.

Heloderma suspectum, COPE, Proc. Acad. Nat. Sci. Phila., 1869, 5.—*Id.*, Check-List N. A. Batrach. & Rept., 1875, 47.

HAB.—Sonoran Region.

This reptile, called "Gila Monster" by western settlers, is not uncommon in Utah, New Mexico, and Arizona. It is believed to be very poisonous, but such is not the case; for, although it will bite fiercely when irritated, the wound is neither painful nor dangerous. Several specimens were secured in 1871, 1873, and 1874; but, with one exception, all were lost in transit to Washington.

While camped on the Rio Grande near San Ildefonso, N. Mex., in August, 1874, a large lizard, presumably of this species, visited the camp, but was not secured, owing to the fact that its sudden appearance frightened the packer, who supposed it to be an alligator. The Pueblo Indians of this place said they were quite common, and were regarded by the Mexicans as

poisonous; the poison being communicated by the breath as well as by the teeth. This has no foundation in fact.

No.	Locality.	Date.	Collector.
X 4 X	Mount Turnbull, Ariz	Sept. 19, 1873	E. Sommer.

IGUANIA.

FAM. IGUANIDAE.

Genus HOLBROOKIA, Girard.

HOLBROOKIA MACULATA, Girard, subspecies MACULATA, Girard.

Holbrookia maculata, GIRARD, Proc. Am. Assoc., iv, 1850-51, 201.—*Id.*, Marcy's Rep. Red Riv., 1852, 223.—*Id.*, Stans. Rep. Exp. Great Salt Lake, 1853, 342.—BD., U. S. & Mex. Bound. Surv., ii, Rept., 1859, 8.—*Id.*, P. R. R. Rep., x, 1859, 18, 38.—HAYD., Trans. Am. Phil. Soc., xii, 1862, 177.—COPE, Proc. Acad. Nat. Sci. Phila., 1866, 313.

Holbrookia maculata, GIRARD, subspecies *maculata*, GIRARD, COPE, Check-List N. A. Batrach. & Rept., 1875, 47.

HAB.—Central and Sonoran Subregions.

Very abundant in all the regions visited; but, being much slower in their movements than most other lizards, they are easily captured.

No.	Locality.	Date.	Collector.
66 D	Denver, Colo.	May, 1873	H. W. Henshaw.
211	..... do	June, 1873	Dr. J. T. Rothrock.
211 A	..... do .....	..... do	Do.
36 A	Santa Fé, N. Mex. ....	..... do	Francis Klett.
R X	Camp Apache, Ariz	July, 1873	Dr. O. Loew.
52	Nutria, N. Mex. ....	..... do	H. W. Henshaw.
52 A	..... do .....	..... do	Do.
B 7	Santa Fé, N. Mex.	June, 1874	Do.
I B 7	..... do .....	..... do	Do.
B 39	..... do .....	..... do	Dr. J. T. Rothrock and H. W. Henshaw.
142 D	Cave Spring, Ariz.	July, 1874	H. W. Henshaw.
A 142 D	..... do .....	..... do	Do.
52 C	Colorado Springs, Colo .....	..... do	John Yarrow.
2 Y	San Ildefonso, N. Mex.	Aug., 1874	Dr. H. C. Yarrow.
480	Sienega, Ariz. ....	..... do	Jas. M. Rutter.
A 153	Plaza del Alcalde, N. Mex. ....	..... do	Dr. H. C. Yarrow.
B 1284	Camp Crittenden, Ariz. ....	..... do	Jas. M. Rutter.
A L 65	New Mexico	Sept., 1874	Dr. O. Loew.
T 3, I	Abiquiu to Jemez, N. Mex .....	..... do	G. Thompson.
T 1	New Mexico	Oct., 1874	Do.

HOLBROOKIA MACULATA, Girard, subspecies **PROPINQUA**, Baird & Girard.

Holbrookia propinqua, BAIRD & GIRARD, Proc. Acad. Nat. Sci. Phila., vi, 1852, 126.—
BD., U. S. & Mex. Bound. Surv., ii, Rept., 1859, 8.—COPE, Proc. Acad. Nat.
Sci. Phila., 1866, 303.

Holbrookia maculata, GIRARD, subspecies *propinqua*, BAIRD & GIRARD, COPE, Check-
List N. A. Batrach. & Rept., 1875, 47.

HAB.—Texas, New Mexico, Colorado, and Arizona.

As abundant as the preceding.

No.	Locality.	Date.	Collector.
15 A	Colorado Chiquito, Ariz	July, 1873	Dr. C. G. Newberry.
656	Camp Apache, Ariz	Aug., 1873	Dr. O. Loew.
656 B 31	..... do .....	..... do	Do.
B 2	Twin Lakes, Colo. ....	..... do	Dr. J. T. Rothrock.

In the notes regarding the collection of 1871, I find that another representative of this genus was secured, which Professor Cope states to be probably *H. approximans*, Baird and Girard.

HOLBROOKIA TEXANA, Troschel.

Cophosaurus texanus, TROSCHER, Arch. für Naturg., (for 1850), (published in 1852), 389,
tab. vi.

Holbrookia texana, BAIRD & GIRARD, Proc. Acad. Nat. Sci. Phila., vi, 1852, 125.—BD.,
U. S. & Mex. Bound. Surv., ii, Reptiles, 1859, 8, pl. xxx.—COPE, Proc.
Acad. Nat. Sci. Phila., 1866, 303.—*Id.*, Check-List N. A. Batrach. & Rept.,
1875, 47.

HAB.—Sonoran Region, Western Texas.

This species is rather rare in New Mexico and Arizona; it resembles *H. maculata* somewhat, but may readily be distinguished from it by its larger size and more elongated tail, as well as by marked other specific differences. Two lateral spots represent the abdominal crescents in the female.

No.	Locality.	Date.	Collector.
151	Camp Apache, Ariz	July, 1874	H. W. Henshaw.

Genus *CALLISAURUS*, Blainville.*CALLISAURUS* *DRACONTOIDES*, Blainville, subspecies *VENTRALIS*, Hallow.*Homalosaurus ventralis*, HALLOW., Proc. Acad. Nat. Sci. Phila., vi, 1852, 179.—*Id.*, Sitgreave's Exp. Zuñi & Col. Riv., 1853, 117.*Callisaurus ventralis*, BD., U. S. & Mex. Bound. Surv., ii, Rept., 1859, 8.*Callisaurus dracontoides*, BLAINVILLE, subspecies, *ventralis*, HALLOW., COPE, Check-List N. A. Batrach. & Rept., 1875, 47.

HAB.—Sonoran Region.

Rather uncommon; but one specimen being secured in 1871 in Arizona.

Genus *CROTAPHYTUS*, Holbrook.*CROTAPHYTUS* *COLLARIS*, Say.*Agama collaris*, SAY, Long's Exped. Rocky Mts., ii, 1823, 252.—HARLAN, Med. & Phys. Res., 1835, 142.*Crotaphytus collaris*, HOLBROOK, N. A. Herp., ii, 1842, 79.—BAIRD & GIRARD, Marcy's Rep. Expl. Red Riv., 1853, 222.—BD., U. S. & Mex. Bound. Surv., ii, Rept., 1859, 6.—*Id.*, P. R. R. Rep., x, 1859, 19, 38.—COPE, Proc. Acad. Nat. Sci. Phila., 1866, 302.—*Id.*, Check-List N. A. Batrach. & Rept., 1875, 47.

HAB.—Sonoran Region; Central Region to latitude 40°.

This beautiful and interesting species was secured in 1871 in Nevada, and was rather uncommon. In 1872, it was noticed only in the locality named in list of specimens, and is apparently quite scarce. Readily distinguished from *C. wislizenii* by the double band of black, bordered with white, on the sides of the neck. In addition to this, the head in *C. collaris* is wider and shorter, the back scales smaller, and those of the belly larger. Femoral pores more conspicuous, and tail shorter.

In 1873, it was found to be very abundant in New Mexico and Arizona, a few being seen in Colorado; and while the allied species *C. wislizenii* is extremely numerous in the more northern Territories, it is very scarce farther south. In 1874, it was found to be in point of abundance the characteristic species of New Mexico.

No.	Locality.	Date.	Collector.
224	Dome Cañon, Nev	Aug., 1872	Dr. H. C. Yarrow.
224 A	..... do .....	..... do	Do.
3	Santa Fé, N. Mex.	June, 1873	Dr. C. G. Newberry.
3 A	..... do .....	..... do	Do.
19	Aguaazul, N. Mex	July, 1873	Do.
R 1	Camp Apache, Ariz.....	Aug., 1873	Do.
X P 3	Colorado .....	..... do	Do.
P R	Mineral Springs, Ariz.....	..... do	Do.
506	Camp Apache, Ariz.....	..... do	Do.
R 8	..... do .....	..... do	Dr. O. Loew.
652	..... do .....	..... do	Do.
R X 1	..... do .....	..... do	Dr. C. G. Newberry.
1236	Santa Fé, N. Mex.....	July, 1874	H. W. Henshaw.
B 39	..... do .....	..... do	Dr. J. T. Rothrock and H. W. Henshaw.
A 7	..... do .....	..... do	H. W. Henshaw.
300	San Ildefonso, N. Mex	Aug., 1874	Dr. H. C. Yarrow.
84 Y	..... do .....	..... do	Do.
T A 1	New Mexico.....	Sept., 1874	G. Thompson.

CROTAPHYTUS WISLIZENII, Baird & Girard.

Crotaphytus wislizenii, BAIRD & GIRARD, Proc. Acad. Nat. Sci. Phila., 1852, 69.—*Id.*, Stans. Rep. Exp. Great Salt Lake, 1852, 340.—BD., U. S. & Mex. Bound. Surv., ii, 1859, Reptiles, 7.—*Id.*, P. R. R. Rep., x, 1859, Gunnison & Beckwith's Route, Reptiles, 17.—*Id.*, P. R. R. Rep., x, 1859, Whipple's Route, Reptiles, 37.—COOP. & SUCKL., Nat. Hist. Wash. Terr., 1860, 294.—COPE, Proc. Acad. Nat. Sci. Phila., 1866, 303.—*Id.*, Check-List N. A. Batrach. & Rept., 1875, 48.

Crotaphytus gambeli, BAIRD & GIRARD, Proc. Acad. Nat. Sci. Phila., 1852, 126.

Crotaphytus fasciatus, HALLOW., Proc. Acad. Nat. Sci. Phila., 1852, 207.—*Id.*, Sitgreave's Exp. Zuñi & Col. Riv., 1853, 115, pl. v.

Crotaphytus (Gambelia) wislizenii, BD., U. S. & Mex. Bound. Surv., *loc. cit.* in text.

HAB.—Pacific and Sonoran Regions, Nevada, and Utah.

In 1872, found rather scarce in Utah, but numerous in Nevada; the Indians in that State using them as food. For full description of this genus, *vide* Stansbury's Report, page 339. In 1873, but few were observed; none in 1874. Is a more northern species than the preceding.

LACERTILIA—IGUANIDAE—CROTAPHYTUS RETICULATUS. 567

No.	Locality.	Date.	Collector.
X	Dome Cañon, Nev	Aug., 1872	Dr. H. C. Yarrow.
X 1	..... do .....	..... do	Do.
X 2	..... do .....	..... do	Do.
221	..... do .....	..... do	Do.
221 A	..... do .....	..... do	Do.
221 B	..... do .....	..... do	Do.
221 C	..... do .....	..... do	Do.
223	Antelope Springs, Nev .....	..... do	Do.
R	Snake Creek, Nev.....	..... do	Do.
R 1	..... do .....	..... do	Do.
R 2	..... do .....	..... do	Do.
R 3	..... do .....	..... do	Do.
265	Meadow Creek, Utah.....	Sept., 1872	Do.
265 A	..... do .....	..... do	Dr. H. C. Yarrow and H. W. Henshaw.
265 B	..... do .....	..... do	Do.
W	Beaver, Utah .....	..... do	Do.
W 1	..... do .....	..... do	Do.
W 2	..... do .....	..... do	Do.

CROTAPHYTUS RETICULATUS, Bd.

Crotaphytus reticulatus, BAIRD, Proc. Acad. Nat. Sci. Phila., 1858, 253.—*Id.*, U. S. & Mex. Bound. Surv., pt. ii, 1859, Reptiles, 6, 7.—COPE, Check-List N. A. Batrach. & Rept., 1875, 48.

HAB.—Western Texas and New Mexico.

This species was first described from specimens procured in Texas (Laredo and Ringgold Barracks). Is more closely allied to *C. collaris* than to *C. wislizenii*. Is thought not to be abundant, but one specimen having been secured by the collectors of the expedition.

No.	Locality.	Date.	Collector.
A 1236	Sante Fé, N. Mex.....	July, 1874	H. W. Henshaw.

Genus *UTA*, Baird & Girard.

The genus *Uta* was established by Baird and Girard upon a number of specimens collected by Captain Stansbury during his expedition to the Great Salt Lake. It bears a close relation to both *Sceloporus* and *Holbrookia*, and is interesting for this reason. The assimilative points and dif-

ferences are very clearly described in Stansbury's report, and afford positive means of identification.

UTA ORNATA, Baird & Girard.

Uta ornata, BAIRD & GIRARD, Proc. Acad. Nat. Sci. Phila., 1852, 126.—BD., U. S. & Mex. Bound. Surv., pt. ii, 1859, Reptiles, 7.—COPE, Check-List N. A. Batrach. & Rept., 1875, 48.

HAB.—Sonoran Region.

A single specimen obtained in 1872 in Middle Utah. In 1873 and 1874, the species was found to be quite numerous in Colorado, Arizona, and New Mexico, frequenting rocky places, and exceedingly hard to catch. Color of throat yellowish-orange, of abdomen white ranging to greenish-olive. The general coloration depends much upon the color of the rock upon which they are found.

The specimens marked XXX and XXX 1 are apparently very closely allied to *U. stansburiana*, B. & G., but vary in some points and may prove to be a new species, or a variety of the one they resemble.

No.	Locality.	Date.	Collector.
8181	Middle Utah	Sept., 1872	Dr. H. C. Yarrow.
505 A	Colorado Chiquito, Ariz	July 21, 1873	H. W. Henshaw.
D D 1	Twin Lakes, Colo	Aug., 1873	Dr. J. T. Rothrock.
D D 1 A	Mineral Springs, Ariz	—, 1873	Francis Klett.
X X X	Camp Apache, Ariz	—, 1873	H. W. Henshaw.
115	Ralston, Ariz	Sept., 1873	Dr. C. G. Newberry.
X X X 1	..... do .....	..... do	Do.
1018 B	San Carlos, Ariz	Oct., 1874	Jas. M. Rutter.
H L	Gila River, Ariz	—, 1874	Dr. O. Loew.
16	(?)	(?)	(?)

UTA STANSBURIANA, Baird & Girard.

Uta stansburiana, BAIRD & GIRARD, Proc. Acad. Nat. Sci. Phila., vi, 1852, 69.—*Id.*, Stans. Rep. Exp. Great Salt Lake, 1852, 345, pl. 5, figs. 4, 6.—BD., U. S. & Mex. Bound. Surv., pt. ii, 1859, Reptiles, 7.—*Id.*, P. R. R. Rep., x, 1859, Whipple's Route, Reptiles, 37.—COPE, Check-List, N. A. Batrach. & Rept., 1875, 48.

HAB.—Pacific, Lower Californian, and Sonoran Regions; Nevada; Utah.

Common in both Utah and Nevada in 1871; but few specimens secured in subsequent years.

No.	Locality.	Date.	Collector.
Z	Dome Cañon, Nev	Aug., 1872	Dr. H. C. Yarrow.
Z 1	..... do .....	..... do	Do.
E 1	Fillmore, Utah	Sept., 1872	Do.
H 1	Southern Utah	Oct., 1872	Do.
2 S 2	San Ildefonso, N. Mex	Aug., 1874	Prof. E. D. Cope.
241 B	..... do .....	..... do	Dr. H. C. Yarrow.
234 D	Tierra Amarilla, N. Mex	Sept., 1874	W. G. Shedd.
141 B	Cave Spring, Ariz.	Oct., 1874	H. W. Henshaw.

UTA SYMMETRICA, Baird.

Uta symmetrica, BD., Proc. Acad. Nat. Sci. Phila., 1858, 253.—*Id.*, U. S. & Mex. Bound. Surv., pt. ii, 1859, Reptiles, 7.—COPE, Proc. Acad. Nat. Sci. Phila., 1866, 303.

HAB.—Sonoran Subregion.

Abundant in Arizona, and particularly noticeable for mimicry of color dependent upon localities where found.

No.	Locality.	Date.	Collector.
526 A	Camp Apache, Ariz	Aug. 8, 1873	H. W. Henshaw.
P P 3	Southern Arizona .....	..... do	Do.

Genus SCELOPORUS, Wiegmann.

SCELOPORUS JARROVII, Cope, *sp. nov.*

PLATE XXIII, FIGS. 2, 2*b*, 2*c*, 2*d*.

Sceloporus jarrovi, COPE, Check-List N. A. Batrach. & Rept., 1875, 48 (no description).

The following description of this beautiful and interesting species is by Prof. E. D. Cope, to whom the specimens were submitted for examination.

"Scales of moderate size, gradually increasing in size from the ventral to the dorsal region, very weakly keeled, and not mucronate above, entire below, except on the pectoral and gular regions, where they bear an apical notch. Thirty transverse series between the interscapular and middle sacral regions. Scales of the superior faces of the limbs keeled. The large transverse supraorbital shields separated from the frontals by one, and from the superciliaries by two, series of scales. Six internasals, five pre-

frontals, two frontals, and on each side posteriorly one fronto-parietal and two parietals. Interparietal large, broad as long. Three longitudinal rows of superior labials; one triangular loreal. Temporals small, keeled; two very large auriculars. Two series of infralabials, the inferior ones short, transverse. Fifteen femoral pores. A short deep sinus on the side of the neck, descending forward. The heel extends to a little beyond the elbow, and the fingers to the groin.

	Millim.
"Total length	177
"Length to vent	89
"Length to posterior border of meatus auditorius	155
"Width of head at border of meatus auditorius	14
"Width of head at nostrils	2½
"Width of frontal bone	3¼
"Length of hind limb	51⅔
"Length of hind foot	21½
"Length of fore limb	39
"Length of fore foot	14

"The ground color above is a bluish-black, which becomes more distinctly blue on the limbs and sides, extending in a patch over the gular region and along the sides of the abdomen. The chin, middle of abdomen, and tail, median line below, shade from a bluish-green in front to a yellow on the last region. Each scale of the upper surface of the body is marked by a light spot, which was some brilliant shade, probably yellow, in life. Behind the interscapular region and on the tail, they are light-blue; top of head and neck bluish-black, the latter inclosed in a rectangular area, bounded by a light band from each squamosal region. Sides of neck with a broad black collar, bluish-black; the collar with a light posterior border above; the dark color extending over the shoulder, the sides of the head, and the throat.

"A light band above the upper labials, and a parallel one below the inferior labials.

"A very handsome species, allied to the *S. torquatus*, *S. ornatus*, &c., resembling in a slight degree *S. formosus*, but is quite distinct, as the following diagnosis will show.

"The distinctive characters of these species are as follows:

"*S. jarrovi*.—Parietals, 2; scales in vertebral line from occiput to opposite groin, 39. Dorsal scale, all with yellow centers; two light bands on side of neck, the upper from the eye and continuous with the anterior border of the collar, the lower commencing at the muzzle; nape black.

"*S. ornatus*.—Parietal single; scales to opposite groin, 50; above black, with two or more longitudinal rows of irregular light spots; no bands on side of neck; nape spotted.

"Dedicated to Dr. H. C. Yarrow, the surgeon and zoölogist of the expedition for 'Explorations west of the one-hundredth meridian.'"

Is scarce in Arizona; but three specimens being secured.

The plate gives figures of head, vent, and femoral pores and scales of the back.

No.	Locality.	Date.	Collector.
P P P 5	Southern Arizona	—, 1873	H. W. Henshaw.
P P P 5 A	..... do	—, 1873	Do.
1199	..... do	Oct., 1874	Do.

SCELOPORUS TRISTICHUS, Cope, *sp. nov.*

Scales of the head smooth; supraorbitals in only three rows; a median series of transverse plates bounded by a row of small ones internally and externally; frontal divided transversely; interparietal wide as long; parietals undivided; scales in forty rows from head to base of tail, well keeled, and strongly mucronate, a little larger than the lateral, which about equal the ventral; four preauricular free scales; a granular patch behind lateral fold of the neck; when the short hind legs are extended forward, the end of the external toe reaches the axilla; femoral pores sixteen.

Color above olive-brown, with a pale lateral band on each side, separated by seven rows of scales. This space is crossed by undulating black cross bands, which are interrupted in the middle, and pale-bordered behind; a brown band from the eye to the middle of the side, where it is broken into spots; legs and feet black-speckled; blue of the sides well separated below; a subround blackish-blue spot on each side the throat.

This species is about the size of the *S. consobrinus*, which it also resembles in color; but it is quite peculiar in having only three series of supra-orbital scales, or only two posteriorly, from the failure of the outer row.

No.	Locality.	Date.	Collector.
4137	Taos, N. Mex	Aug., 1874	W. G. Shedd.

SCELOPORUS SMARAGDINUS, Cope, *sp. nov.*

PLATE XXIV, FIG. 2.

Cephalic plates smooth, the frontal transversely divided, and the supraorbitals in four rows; the latter consist of one series of transverse scuta, separated from the frontal by a complete row of small scales; a row of similar small scales bounds the sharp supraoculars within, and incloses with the large scuta three or two scales of intermediate size; interparietal broad as long; parietal small, subtriangular; scales of back, sides, and tail subequal, strongly keeled, and mucronate; the first named in forty-one rows from head to base of tail in four specimens; abdominal scales smaller, notched. When the hind limb is extended, the longest toe reaches to the orbit. Femoral pores fourteen; five free scuta in front of tympanum. Total length, 0^m.200; length to vent, 0^m.085.

Color bright-green, crossed above by dark blotches, interrupted on the middle line, each half convex backward; blue of sides well separated below; the entire middle portion of the throat blackish-blue.

This species bears much relation in special points to the *S. consobrinus*, B. & G., as in the number of supraorbital and dorsal scales. The outer two supraorbital series are not of equal size, the inner being larger, as in *S. ornatus*, B. & G. The coloration is quite characteristic, and the size exceeds that of any of the *S. consobrinus*.

No.	Locality.	Date.	Collector.
(?)	Beaver, Utah	—, 1872	Dr. H. C. Yarrow.
223	Nevada	—, 1872	Do.
(?)	Dome Cañon, Utah	—, 1872	Do.
(?)	(?)	(?)	(?)

SCELOPORUS POINSETTII, Baird & Girard.

Sceloporus poinsettii, BAIRD & GIRARD, Proc. Acad. Nat. Sci. Phila., 1852, 126.—BD., U. S. & Mex. Bound. Surv., pt. ii, 1859, Reptiles, 5, pl. 29, figs. 1-3.—COPE, Check-List N. A. Batrach. & Rept., 1875, 48.

HAB.—Sonoran Region.

Rather uncommon in Southern Arizona; but three specimens being secured.

No.	Locality.	Date.	Collector.
E 6	Gila River, Ariz	Sept., 1873	Dr. C. G. Newberry.
H 1	Southern Arizona	Oct., 1873	H. W. Henshaw.
H 2	..... do .....	..... do	Do.

SCELOPORUS UNDULATUS, Harlan, subspecies UNDULATUS, Harlan.

Lacerata undulata, DAUDIN, Hist. Nat. des Rept., iii, 384.

Stellis undulatus, LATREILLE, Hist. Rept., ii, 1802, 40.

Lacerta hyacinthina et fasciata, GREEN, Proc. Acad. Nat. Sci. Phila., i, 349.

Uromastyx, MERREM., 57.

Agama undulata, HARLAN, Med. & Phys. Res., 1853, 140.

Tropidolepis undulatus, CUVIER *apud* GRIFFITH, ix, 126.—HOLBROOK, N. A. Herp., iii, 51, pl. viii, and ii, 73, pl. 9, 2d ed., 1842.—DE KAY, Zoöl. N. Y., 1842, 31.—TENNEY, Man. Zoöl., 1866, 296.

Sceloporus undulatus, GRAVENHORST, Nov. Acta, xviii, 768.—WIEGMANN, Isis, 1828, 369.—BD., P. R. R. Rep., x, 1859, Whipple's Route, Reptiles, 37.

Sceloporus undulatus, HARLAN, subspecies *undulatus*, HARLAN, COPE, Check-List N. A. Batrach. & Rept., 1875, 48.

HAB.—North America, except Sonoran and Lower Californian Regions.

Found abundant in Nevada; less so in Utah in 1872. Scarce in the more Southern Territories.

A close examination of the specimens captured reveals no points of difference between the eastern and western varieties, excepting a deeper coloration of the lines and bands in the western form. Inhabiting for the most part rocky ground.

No.	Locality.	Date.	Collector.
N	Dome Cañon, Nev	Aug., 1872	Dr. H. C. Yarrow.
N 1	..... do .....	..... do	Do.
N 2	..... do .....	..... do	Do.
205	Pymont, Nev .....	..... do	Do.
205 A	..... do .....	..... do	Do.
205 B	..... do .....	..... do	Do.
S	Beaver, Utah	Sept., 1872	Do.

SCELOPORUS CONSOBRINUS, Baird & Girard.

Sceloporus consobrinus, BAIRD & GIRARD, Marcy's Exped. Red. Riv., 1853, 224, pl. 10, figs. 5-12.—BD., P. R. R. Rep., x, 1859, Whipple's Route, Reptiles, 37.—*Id.*, U. S. & Mex. Bound. Surv., pt. ii, Reptiles, 5.—HAYD., Trans. Am. Phil. Soc., xii, 1862, 303.—COPE, Proc. Acad. Nat. Sci. Phila., 1866, 303.—ALLEN, Proc. Bost. Soc. Nat. Hist., xvii, 1874, 69.—COPE, Check-List N. A. Batrach. & Rept., 1875, 49.

HAB.—Sonoran and Central Regions, Oregon, and Texas.

Exceedingly abundant throughout regions visited.

In addition to the specimens noted in the list, Professor Cope informs me of a variety found in our collection much like the typical form in squamation, but quite distinct in colors. The sides are very dark, and the dorsal region is yellowish in a broad band from the nape of the neck to the rump. Professor Cope, in his report upon the reptiles collected by the United States Geological Survey of Territories in Montana, page 468, gives four distinct varieties of *S. consobrinus*, to which list this new variety should be added.

No.	Locality.	Date.	Collector.
O	Fairfield, Utah	Aug., 1872	Dr. H. C. Yarrow.
O 1	..... do .....	..... do	Do.
-----	Eastern Nevada .....	..... do	Do.
C	Cove Creek, Utah	Sept., 1872	Do.
445	Fort Wingate, N. Mex	July, 1873	H. W. Henshaw
500	Pescado, N. Mex .....	..... do	Do.
500 A	Southern Arizona .....	..... do	Do.
R 35	Fort Wingate, N. Mex	Aug., 1873	T. V. Brown.
656 B 2	Camp Apache, Ariz .....	..... do	H. W. Henshaw.
626	Southern Arizona	—, 1873	Do.
5 A 2	..... do	—, 1873	Do.
P P P 6	Camp Apache, Ariz	—, 1873	Do.
7	Santa Fé, N. Mex	June, 1874	Do.
7 A	..... do .....	..... do	Do.
A 248	Pagosa, Colo	Sept., 1874	C. E. Aiken.
398	San Juan River, N. Mex .....	..... do	Lieut. R. Birnie.
A T 1	New Mexico .....	..... do	G. Thompson.
2 L 8	..... do .....	..... do	Dr. O. Loew.

SCELOPORUS SPINOSUS, Wiegmann.

Sceloporus spinosis, WEIGMANN, Isis, 1828, 369.

Tropidolepis spinosus, GRAY, Syn. Nat. Rept. Griff., An. King., ix, 1831, 43.

Sceloporus spinosus, WIEGMANN, Herp. Mex., 1834, 50, pl. vii.—BD., U. S. & Mex. Bound. Surv., pt. ii, 1859, Rept., 5.—*Id.*, P. R. R. Rep., x, 1853-54, Whipple's Route, 38.—COPE, Check-List N. A. Batrach. & Rept., 1875, 49.

HAB.—Arizona and Texas.

Specimens secured in Arizona in 1871. Is not common.

SCELOPORUS CLARKII, Baird & Girard, subspecies CLARKII, Baird & Girard.

PLATE XXIII, FIGS. 1, 1a.

Sceloporus clarkii, BAIRD & GIRARD, Proc. Acad. Nat. Sci. Phila., 1852, 127.—BD., U. S. & Mex. Bound. Surv., pt. ii, 1859, Reptiles, 5.

Sceloporus magister, HALLOW., Proc. Acad. Nat. Sci. Phila., vii, 1854, 93.—COPE, Proc. Acad. Nat. Sci. Phila., 1854, 93.

HAB.—Sonoran and South Pacific Regions.

In addition to the typical *S. clarkii*, obtained by the expedition in 1873, a variety was also collected, which has been described by Professor Cope as follows:

"Scales of the back large, keeled, and mucronate in twenty-eight transverse rows from head shields to rump, and six longitudinal rows at the latter point. Edges without or with one or two serræ near the apex. Abdominal scales smaller; lateral intermediate; the former mostly entire; the gulars with one or two shallow notches. Head shields smooth, large; supraorbitals in one row only of transverse shields, separated only anteriorly from the frontals by a row of narrow scales. Eight internasals, six of them in a median row of three pairs; five prefrontals, one broad and median; two frontals; two fronto-parietals, each joined by a single parietal on each side; an interparietal as broad as long. Auricular scales not different from those in front of them. Hind leg extended, bringing the end of the outer toe to the humerus. Twelve femoral pores on each side.

"Total length, 0^m.166; length to vent, 0^m.080; to auricular meatus, 0^m.019; to orbit, 0^m.008; width between supercilia, 0^m.012.

"Five or six blackish undulating cross-bands on an iron-gray ground; behind, on an angle of each bar, on each side, is a yellow scale, thus making two rows of small yellow spots. Below straw color; throat brown, banded lengthwise, with blue between. Sides with blue shades."

The plate affords view of the entire animal, and a profile of the head.

No.	Locality.	Date.	Collector.
R 66	Southeastern Arizona.....	Oct., 1873	E. J. Sommer.
R 67	.....do.....	.....do.....	Do.
1315	.....do.....	(?)	G. M. Keasbey.
176	Rock Cañon, Ariz	Sept., 1874	Jas. M. Rutter.
176 A	.....do.....	.....do.....	Do.
H 1284	Camp Crittenden, Ariz.....	Oct., 1874	Do.
508	Santa Rita Mountains, Ariz .....	.....do.....	H. W. Henshaw.

SCELOPORUS GRATIOSUS, Baird & Girard.

Sceloporus graciosus, BAIRD & GIRARD, Proc. Acad. Nat. Sci. Phila., 1852, 69.—*Id.*, Stans. Rep. Exp. Great Salt Lake, 1853, 346, pl. 5, figs. 1-3.—BD., P. R. R. Rep., x, 1859, Gunnison and Beckwith's Route, Reptiles, 17.—*Id.*, *ib.*, Williamson and Abbott's Route, Reptiles, 9.—COOP. & SUCKL., Nat. Hist. Wash. Terr., 1860, 294.—HAYD., Trans. Am. Phil. Soc. Phila., xii, 1862, 177.—COPE, Proc. Acad. Nat. Sci. Phila., 1866, 303.

Some of the specimens have five rows of supraorbital scales as in the type, but with larger scales, there being 45 and 46 instead of 50 from head to tail. Secured by the expedition in Nevada in 1871, in Utah in 1872, and at Abiquiu, N. Mex., in 1874.

No.	Locality.	Date.	Collector.
(?)	Dome Cañon, Utah	—, 1872	Dr. H. C. Yarrow.
L B 5	Abiquiu, N. Mex	Sept., 1874	Dr. O. Loew.

SCELOPORUS GRACILIS, Baird & Girard.

Sceloporus gracilis, BAIRD & GIRARD, Proc. Acad. Nat. Sci. Phila., 1852, 175.—*Id.*, U. S. Exp. Exped., 1858, 386, pl. 20, figs. 1-9.

For description of this interesting lizard, *vide* Stansbury's Report of Expedition to the Great Salt Lake, page 346. It is chronicled as inhabiting the valley of the Great Salt Lake, but was not met with by our party in the locality noted, being seen only on the western border of the House range of mountains, which form the western limit of the valley in extreme Eastern Nevada.

No.	Locality.	Date.	Collector.
Y	Dome Cañon, Nev.....	Aug., 1872	Dr. H. C. Yarrow.
223	Antelope Springs, Nev .....	.....do.....	Do.

Genus PHRYNOSOMA, Wiegmann.

The collection of Horned Lizards, vulgarly known as "Horned Toads", is very numerous, embracing nearly every species as yet chronicled from the regions visited. Of the *Phrynosoma*, according to Prof. Charles Girard, we may assume that six distinct species exist, for the diagnostic characters of which *vide* Stansbury's Report of Expedition to the Great Salt Lake, page 359; but Professor Cope, in his new check-list, has proposed certain modifications of Girard's diagnoses, and the following list shows the number of species he at present admits;

- Phrynosoma modestum*, GIRARD.
Phrynosoma platyrhinum, GIRARD.
Phrynosoma maccallii, HALLOW.
Phrynosoma regale, GIRARD.
Phrynosoma planiceps, HALLOW.
Phrynosoma cornutum, HARLAN.
Phrynosoma hernandezii, GIRARD.
Phrynosoma douglasii, BELL, subspecies *ornatissimum*, GIRARD.
Phrynosoma douglasii, BELL, subspecies *douglasii*, BELL.
Phrynosoma blainvillei, GRAY.
Phrynosoma coronatum, BLAINVILLE.

PHRYNOSOMA MODESTUM, Girard.

- Phrynosoma modestum*, GIRARD, Stans. Rep. Exp. Great Salt Lake, 1853, 361, 365, pl. 6, figs. 4-8.—COPE, Proc. Acad. Nat. Sci. Phila., 1866, 302.—*Id.*, Check-List N. A. Batrach. & Rept., 1875, 49.
Doliosaurus modestus, BD., U. S. & Mex. Bound. Surv., pt. ii, 1859, Reptiles, 10.—*Id.*, P. R. R. Rep., x, 1859, Whipple's Route, Reptiles, 38.—GIRARD, Herp. U. S. Exp. Exped. 1858, 409.

HAB.—Sonoran Region.

Rather uncommon in Utah and Arizona; but few being seen.

PHRYNOSOMA PLATYRHINUM, Girard.

- Phrynosoma platyrhinus*, GIRARD, Stans. Rep. Exp. Great Salt Lake, 1853, 361-363, pl. vii, figs. 1-5.—COPE, Proc. Acad. Nat. Sci. Phila., 1866, 302.
Doliosaurus platyrhinus, GIRARD, Herp. U. S. Exp. Exped., 1858, 407.—BD., P. R. R. Rep., x, 1859, Gunnison & Beckwith's Route, Reptiles, 18.
Phrynosoma platyrhinum, COPE, Check-List N. A. Batrach. & Rept., 1875, 49.

HAB.—Utah, Nevada, Arizona, and New Mexico.

Very numerous; abounding everywhere in Utah and Nevada; none secured in more southern localities, although they doubtless are found as far

south as Arizona. Some of the specimens enumerated in the following list assimilate closely to *P. modestum*, Girard, and are hardly distinguishable, while a great variety of coloration exists.

No.	Locality.	Date.	Collector.
221	Dome Cañon, Nev	Aug., 1872	Dr. H. C. Yarrow.
208	Sacramento, Nev.....	do	Do.
208 A	do	do	Do.
199	Faust's Station, Utah.....	do	Do.
8	do	do	Do.
8 A	Fairfield, Utah.....	do	Do.
237	Deseret City, Utah	Sept., 1872	Do.
237 A	do	do	Do.
237 B	do	do	Do.
237 C	do	do	Do.
222	Rush Pond, Utah	do	Do.
222 A	do	do	Dr. H. C. Yarrow and H. W. Henshaw.
U	Beaver, Utah	do	Do.
U 1	do	do	Do.
U 2	do	do	Do.
U 3	do	do	Do.
U 4	do	do	Do.
U 5	do	do	Do.

PHRYNOSOMA REGALE, Girard.

Phrynosoma regale, GIRARD, Herp. U. S. Exp. Exped., 1858, 406.—BD., U. S. & Mex Bound. Surv., pt. ii, Reptiles, 1859, 9, pl. xxviii, figs. 1-3.—COPE, Check-List N. A. Batrach. & Rept., 1875, 49.

HAB.—Deserts of Gila and Colorado.

This large and magnificent species was first chronicled from the valleys of the Gila and Colorado Rivers, where it was taken by Mr. A. Schott; it is by no means abundant.

No.	Locality.	Date.	Collector.
A 1098	Camp Lowell, Ariz.....	Oct., 1874	Jas. M. Rutter.
B 1098	do	do	Do.
C 1098	do	do	Do.

PHRYNOSOMA PLANICEPS, Hallow.

PLATE XXIV, FIG. 1.

Phrynosoma planiceps, HALLOW., Proc. Acad. Nat. Sci. Phila., 1852, 178.—COPE, Check-List N. A. Batrach. & Rept., 1875, 49.

HAB.—Southern Sonoran Subregion.

As already remarked, this rare and interesting species has been lost sight of since Girard's description was published. It was rediscovered in 1873 in Southeastern Arizona by Mr. Henshaw.

No.	Locality.	Date.	Collector.
R 5	Southeastern Arizona	—, 1873	H. W. Henshaw.
R 5, 1	..... do	—, 1873	Do.

PHRYNOSOMA CORNUTUM, Harlan.

Phrynosoma cornutum, HARLAN, Jour. Acad. Nat. Sci. Phila., iv, 1825, 299.—GRAY, Syn. Rept. Griff. Cuv., ix, 1831, 45.—GIRARD, Stans. Rep. Exp. Great Salt Lake, 1852, 360, pl. viii, figs. 1-6.—BD., U. S. & Mex. Bound. Surv., pt. ii, Reptiles, 1859, 9.—COPE, Check-List N. A. Batrach. & Rept., 1875, 49.

HAB.—Texas, Arizona, and New Mexico.

This species resembles *P. coronatum* in having a double series of horizontal pyramidal scales on the periphery of the abdomen. Occipital and temporal spines more slender than in *P. coronatum*. Femoral pores inconspicuous, while in *P. coronatum* they are well marked.

This is a southern form, not having been met with north of New Mexico.

No.	Locality.	Date.	Collector.
A 115	Ralston, Ariz.	Oct., 1873	Dr. C. G. Newberry.
A 1098	Camp Lowell, Ariz.	July, 1874	H. W. Henshaw and Jas. M. Rutter.
1174	Camp Apache, Ariz.	July, 1874	Jas. M. Rutter.
1183	Camp Bowie, Ariz.	Aug., 1874	Do.
2 Y	San Ildefonso, N. Mex.	do	Dr. H. C. Yarrow.
1191	Camp Bowie, Ariz.	do	H. W. Henshaw.
L 55	Abiquiu, N. Mex.	Sept., 1874	Dr. O. Loew.

PHRYNOSOMA DOUGLASSII, Bell, subspecies DOUGLASSII, Bell.

Agama douglasii, BELL, Trans. Linn. Soc., xvi, 1828 (1833) 105, pl. 10.—HARLAN, Med. & Phys. Res., 1835, 141, f. 3.

Phrynosoma douglasii, GRAY, Griff. An. King., ix, 1831, 44.—WAGLER, Nat. Syst., Amphib., 1830, 146.—WIEGMANN, Herp. Mex., 1834, 54.—HOLBROOK, N. A. Herp., i, 1842, 101, pl. 14.—DE KAY, Zoöl. N. Y., 1842, 31.—GRAY, Cab. Brit. Mus., 1845, 227.—GIRARD, Staus. Rep. Exp. Great Salt Lake, 1852, 362, pl. 7, figs. 6-9.—COPE, Proc. Acad. Nat. Sci. Phila., 1866, 302.—ALLEN, Proc. Bost. Soc. Nat. Hist., xviii, 1874, 69.

Tapaya douglassii, GIRARD, Herp. U. S. Exp. Exped., 1858, 398, pl. 21, figs. 1-5.—BD., P. R. R. Rep., x, 1859, Gunnison & Beckwith's Route, Reptiles, 18.—*Id.*, P. R. R. Rep., x, 1859, Williamson and Abbott's Route, Reptiles, 9.—COOP. & SUCKL., Nat. Hist. Wash. Terr., 1860, 294.

Phrynosoma douglassii, BELL, subspecies *douglassii*, BELL, COPE, Check-List N. A. Batrach. & Rept., 1875, 49.

HAB.—Entire Central Region, Oregon, and Washington.

In 1872, found to be the most abundant species in Utah; none being discovered in Nevada, although they were found in the eastern portion of that State in 1871; are also abundant in New Mexico and Arizona. The specimens collected are of all sizes, exhibiting every possible variation of color and markings.

No.	Locality.	Date.	Collector.
M	Provo, Utah.....	July, 1872	Dr. H. C. Yarrow and H. W. Henshaw.
M 1	.....do.....	.....do.....	Do.
M 2	.....do.....	.....do.....	Do.
238	Deseret City, Utah.....	Aug., 1872	Dr. H. C. Yarrow.
238 A	.....do.....	.....do.....	Do.
238 B	.....do.....	.....do.....	Do.
238 C	.....do.....	.....do.....	Do.
238 D	.....do.....	.....do.....	Do.
V	Beaver, Utah.....	Sept., 1872	Dr. H. C. Yarrow and H. W. Henshaw.
V 1	.....do.....	.....do.....	Do.
V 2	.....do.....	.....do.....	Do.
V 3	.....do.....	.....do.....	Do.
B 1	Toquerville, Utah.....	Oct., 1872	Do.
B 2	.....do.....	.....do.....	Do.
B 3	.....do.....	.....do.....	Do.
B 4	.....do.....	.....do.....	Do.
B 5	.....do.....	.....do.....	Do.

No.	Locality.	Date.	Collector.
R 6	Santa Fé, N. Mex.....	June, 1873	Dr. O. Loew.
2 A	.....do.....	do	Dr. C. G. Newberry.
393 B	Fort Garland, Colo.....	do	H. W. Henshaw.
418	.....do.....	do	Do.
X P	Colorado.....	July, 1873	Dr. C. G. Newberry.
452 B	Fort Wingate, N. Mex.....	do	H. W. Henshaw.
452 B I	Fort Wingate, N. Mex.....	do	Do.
P 33	Camp Apache, Ariz.....	Aug., 1873	Do.
A 39	Santa Fé, N. Mex.....	June, 1874	Dr. J. T. Rothrock and H. W. Henshaw.
1105	.....do.....	do	H. W. Henshaw.
Y 9	Colorado Springs, Colo.....	July, 1874	John Yarrow.
A 51 var.	.....do.....	do	Do.
106	Rio Colorado, N. Mex.....	Aug., 1874	Dr. H. C. Yarrow.
1284	Camp Crittenden, Ariz.....	do	Jas. M. Rutter.
3 Y	San Ildefonso, N. Mex.....	do	Dr. H. C. Yarrow.
105	Taos, N. Mex.....	do	Prof. E. D. Cope, Dr. H. C. Yarrow, and W. G. Shedd.
L 5	Abiquiu, N. Mex.....	do	Dr. O. Loew.
1275 var.	Camp Lowell, Ariz.....	do	H. W. Henshaw.
274	Pagosa, Colo.....	Sept., 1874	Lieut. C. W. Whipple.
L 48	New Mexico.....	do	Dr. O. Loew.
L 50	.....do.....	do	Do.
A 382	San Juan River, N. Mex.....	do	Lieut. R. Birnie.
235	New Mexico.....	do	W. G. Shedd.
1014 A	Camp Lowell, Ariz.....	Oct., 1874	Jas. M. Rutter.

PHRYNOSOMA DOUGLASSII, subspecies ORNATISSIMUM, Girard.

Phrynosoma orbiculare, HALLOW., Sitgreave's Exp. Zuñi & Col. Riv., 1853, 125, pls. 8-9 (not of Wiegmann).

Tapaya ornatissima, GIRARD, Herp. U. S. Exp. Exped., 1858, 396.—BD., P. R. R. Rep., x, 1859, Whipple's Route, Reptiles, 38.—*Id.*, U. S. & Mex. Bound. Surv., pt. ii, 1859, Reptiles, 9.

Phrynosoma douglasii, subspecies *ornatissimum*, COPE, Check-List N. A. Batrach. & Rept., 1875, 49.

HAB.—Sonoran Region.

This species was not observed in 1871, but in 1872 was collected in Middle Utah in but one locality. Is very abundant in New Mexico and Arizona.

No.	Locality.	Date.	Collector.
267	Cove Creek, Utah.....	Sept., 1872	Dr. H. C. Yarrow.
267 A	..... do .....	..... do	Do.
267 B	..... do .....	..... do	Do.
267 C	..... do .....	..... do	Do.
267 D	..... do .....	..... do	Do.
569	White Mountains, Ariz	Aug. 24, 1873	Dr. C. G. Newberry.
569 A	..... do .....	..... do	Do.
71	..... do .....	..... do	Do.
62	..... do .....	..... do	Do.
72	..... do .....	..... do	Do.
73	..... do .....	..... do	Do.
655	Camp Apache, Ariz.....	Aug., 1873	Dr. O. Loew.
655 A	..... do .....	..... do	Do.
176	Rock Cañon, Ariz.....	Sept., 1874	Jas. M. Rutter.
176 A	..... do .....	..... do	Do.

PHRYNOSOMA BLAINVILLEI, Gray.

Phrynosoma blainvillei, GRAY, Syn. Rept. Griff. Cuv., ix, 1831.—GIRARD, Herp. U. S. Exp. Exped., 1858, 400.—COPE, Check-List N. A. Batrach. & Rept., 1875, 49.

HAB.—Pacific Region.

A number of specimens secured in 1871 in Arizona; not collected since that time.

TESTUDINATA.

FAM. CINOSTERNIDAE.

Genus AROMOCHELYS, Gray.

AROMOCHELYS CARINATUS, Gray.

Aromochelys carinatus, GRAY, Cat. Shield Rept. Brit. Mus.—COPE, Proc. Acad. Nat. Sci. Phila., 1866, 310.—*Id.*, Check-List N. A. Batrach. & Rept., 1875, 52.

Ozotheca tristicha, AGASS., Contrib. Nat. Hist. U. S., i, 1857, 423, pl. 5, figs. 20–22.—BD., U. S. & Mex. Bound. Surv., pt. ii, 1859, Reptiles, 3.

HAB.—Louisianian District and Arizona.

Obtained in Arizona in 1871, also in 1873, and appears to be rather common.

No.	Locality.	Date.	Collector.
P P P 7	Southern Arizona.....	—, 1873	H. W. Henshaw.
145 A	..... do	—, 1873	E. E. Howell.

Genus CINOSTERNUM, Wagler.

CINOSTERNUM HENRICI, LeConte.

PLATE XVI, FIGS. 1, 2, 3.

Kinosternum henrici, LECONTE, Proc. Acad. Nat. Sci. Phila., 1854, 182.—*Id.*, *ib.*, 1859, 4.—COPE, Check-List N. A. Batrach. & Rept., 1875, 52.

This interesting species was first described from specimens brought from New Mexico by Dr. T. C. Henry, of the United States Army, since which time, so far as is known, it has not been seen until collected by Dr. J. T. Rothrock and H. W. Henshaw, of this expedition in 1874. The locality where the specimens were taken is Rock Creek Cañon, south of Camp Apache, Ariz., and they were secured while fishing in a small stream which runs through the cañon, the animals taking the bait fiercely and freely, appearing to be numerous. It is a matter of some surprise in view of this abundance that the species has not been recognized for so long an interval. The plate affords a view of this species from above and below and in profile.

No.	Locality.	Date.	Collector.
1103	Rock Creek Cañon, Ariz.....	July, 1874	Dr. J. T. Rothrock and H. W. Henshaw.
1103 A	.....do.....	..... do	Do.

FAM. EMYDIDAE.

Genus CHRYSEMYS, Gray.

CHRYSEMYS OREGONENSIS, Harlan.

Emys oregonensis, HARLAN, Am. Jour. Sci., xxxi, 382.

Chrysemys oregonensis, HOLBROOK, N. A. Herp., i, 1842, 107.—AGASS., Cont., i, 1857, 440.—BD., U. S. & Mex. Bound. Surv., pt. ii, Reptiles, 1859, 4.—COPE, Check-List N. A. Batrach. & Rept., 1875, 53.

HAB.—Central Region.

This species was found to be quite abundant in the same locality as the preceding, and was taken in a similar manner.

No.	Locality.	Date.	Collector.
1103 A B	Rock Creek Cañon, Ariz	July, 1874	Dr. J. T. Rothrock and H. W. Henshaw.

The following summary will show the number of species actually identified; some few still remain unidentified:

Batrachia	17
Ophidia	26
Lacertilia	35
Testudinata	3
Total	87

NOTE.—It has been thought best, in compiling the above report, to enumerate every specimen accurately labeled, so as to give an indication of geographical distribution.

CHAPTER V.

SYNOPSIS

OF THE

REPTILES AND BATRACHIANS

OF

ARIZONA;

WITH

CRITICAL AND FIELD NOTES, AND AN EXTENSIVE SYNONYMY.

BY

DR. ELLIOTT COUES, U. S. ARMY.

CHAPTER V.

INTRODUCTORY.

This article rests primarily upon the collections and observations made by the writer in Arizona in 1864-65. These collections, containing many new species, were placed, together with the author's field notes, in the hands of Prof. E. D. Cope, by whom the new species were described in a paper published in the Proceedings of the Philadelphia Academy for 1866. Special reference is made to this paper, which contained, furthermore, the identification of the species, forty-four in number, contained in the collections, with some of the author's field notes, critical observations of Professor Cope's, and an enumeration of the additional species then known to inhabit the Territory, sixty-eight in number.

The present paper was drawn up some years since to form part of a General Work upon the Natural History of Arizona, which the author then contemplated, but which pressure of other engagements compelled him to abandon. During the time it has lain in manuscript, it has been retouched at intervals, with the addition of various matter, until it has assumed the present shape of a synopsis of the species now known to inhabit the Territory, eighty-three in number (exclusive of numerous subspecies).

The aim has been to include none which have not actually been found in Arizona as at present bounded. It will be remembered that the present Territory includes the western half of what was formerly New Mexico, together with a considerable part of Sonora, obtained by what is known as the "Gadsden purchase"; consequently, many species described from "New Mexico" and "Sonora" are really Arizonan.

Doubtless some species already known to inhabit this Territory have not come to the writer's knowledge as such, but it is believed that these are very few; and, no doubt, also species remain to be discovered in this region,

so fertile in reptilian life. But the present article is believed to be a fair *résumé* of the subject as at present understood. To render it more generally available, and useful as a work of reference, a copious bibliography has been prepared, representing a large proportion of extant references, and a nearly complete synonymy. Descriptions of lately published or less generally known species are given in many cases, together with such critical and field notes as the author found himself in position to offer.

The classification adopted is that of the eminent herpetologist, Professor Cope, whose nomenclature is followed in the main, though a different stand is taken in some instances; and the identifications of species are mainly upon the same authority, the author's work being little more in this instance than that of a compiler.

The most striking feature of the batrachian fauna of Arizona is the poverty of this region in *Urodela* (one species), which bear small proportion, in numbers of species or of individuals, to the *Anura* (eight species), in comparison with the ratio existing between these two groups in most parts of the United States; while the *Anura* themselves are poorly represented. This is probably due in greatest part to the dryness of the region as a whole. The *Chelonia* (four or five species) are likewise poorly represented, for the same reason. On the other hand, the region is rich in *Ophidia* (thirty-four species), including a larger proportion of venomous species than any other district of the United States; and it is still richer in number of individuals and of species of *Sauria* (thirty-six species). No other portion of our country exhibits such a preponderance of these forms of animal life.

NOTE.

Since the present paper was set in metal, a few *addenda* have come to my knowledge, being indicated as Arizonan in the preceding article by Dr. Yarrow. Such are *Phrynosoma blainvillii*, *Sceloporus tristichus* (sp. n.), *S. spinosus*, *Chilopoma rufopunctatum* (g. s. n.), *Pityophis sayi mexicanus*, *Diadophis pulchellus*, *Ophibolus doliatus annulatus*, *Bufo lentiginosus cognatus*, *B. punctatus*. But the close connection of the two memoirs renders their omission of less consequence.

November 15, 1875.

A.—REPTILIA.

CHELONIA. CRYPTODIRA. CINOSTERNIDAE.

1. *Aromochelys carinatus*, Gray.

Aromochelys carinatus, GRAY, Cat. Shield Reptiles Brit. Mus.—COPE, Proc. Acad. Nat. Sci. Phila., 1866, 310.—*Id.*, Check-List, 1875, 52.

Ozotheca tristycha, AGASS., Contrib. Nat. Hist. U. S., i, 1857, 425, pl. 5, figs. 20–22.—BD., U. S. & Mex. Bound. Surv., ii, pt. ii, 1859, Reptiles, 3.

Specimens from Fort Whipple, summer of 1865.

I ascertained the occurrence in the Territory of two other species of turtles, specimens of which were among a small part of my collections, which unfortunately was lost. One of these was procured on the Colorado Chiquito River in July, 1864; it was about eight inches long. Another entirely different species was found to be common in the headwaters of the San Francisco River, near Fort Whipple, where several specimens were secured with hook and line in January, 1865. They were very voracious, being often drawn out of the water and taken in hand before they would relinquish their hold, although not fastened upon the hook. These were of small size, about four inches in length. (One of these species may have been *Chrysemys oregonensis*.)

The two following species are introduced in the present connection on the authority of Professor Baird's Report on the *Reptilia* of the Mexican Boundary Survey:—

2. *Cinosternum sonoriense*, LeC.

Kinosternon sonoriense, LEC., Proc. Acad. Nat. Sci. Phila., 1854, 184.

Thyrosteron sonoriense, AGASS., Contrib. Nat. Hist. U. S., i, 1857, 423, pl. 5, figs. 8–11.—

BD., U. S. & Mex. Bound. Surv., ii, pt. ii, 1859, Reptiles, 3.

Cinosternum sonoriense, COPE, Check-List, 1875, 52.

"Tucson and Guadeloupe Cañon, *Kennerly*."

This species was originally described from Tucson, "Sonora" (*i. e.*, Arizona).

3. *Cinosternum flavescens*, (*Agass.*).

PLATE XVII, FIGS. 1, 2, 3.

Platythyra flavescens, AGASS., Contrib. Nat. Hist. U. S., i, 1857, 430, pl. 5, figs. 12-15.—

BD., U. S. & Mex. Bound. Surv., ii, pt. ii, 1859, Reptiles, 3.

Cinosternum flavescens, COPE, Check-List, 1875, 52.

"Arkansas, Texas, and valley of the Gila."

The plate affords views of profile, dorsum and abdomen of the species.

3bis. *Cinosternum henrici*, *LeC.*

PLATE XVI.

Kinosternum henrici, LEC., Proc. Acad. Nat. Sci. Phila., 1854, 182.

Cinosternum henrici, COPE, Check-List, 1875, 52.

Obtained in Arizona by the Explorations West of the One-hundredth Meridian; see Dr. Yarrow's Report, *antea*.

SAURIA

NYCTISAURIA.

GECCONIDAE.

4. *Coleonyx variegatus*, (*Bd.*) *Cope*.

Stenodactylus variegatus, BD., Proc. Acad. Nat. Sci. Phila., Dec., 1858, 254.—*Id.*, U. S. & Mex. Bound. Surv., ii, pt. ii, 1859, Reptiles, 12, pl. 23, figs. 9-27, pl. 24, figs. 11-19.

Coleonyx variegatus, COPE, Proc. Acad. Nat. Sci. Phila., 1866, 310.—*Id.*, *ib.*, 1867, 85 (Owen's Valley, Cal.).—*Id.*, Check-List, 1875, 50.

"Colorado Desert, *A. Schott*."

Head very broad; hind foot contained six times in head and body; above brownish-yellow, with irregular, small blotches of light reddish-brown, sometimes in broad transverse bands; edges of eyelids and whole under surface opaque white.—(*Descr. orig.*)

5. *Phyllodactylus tuberculosus*, *Wieg.*

Phyllodactylus tuberculosus, WIEGM., Nova Act. K. Leop.-Car. Acad., xvii, 241.—BD., U. S. & Mex. Bound. Surv., ii, pt. ii, 1859, Reptiles, 12, pl. 23, figs. 1-8 (Durango, Mex.).—COPE, Check-List, 1875, 52.

A species of the Sonoran region, not observed by me.

PLEURODONTA.

IGUANIA.

IGUANIDAE.

6. *Phrynosoma douglassi*, (Bell) Gray.

a. DOUGLASSI.

Agama douglassii, BELL, Trans. Linn. Soc., xvi, 1828 (1833), 105, pl. 10.—HARLAN, Med. & Phys. Res., 1835, 141, f. 3.

Phrynosoma douglassii, GRAY, Griffith's An. King., ix, 1831, 44.—WAGL., Nat. Syst. Amphib., 1830, 146.—WIEGM., Herp. Mex., 1834, 54.—HOLB., N. A. Herp., i, 1842, 101, pl. 14.—DE KAY, Zool. N. Y., 1842, 31.—GRAY, Cat. Brit. Mus., 1845, 227.—GIR., Stans. Rep. Exp. Great Salt Lake, 1852, 362, pl. 7, figs. 6-9. COPE, Proc. Acad. Nat. Sci. Phila., 1866, 302.—ALLEN, Proc. Bost. Soc. Nat. Hist., xvii, 1874, 69.—COPE, Check-List, 1875, 49.

Tapaya douglassii, GIR., Herp. U. S. Exp. Exped., 1858, 398, pl. 21, figs. 1-5.—BD., P. R. R. Rep., x, 1859, Gunnison's & Beckwith's Route, Reptiles, 18.—*Id.*, P. R. R. Rep., x, 1859, Williamson's & Abbott's Route, Reptiles, 9.—COOP. & SUCKL., Nat. Hist. Wash. Terr., 1860, 294.

Tapaya brevirostris, GIR., U. S. Exp. Exped., 158, 377.—BD., P. R. R. Rep., x, 1859, Gunnison's & Beckwith's Route, Reptiles, 18.

Phrynosoma brevirostris, COPE, Proc. Acad. Nat. Sci. Phila., 1866, 302.

b. ORNATISSIMUM.

Phrynosoma orbiculare, HALLOW., Sitgreave's Exp. Zuñi & Col. Riv., 125, pls. 8, 9 (not of Wiegmann).

Tapaya ornatissima, GIR., U. S. Exp. Exped. Herp., 1858, 396.—BD., P. R. R. Rep., x, 1859, Whipple's Route, Reptiles, 38.—*Id.*, U. S. & Mex. Bound. Surv., ii, pt. ii, 1859, Reptiles, 9.

Phrynosoma douglassii, subsp. *ornatissimum*, COPE, Check-List, 1875, 49.

Numerous specimens in my collection, from various parts of New Mexico and Arizona. One of them, No. 407,* from Bero Springs, N. Mex., between Fort Wingate and the Rio Grande, was formerly identified by Professor Cope with *P. brevirostre*, which, however, appears to be not a tenable species.

This round bodied and plain looking species, with the cephalic spines rudimentary, exhibits a wide range of variation in color. Some specimens are uniform brown above; others have dark cross bars, with light hinder edges, or dark oval spots, yellow-margined or not; in some the spines and

* Numbers of specimens throughout this article refer to my field-register.

sides of the head are quite red. The under parts vary from a plain dull grayish-white to close nebulation with numerous squarish dusky spots. The young are generally very light colored and more uniform than the adults, a plain reddish or grayish brown prevailing on the upper parts. The orbicular shape of the body appears constant, but there is a great difference in the length of the tail and its thickness at the base. It varies from nearly half to considerably less than half the total length (contained $1\frac{3}{4}$ to $2\frac{2}{5}$ times in the total length). Specimens from the Colorado Chiquito River are conspicuous by the yellow edging of the oval brown dorsal spots.

This is the most widely distributed species of the genus *Phrynosoma* (including *Tapaya* and *Doliosaurus*) in the United States, and one of the most abundant. I have recently ascertained its extension to British America in the region of the Milk River, where it is a common animal. In these higher latitudes, its dispersion seems strictly coincident with that of *Caudisoma confluenta*. In New Mexico and Arizona, it is the characteristic species. I found it abundant at all points on my journey from Santa Fé, N. Mex., to Fort Whipple, Ariz., and constantly met with it in various other parts of the last named Territory.

Like other species of the same genus, this *Phrynosoma* is slow of foot and readily captured by hand; it makes an interesting pet to one fond of observing the traits of lower animals. It may readily be secured by a thread tied behind the "horns"; and in this state of partial liberty its habits may be studied to advantage. It is one of the most inoffensive and amiable of reptiles; though some of the largest and boldest individuals sometimes make a slight demonstration in self-defense by biting weakly, it usually submits at once without remonstrance. When handled, it has a way of making itself perfectly flat, when, closing its eyes, it will simulate death in this collapsed state. Under some circumstances, it will swell up the body prodigiously till it assumes a nearly spherical shape. It has a sly way of watching for a chance to escape by bolting away when it thinks itself unobserved, and a still more curious knack of burying itself in sand or other loose soil. This is accomplished by a gradual lateral and forward insinuating wriggling of the body, with the muzzle pointed downward and the limbs drawn close to the sides. A few moments suffice for its disap-

pearance. A certain slight means of defense which the "horns" may sometimes afford is shown by the use they are put to when the animal is irritated by poking with a finger or bit of a stick; then the head is lowered, the horns set forward, the back arched up, and the whole attitude becomes ludicrously like that of a bull in miniature. The Horned Lizards show special aversion to dogs; on the approach of one, they raise themselves to the full length of the legs, puff out the body, open the mouth, and hiss audibly, altogether presenting quite a formidable front. Their food, in confinement and otherwise, consists chiefly of flies and other insects, which they capture by a quick thrust of the fleshy tongue, lubricated with viscid saliva. I have not observed the time of coition, nor the period of gestation; but most of the females are found pregnant in July, and the young appear in great numbers in August. The male is usually smaller than the female, and of slenderer form.

7. *Phrynosoma regale*, Gir.

Phrynosoma regale, GIR., Herp. U. S. Exp. Exped., 1858, 406.—BD., U. S. & Mex. Bound. Surv., ii, pt. ii, 1859, Reptiles, 9, pl. 28, figs. 1-3.—COPE, Proc. Acad. Nat. Sci. Phila., 1866, 310.—*Id.*, Check-List, 1875, 49.
 " *Phrynosoma solaris*, GRAY, Cat. Sauria Brit. Mus., 229."

This large species, not noted by me, appears to inhabit more particularly the desert portions of the Territory in the valleys of the Gila and Colorado.

8. *Phrynosoma maccalli*, (Hallow.) Cope.

Anota M'Calli, HALLOW., Sitgreave's Exp. Zúñi & Col. Riv., 1853, 127, pl. 10, (type of genus).
Doliosaurus m'callii, GIR., Herp. U. S. Exp. Exped., 1858, 400.—BD. U. S. & Mex. Bound. Surv., ii, pt. ii, 1859, Reptiles, 9, pl. 28, figs. 4-6.
Phrynosoma maccalli, COPE, Proc. Acad. Nat. Sci. Phila., 1866, 310.—*Id.*, Check-List, 1875, 49.

From the same region as the last, and, like it, not noticed by me.

9. *Phrynosoma planiceps*, Hallow.

PLATE XXIV, fig. 1a, 1b.

Phrynosoma planiceps, HALLOW, Proc. Acad. Nat. Sci. Phila., 1852, 178.—COPE, Check-List, 1875, 49.

This species has been added to the fauna of the Territory by Dr. H. C. Yarrow since the present paper was drawn up.

10. *Phrynosoma platyrhinum*, Gir.

Phrynosoma platyrhinos, GIR., Stans. Rep. Exp. Great Salt Lake, 361, 363, pl. 7, figs. 1-5.—COPE, Proc. Acad. Nat. Sci. Phila., 1866, 302.

Phrynosoma platyrhinum, COPE, Check-List, 1875, 49.

Doliosaurus platyrhinos, GIR., Herp. U. S. Exp. Exped., 1858, 407.—BD., P. R. R. Rep., x, 1859, Gunnison's & Beckwith's Route, Reptiles, 18.

Specimens in my collection from Arizona, or a contiguous portion of New Mexico, but without indication of precise locality.

11. *Phrynosoma modestum*, Gir.

Phrynosoma modestum, GIR., Stans. Rep. Exp. Great Salt Lake, 1853, 361, 365, pl. 6, figs. 4-8.—COPE, Proc. Acad. Nat. Sci. Phila., 1866, 302.—*Id.*, Check-List, 1875, 49.

Doliosaurus modestus, GIR., Herp. U. S. Exp. Exped., 1853, 409.—BD., U. S. & Mex. Bound. Surv., ii, pt. ii, 1859, Reptiles, 10.—*Id.*, P. R. R. Rep., x, 1859, Whipple's Route, Reptiles, 38.

Bero Springs, June, 1864, one specimen of this small and inconspicuous species.

12. *Sceloporus consobrinus*, Bd. & Gir.

Sceloporus consobrinus, BD. & GIR., Marcy's Rep. Exp. Red Riv., 1853, 224, pl. 10, figs. 5-12.—BD., P. R. R. Rep., x, 1859, Whipple's Route, Reptiles, 37.—*Id.*, U. S. & Mex. Bound. Surv., ii, pt. ii, 1859, Reptiles, 5.—HAYD., Trans. Am. Phil. Soc., xii, 1862, 177.—COPE, Proc. Acad. Nat. Sci. Phila., 1866, 303.—ALLEN, Proc. Bost. Soc. Nat. Hist., xvii, 1874, 69.—COPE, Check-List, 1875, 49.

A wide ranging species in the West, whose habitat, as now known, extends north to the Yellowstone, where it was lately discovered by Mr. J. A. Allen, and to Oregon. I found it in various parts of Arizona, not only in the southern desert portions where reptiles most abound, but also in the pine covered mountainous tracts, as about Fort Whipple, for instance, where it was a common inhabitant of the high dry woods, with *Cnemidophorus gularis*.

13. *Sceloporus clarki*, Bd. & Gir.

PLATE XXIII, FIG. 1 (var.).

a. CLARKI.

Sceloporus clarkii, BD. & GIR., Proc. Acad. Nat. Sci. Phila., 1862, 127.—BD., U. S. & Mex. Bound. Surv., ii, pt. ii, 1859, Reptiles, 5.—COPE, Proc. Acad. Nat. Sci. Phila., 1866, 310.—*Id.*, Check-List, 1875, 49.

Sceloporus magister, HALLOW., Proc. Acad. Nat. Sci. Phila., 1854, 93.

b. ZOSTEROMUS.

Sceloporus zosteromus, COPE, Proc. Acad. Nat. Sci. Phila., 1863, 105 (Lower California).
Sceloporus clarkii, subsp. *zosteromus*, COPE, Check-List, 1875, 49.

Judging from the citations of numerous specimens from various localities in the Report of the Mexican Boundary Survey, this species is common along the southern border of the United States. It was not met with by me. Var *zosteromus* is the Lower California form.

14. *Sceloporus poinsetti*, Bd. & Gir.

Sceloporus poinsettii, BD. & GIR., Proc. Acad. Nat. Sci. Phila., 1852, 126.—BD., U. S. & Mex. Bound. Surv., ii, pt. ii, 1859, Reptiles, 5, pl. 29, figs. 1-3.—COPE, Check-List, 1875, 48.

Quoted from "Sonora" in the Mexican Boundary Report. Obtained in Northern Arizona by Mr. H. W. Henshaw.

15. *Sceloporus scalaris*, Wiegman.

Sceloporus scalaris, WIEGM., Herp. Mex., 1834, 52, pl. 8, f. 2.—BD., U. S. & Mex. Bound. Surv., ii, pt. ii, 1859, 6.—COPE, Check-List, 1875, 49.

Los Nogales, "Sonora."

16. *Sceloporus marmoratus*, Hallowell.

Sceloporus marmoratus, HALLOW., Proc. Acad. Nat. Sci. Phila., 1852, 178.—*Id.*, Sitgreave's Exp. Zuñi & Col. Riv., 1853, 110, pl. 2.—BD., U. S. & Mex. Bound. Surv., ii, pt. ii, 1859, Reptiles, 6.—COPE, Check-List, 1875, 48.

Sceloporus delicatissimus, HALLOW., Proc. Acad. Nat. Sci. Phila., 1852, 178.—*Id.*, Sitgreave's Exp. Zuñi & Col. Riv., 1853, 109, pl. 1.

Not observed by me. The known range of this species, however, extends from Utah into the Sonoran Region.

17. *Sceloporus torquatus*, Peale & Green.

Sceloporus torquatus, PEALE & GREEN, Journ. Acad. Nat. Sci. Phila., ii, —, 131.—COPE, Check-List, 1875, 48 (quotes "Proc. Acad." by error for Journ. Acad.).

Quoted by Professor Cope from the Sonoran Region.

18. *Sceloporus yarrowi*, Cope.

PLATE XXIII, FIGS. 2, 2b, 2c, 2d.

Sceloporus jarrovii, COPE, Zoöl. Expl. W. 100th Merid., *antèd.*, p. 569.—COPE, Check-List, 1875, 48. (N. B. The "Check-List" is published during the passage of the present volume through the press.)

From Southern Arizona, *Mr. H. W. Henshaw*.

An account of this fine new species, appropriately dedicated to the zoölogist of the Explorations west of the one hundredth meridian, will be found on the preceding pages.

19. *Sceloporus graciosus*, *Bd. & Gir.*

Sceloporus graciosus, *BD. & GIR.*, Proc. Acad. Nat. Sci. Phila., 1852, 69.—*Id.*, Stans. Rep. Exp. Great Salt Lake, 346, pl. 5, figs. 1-3.—*BD.*, P. R. R. Rep., x, 1859, Gunnison's & Beckwith's Route, Reptiles, 17.—*Id.*, P. R. R. Rep., x, 1859, Williamson's & Abbott's Route, Reptiles, 9.—*COOP. & SUCKL.*, Nat. Hist. Wash. Terr., 1860, 294.—*HAYD.*, Trans. Am. Phil. Soc., xii, 1862, 177.—*COPE*, Proc. Acad. Nat. Sci. Phila., 1866, 303.

Sceloporus gracilis, *BD. & GIR.*, Proc. Acad. Nat. Sci. Phila., 1852, 175.—*GIR.*, U. S. Exp. Exped., 1858, 386, pl. 20, figs. 1-9.

Observed at Navajo Springs, near the eastern border of the Territory, and along the Colorado Chiquito River in sandy situations.

Like the last, the present species is a wide ranging one, having been obtained by Dr. Suckley at The Dalles of the Columbia, or at Steilacoom. This gentleman found it living in the crevices of basaltic rocks, and notices variations in color, according to the situation frequented, like those below mentioned in the case of *Uta symmetrica*.

20. *Uta graciola*, (*Hallow.*) *Bd.*

Uro-saurus graciosus, *HALLOW.*, Proc. Acad. Nat. Sci. Phila., vii, 1854, 92.—*Id.*, P. R. R. Rep., x, 1859, Williamson's Route, Reptiles, 4.

Uta graciola, *BD.*, U. S. & Mex. Bound. Surv., ii, pt. ii, 1859, Reptiles, 7.—*COPE*, Proc. Acad. Nat. Sci. Phila., 1866, 310.—*Id.*, Check-List, 1875, 48.

In referring this species, originally described as a *Urosaurus*, to the genus *Uta*, Professor Baird quotes specimens from the Colorado River, collected by Mr. Arthur Schott. It was not observed by me.

21. *Uta stansburiana*, *Bd. & Gir.*

Uta stansburiana, *BD. & GIR.*, Proc. Acad. Nat. Sci. Phila., vi, 1852, 69.—*Id.*, Stans. Rep. Exp. Great Salt Lake, 345, pl. 5, figs. 4-6.—*BD.*, U. S. & Mex. Bound. Surv., ii, pt. ii, 1859, Reptiles, 7.—*Id.*, P. R. R. Reptiles, x, 1859, Whipple's Route, Reptiles, 37.—*COPE*, Check-List, 1875, 48.

Originally described from the valley of the Great Salt Lake, where specimens were secured by Capt. Howard Stansbury, this species has since been ascertained to inhabit Texas, New Mexico, and Arizona. It was

taken in the desert of the Gila by Mr. Arthur Schott. No specimens are contained in my collections.

22. *Uta ornata*, Bd. & Gir.

Uta ornata, BD. & GIR., Proc. Acad. Nat. Sci. Phila., 1852, 126.—BD., U. S. & Mex. Bound. Surv., ii, pt. ii, 1859, Reptiles, 7.—COPE, Check.List, 1875, 48.

Uta ornata var. *linearis*, BD., l. c. (Los Nogales).

Obtained by the naturalists of the United States and Mexican Boundary Survey at various points along the line, and therefore properly to be included in the present connection.

? *Uta symmetrica*, Bd. (= *ornata*?)

Uta symmetrica, BD., Proc. Acad. Nat. Sci. Phila., 1858, p. —.—*Id.*, U. S. & Mex. Bound. Surv., ii, pt. ii, 1859, Reptiles, 7.—COPE, Proc. Acad. Nat. Sci. Phila., 1866, 303.

“Larger dorsal scales in four regular series, two on either side of the median smaller ones; head short, depressed, one and a half times as wide as deep; tail one and a half times the head and body; general color light-brown above, the belly white; sides with broad transverse bands of blackish; size of *U. ornata*. Gila River.”—(*Baird.*)

The above description may be supplemented with a statement of the great variation in coloration during life of different specimens, as observed by me. This variation, which I have no reason to presume to be confined to the present species of the genus, is mainly dependent upon the character of the rocks which the animals frequent. Out of great numbers of specimens procured in one locality, namely, Bero Springs, near Fort Wingate, N. Mex., and unquestionably the same species, almost the only color mark common to all was the pale yellow throat. Some were plain silvery-white below, others were bright greenish-olive on the belly. Above, the color ranges from a deep grayish-black, to a dull grayish-brown with dark lateral streak. I satisfied myself that the same individual assumed these different colors according to the kind of rocks it happened to be upon. The blackish specimens were invariably found upon dark lava rocks, the lighter ones upon yellowish sandstone. We have here an interesting case of protective assimilation. The same thing has been noted by Dr. H. C. Yarrow, as this gentleman informs me, in other cases, and it is doubtless of more general occurrence than has been fully recognized by naturalists. The common Fence

Lizard of the Eastern States (*Sceloporus undulatus*) exhibits corresponding changes in color.

This species is very abundant in certain rocky places. Like others of the genus, it is difficult to secure without mutilation, on account of its extreme agility and the fragility of the tail. Specimens may be best obtained by switching them off the rocks with a light rod drawn rapidly along the surface.

23. *Crotaphytus collaris*, (Say) Holbr.

Agama collaris, SAY, Long's Exped. Rocky Mts., ii, 1823, 252.—HARLAN, Med. & Phys. Res., 1835, 142.

Crotaphytus collaris, HOLBR., N. A. Herp., ii, 1842, 79, pl. 10.—BD. & GIR., Marcy's Rep. Exp. Red Riv., 1853, 222.—BD., U. S. & Mex. Bound. Surv., ii, pt. ii, 1859, Reptiles, 6.—*Id.*, P. R. R. Rep., x, 1859, Gunnison's & Beckwith's Route, Reptiles, 19, pl. 24, figs. 1a-e.—*Id.*, *ib.*, Whipple's Route, Reptiles, 38.—COPE, Proc. Acad. Nat. Sci. Phila., 1866, 302.—*Id.*, Check-List, 1875, 47.

A long and well known species of striking characters, type of the genus, and of very general distribution in the Southwest. It was observed by me in New Mexico and Arizona at various points from the crossing of the Rio Grande at Los Pinos to the Colorado Chiquito River, where it was particularly abundant, on dry, sandy soil among fallen timber, in brush-heaps, &c. It was not noted at Fort Whipple, and probably does not occur in the coniferous mountainous portions of the Territory.

The length of this species, as commonly observed, is eleven or twelve inches. The colors in life, when the animal is in full vigor, are strikingly rich and varied; they fade noticeably before death when the creatures fret and pine in captivity, and certainly no description taken from alcoholic specimens, even comparatively fresh, conveys an accurate idea of the richness of the tints. The throat is loose and dilatable, and the animal has a habit of puffing it out when hissing under irritation or in anger.

This lizard is one of the more agile species of its group, though not so remarkably swift-footed as some of the *Cnemidophori*, and is difficult to capture alive without injury. It is one of the boldest, fiercest, and most irascible of its kind; those that I kept in confinement proved entirely untamable. They not only defended themselves with spirit and vigor by

biting when handled or irritated, but sometimes assumed the offensive, leaping to attack to the full length of the cord which confined them. Their behavior was in striking contrast to that of the Horned Frogs picketed with them. The lizards lay sullen, but not cowed, watching every movement of the persons around them with glittering eyes, ready to spring upon an intruder without warning. They clung tenaciously to a stick or the finger, in which they might fix their teeth, and suffered themselves to be suspended in this manner for some time before relinquishing hold. Now and then they seemed to have fits of ungovernable rage, during which they leaped aimlessly about, and tugged persistently at the cord. They refused to eat, apparently from pure chagrin, and all died within a few days.

24. *Crotaphytus wislizeni*, *Bd. & Gir.*

Crotaphytus wislizenii, BD. & GIR., Proc. Acad. Nat. Sci. Phila., 1852, 69.—*Id.*, Stans. Rep. Exp. Great Salt Lake, 1852, 340, pl. 3.—BD., U. S. & Mex. Bound. Surv., ii, pt. ii, 1859, Reptiles, 7, pl. 31.—*Id.*, P. R. R. Rep., x, 1859, Gunnison & Beckwith's Route, Reptiles, 17.—*Id.*, *ib.*, x, 1859, Whipple's Route, Reptiles, 37.—COOP. & SUCKL., Nat. Hist. Wash. Terr., 1860, 294.—COPE, Proc. Acad. Nat. Sci. Phila., 1866, 303.—COPE, Check-List, 1875, 48.

Crotaphytus (Gambelia) wislizenii, BD., U. S. & Mex. Bound. Surv., *loc. cit.*, in text.

Crotaphytus gambeli, BD. & GIR., Proc. Acad. Nat. Sci. Phila., 1852, 126.

Crotaphytus fasciatus, HALLOW., Proc. Acad. Nat. Sci. Phila., 1852, 207.—*Id.*, Sitgreave's Exp. Zuñi & Col. Riv., 1853, 115, pl. 5.

This species, very distinct from the last, and only less beautiful, was found associated with it along the Colorado Chiquito River, where, however, it was less abundant. Its habits and traits appear to be much the same. Its distribution in the West is general, in suitable localities, the species being found as far north as The Dalles in Oregon.

25. *Crotaphytus reticulatus*, *Bd.*

Crotaphytus reticulatus, BD., Proc. Acad. Nat. Sci. Phila., 1858, 253 (West Texas).—COPE, Check-List, 1875, 48.

This species, originally described from Western Texas, has been recently added to the fauna of the Territory by the Explorations West of the One-hundredth Meridian.—(See Dr. Yarrow's report, *anteà*.)

26. *Dipsosaurus dorsalis*, (*Bd. & Gir.*) *Hallow.*

Crotaphytus dorsalis, BD. & GIR., Proc. Acad. Nat. Sci. Phila., vi, 1852, 126.—BD., U. S. & Mex. Bound. Surv., ii, pt. ii, 1859, Reptiles, 8, pl. 32, figs. 7-13.

Dipsosaurus dorsalis, HALLOW., Proc. Acad. Nat. Sci. Phila., vii, 1854, 92.—COPE, Proc. Acad. Nat. Sci. Phila., 1866, 310.—*Id.*, Check-List, 1875, 48.

From the Colorado Desert. Not noted by me.

27. *Callisaurus draconoides ventralis*, (Hallow.) Bd.

b. VENTRALIS.

Homalosaurus ventralis, HALLOW., Proc. Acad. Nat. Sci. Phila., vi, 1852, 179.—*Id.*, Sitgreave's Exp. Zúñi & Col. Riv., 1854, 117, pl. 6.

Callisaurus ventralis, BD., U. S. & Mex. Bound. Surv., ii, pt. ii, 1859, Reptiles, 8.

Callisaurus draconoides subsp. *ventralis*, COPE, Check List, 1875, 47.

Like the last, from the southern desert portions of the Territory, and not observed by me. *Callisaurus* var. *gabbi* (Cope, Check-List, 47) is a form from Owen's Valley, California, likely to be found in Arizona.

28. *Sauromalus ater*, Duméril.

Sauromalus ater, "DUM., Arch. du Mus."—COPE, Check-List, 1875, 47.

Euphryne obesa, BD., Proc. Acad. Nat. Sci. Phila., 1858, p. —.—*Id.*, U. S. & Mex. Bound. Surv., ii, pt. ii, 1859, 6, pl. 27.—COPE, Proc. Acad. Nat. Sci. Phila., 1866, 310.

Fort Yuma.

29. *Uma notata*, BD.

Uma notata, BD., Proc. Acad. Nat. Sci. Phila., 1858, 253 (Mojave Desert, Heermann).—COPE, Check-List, 1875, 47.

Ears distinct; a very long infraorbital plate; palate without teeth; outer face of upper labials plane and broadly vertical; the labials themselves much imbricated and very oblique; scales of body above equal, much smaller than ventral ones; interorbital space with two series of plates; claws very long, slender, and straight; sides with a round black spot.

Head about two-fifths the head and body; above light pea-green, spotted with darker green; beneath white; head and body about two inches long.—(*Descr. orig. gen. et sp.*)

Fort Buchanan, Ariz., Dr. B. J. D. Irwin, U. S. A. Originally described from the Mojave Desert.

30. *Holbrookia texana*, (Trosch.) Bd. & Gir.

Coposaurus texanus, TROSCH., Archiv f. Naturg. for 1850 (1852), 389, pl. 6.

Holbrookia texana, BD. & GIR., Proc. Acad. Nat. Sci. Phila., vi, 1852, 125.—BD., U. S. & Mex. Bound. Surv., ii, pt. ii, 1859, Reptiles, 8, pl. 30.—*Id.*, P. R. R. Rep., x, 1859, Whipple's Route, Reptiles, 38.—COPE, Proc. Acad. Nat. Sci. Phila., 1866, 303.—*Id.*, Check-List, 1875, 47.

Holbrookia approximans, BD.

Originally described from Texas, and subsequently found in Arizona by Mr. Arthur Schott and myself. The specimens do not retain indication of precise locality.

31. *Holbrookia maculata*, Gir.

Holbrookia maculata, GIR., Proc. Am. Assoc., iv, 1850 (1851), 201.—*Id.*, Stans. Exp. Great Salt Lake, 1852, 342, pl. 6, figs. 1-3.—*Id.*, Marcy's Rep. Exp. Red. Riv., 1852, 223.—BD., U. S. & Mex. Bound. Surv., ii, pt. ii, 1859, Reptiles, 8.—*Id.*, P. R. R. Rep., x, 1859, Gunnison's & Beckwith's Route, Reptiles, 18.—*Id.*, *ib.*, x, 1859, Whipple's Route, Reptiles, 38.—HAYD., Trans. Am. Phil. Soc., xii, 1862, 177.—COPE, Proc. Acad. Nat. Sci. Phila., 1866, 303.—*Id.*, Check-List, 1875, 47.

Holbrookia affinis, BD. & GIR., Proc. Acad. Nat. Sci. Phila., vi, 1852, 125.—BD., U. S. & Mex. Bound. Surv., ii, pt. ii, 1859, Reptiles, 8.

A species of general distribution in the southwest, along the Arkansas, Red, Canadian, and Platte Rivers, in Utah, Texas, New Mexico, and Arizona, as may be gathered from the foregoing references, and in some places extremely abundant. My specimens are from Fort Whipple, where the animal is common.

31a. *Holbrookia maculata propinqua*, Bd. & Gir.

Holbrookia propinqua, BD. & GIR., Proc. Acad. Nat. Sci. Phila., vi, 1852, 126.—BD., U. S. & Mex. Bound. Surv., ii, pt. ii, 1859, Reptiles, 8.—COPE, Proc. Acad. Nat. Sci. Phila., 1866, 303.

Numerous specimens, identified with this form by Professor Cope, are represented in my collections, from various points along my line of march, both in New Mexico and Arizona. It is perhaps the most abundant and generally distributed representative of the genus in the latter Territory. The earlier indications are from Texas.

DIPLOGLOSSA.

HELODERMATIDAE.

32. *Heloderma suspectum*, Cope.

Heloderma horridum, BD., U. S. & Mex. Bound. Surv., ii, pt. ii, 1859, Reptiles, 11, pl. 26 (not of WIEGM., Isis, 1829, 627, and Herp. Mex., 1834).—*Id.*, P. R. R. Rep., x, 1859, Whipple's Route, Reptiles, 38.—COPE, Proc. Acad. Nat. Sci. Phila., 1866, 303.

Heloderma suspectum, COPE, Check-List N. A. Batrach. & Rept., 1875, 47.—YARROW, Zoöl. Expl. W. 100th Merid., *antea*.

Loss of the label from the specimen in my collection, noted by Pro-

fessor Cope as above, led to an erroneous assignment of Fort Whipple as the locality. The specimen was taken in the desert in the vicinity of La Paz on the Colorado River, and I am confident it does not occur in the higher mountainous parts of the Territory.

The "Gila Monster", as this large and repulsive looking reptile is called, appears to be not uncommon in the hot, southern parts of the Territory. A poisonous property is attributed to its saliva by the Mexicans, with whom the belief is also prevalent that it has the power of spiriting its supposed venom. The females of the same ignorant people have a superstitious belief in the influence that this and some other Saurians may exercise over certain periodical functions of their sex. I am informed by Dr. H. C. Yarrow that in some localities they attribute to *Amblystoma* a miraculous power of causing conception—a form of superstition doubtless found convenient at times, especially if shared by their male relatives.

GERRHONOTIDAE.

33. *Gerrhonotus nobilis*, Bd. & Gir.

Elgaria nobilis, BD. & GIR., Proc. Acad. Nat. Sci. Phila., 1852, 129.

Gerrhonotus nobilis, BD., U. S. & Mex. Bound. Surv., ii, pt. ii, 1859, 11, pl. 25, figs. 1-8.—COPE, Check-List, 1875, 47.

From the copper-mines of "New Mexico" (*i. e.*, Arizona).

G. infernalis is a species from Western Texas, which may yet be found to inhabit Arizona. (COPE, Proc. Nat. Sci. Acad., Phila., 1866, 322; Check-List, 1875, 47.)

LEPTOGLOSSA.

TEIIDAE.

34. *Cnemidophorus sexlineatus gularis*, (Bd. & Gir.).

b. GULARIS.

Cnemidophorus gularis, BD. & GIR., Proc. Acad. Nat. Sci. Phila., vi, 1852, 128.—BD. & GIR., Marcy's Rep. Exp. Exped. Red Riv., 1852, 227, pl. 10, figs. 1-4.—BD., U. S. & Mex. Bound. Surv., ii, pt. ii, 1859, Reptiles, 11, pl. 34, figs. 1-6.—*Id.*, P. R. R. Rep., x, 1859, Whipple's Route, Reptiles, 38.

Cnemidophorus sexlineatus var. *gularis*, COPE, Proc. Acad. Nat. Sci. Phila., 1866, 303.

Cnemidophorus guttatus, HALLOW., Proc. Acad. Nat. Sci. Phila., 1854, 192.—*Id.*, P. R. R. Rep., x, 1859, Parke's Route, Reptiles, 23.

Numerous specimens in my collection, from various localities nearly throughout Arizona, where it is abundant. At Fort Whipple, it is the most numerous and characteristic species. It lives in the high dry pine and oak woods, about bushes, brush-heaps, stumps, logs, &c.; but I never saw it on rocks, nor knew it to ascend the trunks of standing trees. It used to frequently enter our tents during the summer, and hunt for flies in a quiet, furtive manner, catching them with great address, and was very favorably regarded by all on this account, though its labors resulted in no sensible diminution of the pests. Though thus familiar, it is an exceedingly timorous animal, and darts out of sight upon the least alarm. It is one of the very swiftest of its agile tribe—the eye can scarcely follow it when running at its best on level ground.

35. *Cnemidophorus grahami*, Bd. & Gir.

Cnemidophorus grahami, BD. & GIR., Proc. Acad. Nat. Sci. Phila., 1852, 128.—BD., U. S. & Mex. Bound. Surv., ii, pt. ii, 1859, Reptiles, 10, pl. 32, figs. 1-6.—COPE, Check-List, 1875, 45.

“Los Nogales, *Kennerly*.”

36. *Cnemidophorus perplexus*, Bd. & Gir.

Cnemidophorus perplexus, BD. & GIR., Proc. Acad. Nat. Sci. Phila., 1852, 128.—BD., U. S. & Mex. Bound. Surv., ii, pt. ii, 1859, Reptiles, 10.—COPE, Check-List, 1875, 46.

“Tucson, Arizona, *Kennerly*.”

37. *Cnemidophorus tessellatus gracilis*, (Bd. & Gir.).

Cnemidophorus gracilis, BD. & GIR., Proc. Acad. Nat. Sci. Phila., 1852, 128.—BD., U. S. & Mex. Bound. Surv., ii, pt. ii, 1859, Reptiles, 10, pl. 34, figs. 7-14.—COPE, Proc. Acad. Nat. Sci. Phila., 1866, 310.

Cnemidophorus tessellatus subsp. *gracilis*, COPE, Check-List, 1875, 46.

Indicated as occurring in this region in Professor Cope's enumeration of species additional to those contained in my collections.

37a. *Cnemidophorus tessellatus melanostethus*, Cope.

Cnemidophorus melanostethus, COPE, Proc. Acad. Nat. Sci. Phila., 1863, 104.

Cnemidophorus tessellatus subsp. *melanostethus*, COPE, Check-List, 1875, 46.

From southeastern portions of Arizona.

37b. *Cnemidophorus tessellatus tigris*, (Bd. & Gir.).

Cnemidophorus tigris, BD. & GIR., Proc. Acad. Nat. Sci. Phila., 1852, 69.—*Id.*, Stans. Rep. Exp. Great Salt Lake, 1853, 338.—BD., U. S. & Mex. Bound. Surv., ii, pt. ii, 1859, Reptiles, 10, pl. 33.

? *Cnemidophorus marmoratus*, BD. & GIR., Proc. Acad. Nat. Sci. Phila., 1852, 128.

? *Cnemidophorus undulatus*, HALLOW., Proc. Acad. Nat. Sci. Phila., 1854, 94.—*Id.*, P. R. R. Rep., x, 1859, Williamson's Route, Reptiles, 8.

Utah and southward in the Sonoran region. The true *tessellatus* of Say, which splits into several conspecies, is indicated by authors from Colorado.

SCINCIDAE.

38. *Eumeces obsoletus*, (Bd. & Gir.) Cope.

Plestiodon obsoletum, BD. & GIR., Proc. Acad. Nat. Sci. Phila., 1852, 129.—HALLOW., Sitgreave's Exp. Zuñi & Col. Riv., 1853, 111.

Plestiodon obsoletus, BD., U. S. & Mex. Bound. Surv., ii, pt. ii, 1859, Reptiles, pl. 25, figs. 9-16.—*Id.*, P. R. R. Rep., x, 1859, Whipple's Route, Reptiles, 39.

Plistodon obsoletus, COPE, Proc. Acad. Nat. Sci. Phila., 1866, 304.

Eumeces obsoletus, COPE, Check-List, 1875, 45.

The specimen, to which no locality is assigned in Professor Cope's article above cited, was taken at Bero Springs, N. Mex., from among some aquatic plants of a pool. It appeared sluggish, and was easily caught.

39. *Eumeces guttulatus*, (Hallow.) Cope.

Lamprosaurus guttulatus, HALLOW., Proc. Acad. Nat. Sci. Phila., 1852, 206.—*Id.*, Sitgreave's Exp. Zuñi & Col. Riv., 1853, 113, pl. 4.

Plestiodon guttulatus, HALLOW., Proc. Acad. Nat. Sci. Phila., 1857, 215.—BD., U. S. & Mex. Bound. Surv., ii, pt. ii, 1859, Reptiles, 12.—*Id.*, P. R. R. Rep., x, 1859, Whipple's Route, Reptiles, 18.

Plistodon guttulatus, COPE, Proc. Acad. Nat. Sci. Phila., 1866, 304.

Eumeces guttulatus, COPE, Check-List, 1875, 45.

From Fort Whipple, my collection.

OPHIDIA.

SOLENOGLYPHA.

CROTALIDAE.

40. *Caudisona confluenta*, (Say) Cope.

Crotalus confluentus, SAY, Long's Exped. Rocky Mts., ii, 1823, 48.—BD. & GIR., Cat. N. A. Rept., 1853, 8.—BD., P. R. R. Rep., x, 1859, Whipple's Route, Reptiles, 40, pl. 24, f. 4.—*Id.*, U. S. & Mex. Bound. Surv., ii, pt. ii, 1859, Reptiles, 14.—COOP. & SUCKL., Nat. Hist. Wash. Terr., 1860, 295, pl. 12.—COPE, Check-List, 1875, 33.

- Caudisona confluenta*, COPE, App. Mitchell's Researches, 1861, 122.—COPE, Proc. Acad. Nat. Sci. Phila., 1866, 307.—ALLEN, Proc. Bost. Soc. Nat. Hist., xvii, 1874, 307, 309.
- Crotalus lecontei*, HALLOW., Proc. Acad. Nat. Sci. Phila., vi, 1851, 180.—*Id.*, Sitgreave's Exp. Zuñi & Col. Riv., 1853, 139, pl. 18.—*Id.*, P. R. R. Rep., x, 1859, Williamson's Route, Reptiles, 18, pl. 3.—HEERM., *ibid.*, 25.
- Caudisona lecontei*, COPE, App. Mitchell's Res., 1861, 121.—HAYD., Trans. Am. Phil. Soc., xii, 1862, 177.
- Caudisona confluenta* var. *lecontei*, COPE, Proc. Acad. Nat. Sci. Phila., 1866, 307.
- Crotalus cinereus* (sic), LECONTE *apud* HALLOW., Sitgreave's Exp. Zuñi & Col. Riv., 1853, 140 (in text).

Examination of more material than that before Professor Cope in 1866 has failed to substantiate the distinctions sought to be maintained between *confluenta* and *lecontei*; and as the two forms do not appear to be geographically separated, there may be no necessity for their varietal recognition.

I have found this common and wide ranging species in various parts of the West, from the British possessions nearly to the Mexican border. At the North it is the only representative of its family, and one extremely abundant in some regions, as those of the Yellowstone, Upper Missouri, and Milk Rivers. In Arizona, where it is associated with several other species, it is not so abundant, nor is it the characteristic form. I found it only in the country about Prescott and on the San Francisco Mountains.

Specimens.

No. 510. San Francisco Mountains, July, 1864.

No. 572. Fort Whipple.

No. 678. Fort Whipple; length 31 inches; stomach contained an adult *Sialia mexicana* (Bluebird).

No. 801. San Francisco Mountains, at an altitude of about 10,000 feet.

41. *Caudisona molossus*, (Bd. & Gir.) Cope.

Crotalus molossus, BD. & GIR., Cat. N. A. Rept., 1853, 10 (New Mexico).—BD., U. S. & Mex. Bound. Surv., ii, pt. ii, 1859, Reptiles, 14, pl. 2.—*Id.*, P. R. R. Rep., x, 1859, Reptiles, pl. 24, f. 5 (no text).—COPE, Check-List, 1875, 45.

Caudisona molossus, COPE, Mitchell's Res., 1861, 124.—*Id.*, Proc. Acad. Nat. Sci. Phila., 1866, 307, 308.

Crotalus ornatus, HALLOW., Proc. Acad. Nat. Sci. Phila., vii, 1852, 192.—*Id.*, P. R. R. Rep., x, 1859, Parke's Route, Reptiles, 23, pl. 2.

Muzzle broad; rostral small; scales between superciliaries small, uni-

form, except the two anterior; two frontals; four post-frontals; two intersupercilia, all in contact; five rows of scales between labials and suborbital row; middle row not extending beyond the middle of the orbit; labials 18 above, fifth and sixth largest; 17 below; dorsal rows of scales 29; two external rows small; tail uniform black; color roll-sulphur, a series of chestnut-brown transverse lozenges, with exterior corners produced to the abdomen; centers of lozenges with one or two spots; each scale but one color; a brown patch below and behind the eye. "One of the most strongly marked of all the species" (*B. & G.*). Top of muzzle with three pairs of symmetrical shields; rattle parallelogrammic (*Cope*).

San Francisco Mountains, on dry, rocky ground, July, 1864.

42. *Caudisona lucifer*, (*Bd. & Gir.*) *Cope*.—Black Rattlesnake.

Crotalus lucifer, *BD. & GIR.*, Proc. Acad. Nat. Sci. Phila., vi, 1852, 177.—*Id.*, Cat. N. A. Rept., 1853, 6.—*GIR.*, U. S. Exp. Exped., 1858, 187, pl. 15, figs. 1-6.—*BD.*, P. R. R. Rep., x, 1859, Williamson's & Abbott's Route, Reptiles, 10, pl. 11.—*COOP. & SUCKL.*, Nat. Hist. Wash. Terr., 1860, 295.—*COPE*, Check-List, 1875, 33.

Caudisona lucifer, *COPE*, Mitchell's Res., 1861, 121.—*Id.*, Proc. Acad. Nat. Sci. Phila., 1866, 307, 309.

Head short, broad, and deep, with much rounded angles; snout less pointed than in *C. confluenta*. Labials 15-16 above and below; dorsal rows, 25. A dorsal series of brown blotches not margined with white; two small irregular lateral series on each side. Posteriorly, 15-20 half-rings, becoming blackish in old specimens. Light stripe from orbit below superciliary to angle of jaw above labials. Light stripe before eye expanding upon the whole of the upper labials and front and sides of face below crown and in front of orbits. Single light transverse line on superciliaries often obsolete. Rostral not edged with lighter.—(*Kennicott.*) Rattle parallelogrammic; rostral elevated, narrow; cuneiform; muzzle with two marginal shields above each canthus rostralis, and numerous small plates above.—(*Cope.*)

Originally described from Oregon, as above. This species was subsequently found in California, and later its range was shown to include Arizona by Dr. B. J. D. Irwin, U. S. A., and myself.

My numerous specimens from Arizona are nearly black, especially on the head, differing so decidedly from the Oregon type as to probably war-

rant varietal distinction of this southern form, which may be called *C. lucifer* var. *cerberus*.

Nos. 509, 511, and others, my collection, from the San Francisco Mountains, July, 1864.

This species was found associated with *C. confluenta* in Northern and Central Arizona, where it is abundant. The great size to which it attains, the caliber of the body, and black color combine to render it peculiarly repulsive. An unusual degree of virulence is attributed by backwoodsmen to the "Black Rattlesnake", but probably without foundation.

43. *Caudisona adamantea atrox* (Bd. & Gir.).

Crotalus atrox, BD. & GIR., Cat. N. A. Rept., 1853, 5, 156.—BD., P. R. R. Rep., x, 1859, Whipple's Route, Reptiles, 39, pl. 24, f. 3.—*Id.*, U. S. & Mex. Bound. Surv., ii, pt. ii, 1859, Reptiles, 14, pl. 1.

Caudisona atrox, COPE, Mitchell's Res., 1861, 121.—COPE, Proc. Acad. Nat. Sci. Phila., 1866, 309.

Crotalus adamanteus, subsp. *atrox*, COPE, Check-List, 1875, 33.

Head subtriangular. Plates on head; 2 anterior frontals in contact; between these and superciliaries, on side of crown, 2 imbricated plates; space inclosed occupied by smaller scales; superciliaries bordered by a row of larger scales; the anterior much largest. Three rows of scales between labials and suborbitals. Labials 16 above, first, fifth, and seventh largest; 15 below, first and third largest; dorsal rows 25-27; 2 exterior rows smooth. On the tail 3-6 half-rings. Color yellowish-brown, with a continuous succession of dorsal lozenges, sometimes truncate before and behind; intervals all narrow. A single transverse light line on superciliary. Stripe from superciliary directly to angle of mouth.—(B. & G., *descr. orig.*) Rattle and rostral plates as in *C. lucifer*.

Originally described only from Texas, and quoted with this restriction by Professor Cope in 1861 (*l. c.*). This species was ascertained by the Mexican Boundary Survey, results of which were published in 1859, to occur also in the lower portions of Arizona.

43a. *Caudisona adamantea scutulata*, (Kenn.).

Caudisona scutulata, KENN., Proc. Acad. Nat. Sci. Phila., 1861, 207.—COPE, Proc. Acad. Nat. Sci. Phila., 1866, 307, 309.

Crotalus adamanteus, subsp. *scutulatus*, COPE, Check-List, 1875, 33.

Rattle and rostral plates as in *C. lucifer*. Dorsal rows, 25; superior labials, 16; 3–4 rows of interorbital scales, bounded in front by two shields. Yellow stripe from eyebrow above rictus oris. Yellowish-brown, with a dorsal series of truncate, brown, yellow-edged rhombs; tail black-ringed.—(*Kenn.*)

Specimen in my collection from the San Francisco Mountains, July, 1864. Twenty inches long.

44. *Caudisona tigris* (*Kenn.*) *Cope*.

Crotalus tigris, KENN., MSS.—BD., U. S. & Mex. Bound. Surv., ii, pt. ii, 1859, Reptiles, 14, pl. 4 (Gila and Colorado, A. Schott).—COPE, Check-List, 1875, 33.

Caudisona tigris, COPE, Mitchell's Res., 1861, 122.—*Id.*, Proc. Acad. Nat. Sci. Phila., 1866, 309.

Body slender; head small, very much depressed, narrow behind; nose remarkably broad and obtuse; whole outline of head nearly quadrangular. Superciliaries and frontals smooth; space between superciliaries very wide; 4 frontals; 6 post-frontals; two rows of scales between suborbital chain (which is complete) and the labials. Labials 14 above; 14–15 below. Dorsal rows 21–23; very slightly carinated. Dorsal scales broad, rounded behind. Color yellowish-ash above, with rather small, indistinct, dorsal brown blotches anteriorly; two posterior thirds of body banded with brown.—(*Kennicott.*) Rattle acuminate; rostral plate equilateral, broad, depressed.—(*Cope.*)

This species, which was not met with by me, occurs in the deserts of the Gila and Colorado Rivers.

45. *Caudisona pyrrha*, *Cope*.

PLATE XXII.

Caudisona pyrrha, COPE, Proc. Acad. Nat. Sci. Phila., 1866, 308, 310 (type No. 6606, Mus. Smiths. Inst., Arizona, near Fort Whipple, coll. Coues).

Crotalus pyrrhus, COPE, Check-List, 1875, 33.

DIAG.—Scales in twenty-five series, broad and rounded; the two inferior rows smooth. Head short and very obtuse; the nostrils opening subvertically. Superior labials higher than long; three rows of temporals smooth; scales of vertex small, keeled; those more anterior, striate. Superciliaries broad, oval, striate. Canthus rostralis none. Inferior labials fif-

teen, the first and second margining a plate, which meets its fellow in front of the geneials, and is in other species a continuation of the first. Gastrosteges, 178; urosteges, 84; joints of rattle, 9. The general tint of this species is a bright salmon-red; the scales of the inferior rows punctulate with brown.

Nasal plates distinct; muzzle with small plates or numerous scales above [as in *cerastes* and *mitchelli*]. Upper margin of canthus rostralis with small scales like the others. Prenasal separated from rostral by scales; superciliary not prolonged. Rostral broad as long; head very obtuse, rounded. Scales 25 rows; 7 between superciliaries, 3 below orbit; labials, 14; 2 very small preorbitals and 4 loreals. Pale-vermillion varied with yellow on the sides of the belly, with numerous large reddish-bay hexagons, which become transverse bands on posterior two-thirds of length; yellow below. Rattle subacuminate.

This species is one of the most handsomely colored of the genus. Its affinities are with the *C. mitchelli*, Cope; but it exhibits an even higher degree of subdivision of the head shields.—(*Cope, descr. orig.*)

A single specimen of this richly colored species was procured at Cañon Prieto, a locality near Fort Whipple. It is not in the best order, as it was procured under the untoward circumstances of a hasty retreat from hostile Indians. The species is probably rare, as I never met with a second example, while that one procured was regarded as a curiosity by the numerous persons who came to see a "red rattlesnake".

46. *Caudisona* (*Æchmophrys*) *cerastes*, (*Hallow.*).

Crotalus cerastes, HALLOW., Proc. Acad. Nat. Sci. Phila., 1854, 95.—*Id.*, P. R. R. Rep., x, 1859, Williamson's Route, Reptiles, 17.—HEERM., *ibid.*, 24.—BD., U. S. & Mex. Bound. Surv., ii, pt. ii, 1859, Reptiles, 14, pl. 3.—COPE, Check-List, 1875, 33.

Caudisona cerastes, COPE, Proc. Acad. Nat. Sci. Phila., 1866, p. —.

Æchmophrys cerastes, COUES.

Head small, with rounded angles; nose depressed, obtuse; rostral as broad as high; nostril in middle of a single large plate; lateral edge of superciliary plate elongated into a horn-like process over the eye. Two rows of scales between the suborbital series and the labials; superior labials

11-13, inferior 12-13. Dorsal rows, 21; the scales slightly carinated; each scale along the middle of back with a tubercular swelling toward the center. Crown tubercular. Entire head and upper parts of a light yellowish, with a dorsal series of small indistinct blotches, below which are several irregular rows of isolated brown dots; a narrow brown stripe from orbit back over angle of mouth.—(*Kennicott.*)

The singular development of the supraorbital plate into a horn-like process, contact of prenasal with rostral, and turgidity of the dorsal and coronal scales, may be considered sufficient grounds for the establishment of a section of the genus, as above indicated.

This rather small species is found with *C. tigris* in the arid region of the Gila and Colorado, where it is common. In the position of the nostrils, it appears related to *Aploaspis*, Cope, type *C. lepida*, Kenn. (Proc. Phila. Acad., 1861, 206). This last species, described from Western Texas, will probably yet be found to inhabit Arizona.

46. *Crotalus edwardsi* (*Bd. & Gir.*) Cope.

Crotalophorus edwardsii, BD. & GIR., Cat. N. A. Rept., 1853, 15.—DUM. & BIBR., Erp. Gén., vii, 1853.—BD., P. R. R. Rep., x, 1859, pl. 24, f. 8 (no text).—*Id.*, U. S. & Mex. Bound. Surv., ii, pt. ii, 1859, Reptiles, 15, pl. 5, f. 1.

Crotalus edwardsii, COPE, Mitchell's Res., 1861, 125.

Caudisona edwardsii, COPE, Check-List, 1875, 34.

Twenty-three rows of dorsal scales; two first rows smooth. Vertical plate subpentagonal, tapering to an acute point posteriorly. Color light yellowish-brown, with chestnut blotches, lighter than in *C. tergeminus* or *C. consors*. Lateral blotches proportionally small. Yellowish line from nostril to angle of mouth as in *C. consors*; no vertebral reddish line.—(*Baird.*)

This species, with which I did not myself meet, occurs on the southern border of the Territory. Specimens have been described from Sonora on the Mexican boundary line; Tamaulipas, Mexico; and Brownsville, Texas.

Crotalus miliarius is a species probably to be added to the fauna of Arizona.

PROTEROGLYPHA.

ELAPIDAE.

48. *Elaps euryxanthus*, Kenn.—Harlequin Snake.

Elaps euryxanthus, KENN., Proc. Acad. Nat. Sci. Phila., 1860, 337.—COPE, Proc. Acad. Nat. Sci. Phila., 1866, 307.—*Id.*, Check-List, 1875, 34.

Head very small, narrower than the neck; entirely black as far back as the angles of the mouth. Body banded alternately with black and light brick red, separated by narrow rings of creamy white; all the bands immaculate; first broad ring behind the occiput red instead of black, as in the other species.... The plates of the head and the peculiar style of coloration in this strongly marked species cannot be mistaken. The three colors, each immaculate, glossy, and clear, form a striking contrast, and the red is probably bright carmine in life, thus affording the most beautiful coloration possessed by any North American snake.—(*Descr. orig.*)

A rather large, slender, and very beautiful species, known in Arizona as the "King" and "Ring" snake. It is apparently not abundant. One of my two specimens was taken at Fort Whipple, the other on Date Creek. Excepting the rattlesnakes, this is the only venomous reptile I observed in the Territory.

ASINEA.

COLUBRIDAE.

49. *Heterodon simus nasicus*, (Bd. & Gir.).*b. NASICUS.*

Heterodon nasicus, BD. & GIR., Stans. Rep. Exp. Great Salt Lake, 1852, 352.—*Id.* Marcy's Rep. Red Riv., 1852, 208.—*Id.*, Cat. N. A. Rept., 1853, 61, 157.—HALLOW., Sitgreave's Exp. Zuñi & Col. Riv., 1853, 147.—BD., P. R. R. Rep., x, 1859, Whipple's Route, Reptiles, 41.—HALLOW., Proc. Acad. Nat. Sci. Phila., 1856, 249.—BD., P. R. R. Rep., x, 1859, Beckwith's Route, Reptiles, 19.—*Id.*, U. S. & Mex. Bound. Surv., ii, pt. ii, 1859, 18, pl. 11, f. 1.—HAYD., Trans. Am. Phil. Soc., xii, 1862, 177.—COPE, Proc. Acad. Nat. Sci. Phila., 1866, 307.—ALLEN, Proc. Bost. Soc. Nat. Hist., xvii, 1874, 69 (Yellownstone).

Heterodon simus, subsp. *nasicus*, COPE, Check-List, 1875, 43.

This species belongs to the section of the genus in which the median plate behind the rostral is separated from the frontals by several small plates. Originally described from Utah, its range has since been ascertained to be general in the West, east of the Rocky Mountains, from the British to the Mexican boundary. I have found it along the northern boundary line, latitude 49° , the northernmost point at which any species of the genus is known to occur; and in most portions of Arizona and New Mexico it is one of the commonest serpents.

50. *Tropidonotus** *sipedon couchi*, (Kenn.).

Nerodia couchii, KENN., Proc. Acad. Nat. Sci. Phila., 1869, 335. (Nuevo Leone).

Tropidonotus sipedon subsp. *couchii*, COPE, Check-List, 1875, 42.

Resembles *N. erythrogaster* [*i. e.*, *Trop. sipedon* var. *erythrogaster*], but the head is shorter and very broad, the muzzle broad and obtuse. Post-orbitals three, much larger than in *N. erythrogaster*, the lower extending forward beyond the middle of the eye. Eight upper labials, all large; the seventh much larger than in *N. erythrogaster*. The dorsal scales are broader and less strongly keeled, and in twenty-three rows. Color uniform light dull slaty brown above, paler than in *erythrogaster*.—(Kennicott.)

A species of the Sonoran Region as defined by Professor Cope.

51. *Tropidonotus validus*, (Kenn.) Cope.

PLATE XXI.

Regina valida, KENN., Proc. Acad. Nat. Sci. Phila., 1860, 334.

Tropidonotus validus, COPE, Proc. Acad. Nat. Sci. Phila., 1866, 310.—*Id.*, Check-List, 1875, 42.

Body stout for the genus. Head large, short but high; broad posteriorly. Snout elongated, narrow, and pointed. Vertical very narrow, obtusely pointed posteriorly; occipitals small; nineteen rows of scales, all carinated; the exterior very feebly. Light brownish-ash above, with faint black markings upon the bases of the scales of the first, fourth, and eighth rows; abdomen entirely uniform yellowish.—(Kennicott.)

This species, resembling the better known *T. erythrogaster*, was originally described from Durango, Mexico, and I only know of it as an inhabitant of the Territory from Professor Cope's indication above cited.

**Nerodia* + *Regina*, Bd. & Gir.

52. *Eutænia ornata*, Bd. & Gir.

Eutænia parietalis; BD. & GIR., Cat. N. A. Rept., 1853, 38 (*synon. excl. Non Coluber parietalis Say*).

Eutænia ornata, BD. & GIR., U. S. & Mex. Bound. Surv., ii, pt. ii, 1859, Reptiles, 16, pl. 9.—COPE, Proc. Acad. Nat. Sci. Phila., 1866, 305, 306.—COPE, Check-List, 1875, 41.

In this apparently well marked species, there are nineteen rows of dorsal scales, on the second and third of which are the lateral stripes. The body is rather slender, and the tail more than a fourth of the total length. The color above is olive-brown; the bands are greenish-yellow, and on the stretched skin red spots show among the black ones, which occur along the sides.

In their aquatic habits, these snakes differ from *E. cyrtopsis* and *macrostemma*, neither of which, according to my observations, are specially addicted to the water, frequenting dry herbage and bushes like *E. sirtalis* of the East. I found *E. ornata*, in June, 1864, in considerable numbers, basking about small, shallow pools in the *bosqué* of cottonwood which fringes the Rio Grande at Los Pinos, N. Mex. No specimens are contained in my collections from Arizona itself, where the aquatic species, observed at various points, is *E. vagrans*.

53. *Eutænia cyrtopsis*, Kenn.

PLATE XX, FIGS. 2, 2a.

Eutænia cyrtopsis, KENN., Proc. Acad. Nat. Sci. Phila., 1860, 333.—COPE, Proc. Acad. Nat. Sci. Phila., 1866, 306.—COPE, Check-List, 1875, 41.

Form very slender; but little stouter than that of *E. saurita*; but with shorter tail, one-fourth the total length. Head and eye large. Superior labials eight, the sixth and seventh largest. Postorbitals three; upper much the largest. Dorsal scales in nineteen rows; lateral stripe on the second and third rows. Olive-brown, with two alternating series of elongated spots between the stripes, giving the appearance of a zigzag line. Dorsal stripe narrow, distinct to the end of the tail, whitish; lateral stripe like the dorsal in color, broad, distinct from head to arms. A series of black spots on the first dorsal row. Abdomen uniform greenish-white. Orbits whitish. Occipital spots obsolete.—(*Kennicott*.)

This species, originally described from Coahuila, Durango, and the Gila River, was found to be quite common at Fort Whipple, where numerous specimens were observed besides the few transmitted to Washington. It grows to a large size, equaling or surpassing *E. sirtalis* in this respect, but preserving its very slender form, which, with the strong, clear stripes, renders it an attractive object. The larger animals, which I kept in confinement, were quite savage when first caught, biting when taken in hand, and even acting sometimes on the offensive when irritated; but they usually became gentle and submissive after a little handling.

53. *Eutænia vagrans*, Bd. & Gir.

Eutænia vagrans, BD. & GIR., Cat. N. A. Rept., 1853, 35.—GIR., U. S. Exp. Exped. Herp., 1858, 154, pl. 14, figs. 5–10.—BD., P. R. R. Rep., x, 1859, Beckwith's Route, Reptiles, 19, pl. 17.—COOP. & SUCKL., Nat. Hist. Wash. Terr., 1860, 297.—COPE, Proc. Acad. Nat. Sci. Phila., 305, 307.—COPE, Check-List, 1875, 41.

? *Eutænia angustirostris*, KENN., Proc. Acad. Nat. Sci. Phila., 1860, 332.

As in *E. macrostemma*, the dorsal scales are in twenty-one rows; but the lateral stripe is on the second and third, not third and fourth. There are eight superior labials, of which the sixth and seventh are very large, being higher than wide, one of them extending above the lower level of the eye. The color is a light olive-brown, or ashy-brown; the head indifferently brown or black on top. The bands are narrow, unmargined; the dorsal one strong; the lateral ones less distinct; and there are two series of small, black, lateral spots, which encroach at regular intervals upon both the longitudinal bands.

This species appears to merit its name, since, unlike several others of local distribution, it is widely dispersed in the West. My latest investigations carry its range to the northern borders of Dakota and Montana, and even a little beyond the watershed of the Missouri, into that of the Saskatchewan, as I found it in the summer of 1874 at Chief Mountain Lake, latitude 49° N., where it was associated with the form of *E. sirtalis* called *E. pickeringi*. I also found it in a corresponding latitude farther east, along with *E. radix*. It is a common species in various parts of Arizona and New Mexico. My specimens were found along the Zuñi River in New Mexico, wherever this

stream spread into sluggish lagoons, basking on the floating plants, or swimming freely in the water like a *Nerodia* or *Regina*. Others were taken on the San Francisco Mountains in Arizona. They were all rather small, under two feet in length, and differed much in the coloration of the head, which, in some cases, was pitchy black, contrasting strongly with the brown of the body; in others brown. This difference, however, appears to be fortuitous, as both kinds were found together, evidently representing but one species.

155. *Eutænia macrostemma*, Kenn. (teste Cope).

Eutænia macrostemma, KENN., Proc. Acad. Nat. Sci. Phila., 1860, 331.—(?)COPE, Proc. Acad. Nat. Sci. Phila., 1866, 306, 307 (rather var. *megalops*).

Dorsal scales in twenty-one rows, the lateral on the third and fourth. Frontal plate longer than the occipital suture. Temporal small, margining only the anterior part of penultimate labial. Post-geneials longer than pre-geneials; superior labials eight; loreal higher than long. Olivaceous, with one row of small black spots below, and two rows above the lateral stripe. Two small black nuchal spots and a short post-oral pale crescent.—(Cope.)

In the original description, Mr. Kennicott gives the ground color as very dull yellowish-brown; the dorsal stripe broad, covering nearly three rows of scales, light brownish, but little lighter than the ground color, indistinctly bordered with black; the lateral stripe indistinct, dull yellowish-green, and two broken series of indistinct spots along the sixth and seventh rows of scales; the abdomen immaculate, a varying shade of green; the head dark-brown above; the superior labials but little lighter, narrowly black-bordered behind. The type is from the city of Mexico.

Two specimens from Fort Whipple, identified with this species by Professor Cope. They appear, however, to rather represent the following variety, as the true *macrostemma* probably does not occur so far north.

55a. *Eutænia macrostemma megalops*, (Kenn.)

Eutænia megalops, KENN., Proc. Acad. Nat. Sci. Phila., 1860, 330.

Eutænia macrostemma subsp. *megalops*, COPE, Check-List, 1875, 41.

“Form shorter and stouter, with proportionally shorter tail than in *E. proxima*, which this species resembles. Tail one-fourth of the total length. Eye very large, greater than in *E. proxima*. First dorsal row of scales broader;

each scale as high as long, and less strongly carinate. Dorsal stripe narrow, covering one and less than two half rows of scales. . . . Color uniform dull brownish-ash or clay color, with the dorsal and lateral stripes whitish-yellow. A few of the scales have narrow black spots on their edges, but these are prominent, and never extend over a scale, appearing as indistinct mottlings of black on the ground color always on the rows next the stripes. The head above is light olive-ash. The lateral stripe is on the third and fourth rows, and is narrower than in *E. proxima*, covering rather less than two half scales. The color below the lateral stripe is a little lighter than that of the back. The exterior dorsal row is much wider than in any of the allied species, each scale being as high as long. The second row is much narrower, though a little wider than the third. The eye is strikingly large, and the superciliaries are raised, rendering the fore part of the crown an inclined plane, yet the muzzle is higher than in *E. proxima*."—(*Descr. orig.*)

With this species, described from Tucson, I am acquainted only by the above description, as no specimens were included in my collections.

56. *Bascanium** *tæniatum*, (Hallow.) Cope.

Leptophis tæniata, HALLOW., Proc. Acad. Nat. Sci. Phila., vi, 1852, 181.—*Id.*, Sitgreave's Exp. Zuñi & Col. Riv., 1853, 133, 146.

Masticophis tæniatus, BD. & GIR., Cat. N. A. Rept., 1853, 103.—BD., P. R. R. Rep., x, 1859, Beckwith's Route, Reptiles, 20, pl. 23.—*Id.*, *ib.*, Abbott's Route, Reptiles, 11.—COOP. & SUCKL., Nat. Hist. Wash. Terr., 1860, 302.—COPE, Proc. Acad. Nat. Sci. Phila., 1866, 305.

Drymobius tæniatus, COPE, Proc. Acad. Nat. Sci. Phila., 1860, 561.

Bascanium tæniatum, COPE, Check-List, 1875, 40.

Masticophis schottii, BD. & GIR., Cat. N. A. Rept., 1853, 160.—BD., U. S. & Mex. Bound. Surv., ii, pt. ii, 1859, Reptiles, 20, pl. 18.

? *Leptophis lateralis*, HALLOW., Proc. Acad. Nat. Sci. Phila., 1853, 237 (a separate variety?).

Several specimens from various parts of the Territory, including old and young; the former considered by Professor Cope to represent "*Leptophis lateralis*" of Hallowell. The *B. tæniatum*, as redescribed by Baird and Girard, has a broad, brown, dark-edged, dorsal band, six and two half scales wide, and yellow lateral bands, four scales wide, with a dark line on each scale, and another dark line along the edge of the abdomen (six dark lines

* *Bascanium* + *Masticophis*, Bd. & Gir.

in all); the belly yellowish. The characters of a supposed second species, *M. schottii*, have been found by Cope not to hold good.

Var. *ornatum* (*Masticophis ornata*, B. & G., Cat., 102), from Western Texas, is probably to be added to the list.

57. *Bascanium flagelliforme testaceum*, (Say) Cope.

Coluber testaceus, SAY, Long's Exped. Rocky Mts., ii, 1823, 48.—HARLAN, Jour. Acad. Nat. Sci. Phila., v, 1827, 348.—HOLBR., N. A. Herp., iii, 1842, 63, pl. 13.—HARLAN, Med. & Phys. Res., 1835, 113.—BD. & GIR., Cat. N. A. Rept., 1853, 150.

Masticophis testaceus, BD. & GIR., U. S. Mex. Bound. Surv., ii, pt. ii, 1859, 20, pl. 16.—BD., P. R. R. Rep., x, 1859, Whipple's Route, Reptiles, 43.—COPE, Proc. Acad. Nat. Sci. Phila., 1866, 305.

Drymobius testaceus, COPE, Proc. Acad. Nat. Sci. Phila., 1860, 561.

Psammophis flavigularis, HALLOW., Proc. Acad. Nat. Sci. Phila., vi, 1852, 178.—*Id.*, Sitgreave's Exp. Zuñi & Col. Riv., 1853, 131, 146, pl. 11.

Masticophis flavigularis, BD. & GIR., Cat. N. A. Rept., 1853, 99, 159.

Herpetodryas flavigularis, HALLOW., P. R. R. Rep., x, 1859, Williamson's Route, Reptiles, 12.

Bascanium flagelliforme subsp. *testaceum*, COPE, Check-List, 1875, 40.

The recognition, in the present species, of the *Coluber testaceus* of Say, satisfactorily completes the identification of the species of that eminent and successful naturalist.

The present is a species of general distribution in Arizona, being met with both in the mountainous and desert portions of the Territory, and is one of the common Ophidians.

57a. *Bascanium flagelliforme piceum*, Cope.

Bascanium flagelliforme subsp. *piceum*, COPE, Dr. Yarrow's Rep., *anted.*—*Id.*, Check-List, 1875, 40.

Camp Grant, Ariz.

58. *Pityophis sayi bellona*, (Bd. & Gir).

a. SAYI.

Coluber melanoleucus var., SAY.—HARLAN, Jour. Acad. Nat. Sci. Phila., v, 1827, 360.—*Id.*, Med. & Phys. Res., 1835, 123.

Coluber sayi, SCHL., Ess. Physiog. Serp., 1837, 157 (not *Coronella sayi*, HOLBR., nor *Coluber sayi*, HARLAN, which are *Ophibolus*).—BD. & GIR., Cat. N. A. Rept., 1853, 151.

Pityophis sayi, BD. & GIR., Cat. N. A. Rept., 1853, 152 (in text).—KENN. *apud* COOP. & SUCKL., Nat. Hist. Wash. Terr., 1860, 300, pl. 22.—HAYD., Trans. Am. Phil. Soc., xii, 1862, 177.

b. *BELLONA*.

Churchillia bellona, BD. & GIR., Stans. Rep. Exp. Great Salt Lake, 1852, 350.

Pituophis bellona, BD. & GIR., Cat. N. A. Rept., 1853, 66, 157.

Pityophis bellona, KENN. *apud* BD., P. R. R. Rep., x, 1859, Williamson's Route, Reptiles, 42.—BD., P. R. R. Rep., x, 1859, Beckwith's Route, Reptiles, 19.—KENN. *apud* BD., U. S. & Mex. Bound. Surv., ii, pt. ii, 1859, Reptiles, 18.—COPE, Proc. Acad. Nat. Sci. Phila., 1866, 305.—ALLEN, Proc. Bost. Soc. Nat. Hist., xvii, 1874, 69.

Pityophis affinis, HALLOW., Proc. Acad. Nat. Sci. Phila., vi, 1852, 181.—*Id.*, Sitgreave's Exp. Zuñi & Col. Riv., 1853, 130, 146, pl. 10.

Pityophis sayi var. *bellona*, COPE, Check-List, 1875, 39.

Although perfectly harmless, this species is commonly called "Adder", like *Heterodon nasicus* and other blotched serpents, more or less resembling some of the venomous ones; it is also known as Bull Snake. *P. bellona* is one of the most abundant of all the species about Fort Whipple, where specimens could be found at any time during the summer in the grass and woods. Numbers used to be killed in the fort and surrounding buildings.

The great variability of this species, not only in color, but also in the details of the plates of the head, points not at first recognized, necessitates the reference of *bellona* to the longer known *Coluber sayi*. The use of the name "*sayi*" in this connection is to be carefully discriminated from its employ for an altogether different species of *Ophibolus*.

In addition to the foregoing, Professor Cope indicates a subspecies *mexicana* (D. & B.), as occurring in the Central and Sonoran Regions. Of this form I know nothing.

59. *Pityophis elegans* (Kenn.) Cope.

Arizona elegans, KENN., *apud* BD., U. S. & Mex. Bound. Surv., ii, pt. ii, Reptiles, 18.

Pityophis elegans, COPE, Check-List, 1875, 39.

"Sonoran Region."

60. *Ophibolus getulus boylii*, Bd. & Gir.

Ophibolus boylii, BD. & GIR., Cat. N. A. Rept., 1853, 82.—BD., P. R. R. Rep., x, 1859, Williamson & Abbott's Route, Reptiles, 11.—*Id.*, U. S. & Mex. Bound. Surv., ii, pt. ii, 1859, Reptiles, 20.—COPE, Proc. Acad. Nat. Sci. Phila., 1866, 305.

Lampropeltis boylii, COPE, Proc. Acad. Nat. Sci. Phila., 1860, 255.

Coronella balteata, HALLOW., Proc. Acad. Nat. Sci. Phila., 1853, 236.—*Id.*, P. R. R. Rep., x, 1859, Williamson's Route, Reptiles, 14.

Ophibolus getulus subsp. *boylii*, COPE, Check-List, 1875, 37.

Specimens from Date Creek, fifty miles south of Fort Whipple. This species, originally described from California, has an extensive dispersion in the West as far north as the Yellowstone, as I find a specimen in a collection from that region.

60a. *Ophibolus getulus splendidus*, Bd. & Gir.

Ophibolus splendidus, BD. & GIR., Cat. N. A. Rept., 1853, 83 (Sonora).—BD., U. S. & Mex. Bound. Surv., ii, pt. ii, 1859, Reptiles, 20, pl. 14 (Arizona).—COPE, Proc. Acad. Nat. Sci. Phila., 1866, 310.

Lampropeltis splendida, COPE, Proc. Acad. Nat. Sci. Phila., 1860, 255 (Fort Buchanan, Ariz.).

Ophibolus getulus subsp. *splendidus*, COPE, Check-List, 1875, 37.

Not contained in my collections. It appears to be rather an inhabitant of the southern portions of the Territory and southward.

61. *Ophibolus pyromelas*, Cope.

PLATE XIX, FIGS. 1, 1a, 2.

Ophibolus pyromelanus, COPE, Proc. Acad. Nat. Sci. Phila., 1866, 305 (described from Nos. 731 and 760 of my collection from Fort Whipple, August, 1864).

Ophibolus pyromelas, COPE, Check-List, 1875, 37.

"Scales in 23 longitudinal rows; tail five and one-half times in total length. Scuta 224, 1, 66. Fifty to fifty-eight black annuli on an ochraceous white ground, on the body; each anteriorly completely, posteriorly more or less incompletely, split by a vermilion annulus; all extending with irregularities on the belly.

"Head quite distinct from body; muzzle contracted. Frontal plate broad, with prolonged apex; parietals elongate, emarginate behind; cephalic shields otherwise as in *polyzonus*, *splendidus*, &c. Postgeneials half the length of the pregeneials. Dorsal scales rather broad; outer series not abruptly enlarged. In one specimen, all the black annuli to the middle of the tail are divided by the red, thus leaving the black as a margin to it; hence the number of these annuli is fewer; they are four scales wide behind the middle of the body. In another specimen, only four anterior rings are com-

pletely divided, those on the following third of the length being divided by red on the sides; the remaining annuli black, three scales wide; white annuli one and one-half scales; anterior or nuchal red; annulus widest, its anterior black margin attaining parietals; an ochraceous band from gular region, not quite completed across parietals. Muzzle, prefrontal plates, and labial margin ochraceous; remainder of top and sides of head black. Total length, 30.5 inches.

"This species has a longer body than the known red-ringed species, and is, indeed, most closely related to the *O. boylii*. It will always be distinguished for the latter by the much more numerous annuli (twenty-eight in *boylii*)."—Cope.

62. *Phimothyra grahamiæ*, (Bd. & Gir.) Cope.

Salvadora grahamiæ, BD. & GIR., Cat. N. A. Rept., 1853, 104, 161 (type of genus). (Sonora, Mex.).—BD., U. S. & Mex. Bound. Surv., ii, pt. ii, 1859, 21, pl. 5, f. 2.

Phimothyra grahamiæ, COPE, Proc. Acad. Nat. Sci. Phila., 1866, 310.—*Id.*, Check-List, 1875, 38.

Lower California, Sonora, and Arizona, to Utah and Texas.

62a. *Phimothyra grahamiæ hexalepis*, Cope.

Phimothyra hexalepis, COPE, Proc. Acad. Nat. Sci. Phila., 1866, 305 (described from my specimen from Fort Whipple).

Phimothyra grahamiæ subsp. *hexalepis*, COPE, Check-List, 1875, 38.

"Resembles the *P. grahamiæ* (*Salvadora grahamiæ*, B. & G.), but differs in having a shorter tail, five and one-third times in length, instead of four times; eye resting on sixth supralabial, on account of the presence of three narrow preoculars, two or three loreals—largest higher than long; nostril on suture between nasals and internasals; dorsal stripe narrow—one and two half scales, and lateral brown band wide, four and a half to five scales, whose *superior* margins are ochraceous at base. Rostral plate well developed, higher than broad; nasals elongate, much depressed, anterior extending behind first labial; postoculars two; two long narrow temporals. Width of occipitals nearly equal common suture. Nine superior labials; first pair inferior labials much dilated medially, their common suture nearly equal that of pregenaeals; scales seventeen rows. Gastrosteges, 176; urosteges, 75. Tail and below uniform yellowish."—Cope.

Fort Whipple. The stomach contained a *Chemidophorus sexlineatus*.

63. *Trimorphodon lyrophanes*, Cope.*Lycodon lyrophanes*, COPE, Proc. Acad. Nat. Sci. Phila., 1860, 343.*Trimorphodon lyrophanes*, COPE, Proc. Acad. Nat. Sci. Phila., 1866, 310.—*Id.*, Check-List, 1875, 38.

Scales in 21 rows, broad posteriorly and upon the middle of the body, the dorsal series not larger; body anteriorly slender; neck contracted. Tail not one-sixth the total length. Head broadest just behind the eyes; constricted at the orbits. Muzzle rather narrow and truncate. Rostral broader than high, with four sutural borders; the superior one very long; the apex apparent upon the surface of the head. Prefrontals much broader than long; one-third the size of that part of the postfrontals visible from above. Postfrontals longer than broad upon vertical view. Occipitals, superciliaries, and vertical well developed; the last right-angled posteriorly, with slightly concave and convergent lateral borders. Occipitals not longer than vertical; about as wide as long; in contact with a large scale in their posterior common emargination. Nasal plates distinctly divided, very small, higher than long. Loreals *two*; anterior one higher than long, wedged above between pre- and postfrontal; the posterior as long as high. Preoculars *three*; the superior largest, not in contact with the vertical; the inferior bounded anteriorly by the third upper labial. Postoculars three; the inferior a little the largest. Superior labials nine; fourth and fifth entering the orbit, sixth largest, higher than broad. Inferior labials twelve, third and fourth narrow, and much produced posteriorly. Genaials two pair, the anterior longest. Gastrosteges, 236; one divided anal; urosteges, 70. Length, 27 inches 10 lines; tail, 4 inches 4 lines. Ground color light-gray. Muzzle crossed by an indistinct ashy band, which extends upon the anterior part of the postfrontals. The posterior half of these plates is involved in a deep-brown band across the head between the eyes, with concave posterior border, extending upon the superciliaries, and continued posteriorly upon the inferior postorbital and sixth upper labial. A pair of broad diverging bands, commencing one on either side of the center of the vertical, crosses the superciliary and occipital, follows the expanded outline of the temporal and tympanic regions, contracts and becomes parallel and longitudinal upon the neck. A brown spot upon the posterior extremity of the verticals, with its posterior

elongation, completes the resemblance to a lyre, or rather a Jew's-harp. The ground color appears upon the vertex as an anchor-shaped figure, and on the cheeks as an oblique band. The back, as far as the anus, has 21 pairs of deep-brown spots, their gemination only apparent anteriorly by the punctulate character of the scales in their intervals. These are always about 3 scales wide; the lesser ones $2\frac{1}{2}$ anteriorly, $1\frac{1}{2}$ posteriorly. Dorsal spots 7 scales wide; as the scales are broader posteriorly, the spots are also. An irregular series of lateral spots, one opposite each of the intervals, sometimes confluent with the dorsal spots, anteriorly forming a very narrow broken band. Another series of spots involves the tips of pairs of the gastrosteges, which are separated by 2 to 5 immaculate ones. Ten confluent pairs of spots on the tail above. Whole under surface whitish.—*From the orig. descr.*

This tropical form is one of the most interesting of the later additions to our fauna. It was first discovered in the United States by Dr. B. J. D. Irwin, U. S. A., at Fort Buchanan, Ariz.; but had been previously taken at Cape Saint Lucas. In describing it, Professor Cope at first referred it to the genus *Lycodon*, Duméril, but subsequently placed it in *Trimorphodon*.

The *Sibon annulatum* var. *septrionalis* (*Dipsas septrionalis*, Kenn., U. S. & Mex. Bound. Surv., ii, pt. ii, 1859, Reptiles, 16), from Southwestern Texas, will probably be found in the Territory. For the position of this form, see Cope, Proc. Phila. Acad., 1860, 266.

64. *Hypsiglena ochrorhyncha chlorophæa*, Cope.

a. OCHRORHYNCHA.

Hypsiglena ochrorhynchus, COPE, Proc. Acad. Nat. Sci. Phila., 1860, 246 (type of the genus), (Cape Saint Lucas).—*Id.*, Check-List, 1875, 38.

b. CHLOROPHÆA.

Hypsiglena chlorophæa, COPE, Proc. Acad. Nat. Sci. Phila., 1860, 247 (Fort Buchanan, Ariz.).

Hypsiglena ochrorhynchus var. *chlorophæa*, COPE, *op. cit.*, 1866, 304.

Hypsiglena ochrorhynchus subsp. *chlorophæa*, COPE, Check-List, 1875, 38.

My specimens from Arizona, the precise locality not indicated, are of the variety *chlorophæa*, originally described as a distinct species. The numerous small dorsal spots are mostly divided. The original form is from Lower California. The Arizonan variety is described substantially as follows:—

Rather more slender than *H. ochrorhynchus*; scales more elongate, and rows more oblique; vertical plate rather broader, and head relatively narrower. Color greenish-ash, darker than in *H. ochrorhynchus*; the dorsal spots black instead of brown, smaller 2 scales apart, $1\frac{1}{2}$ scale long, 58 to 66 in number on the body, occupying only the space from the ninth to the thirteenth dorsal row, frequently dividing and alternating; two rows of smaller alternating spots on the sides, one on sixth and seventh rows, the other on the fourth row; crown and muzzle thickly dotted with black; beneath pale olivaceous; distribution of colors on the head and neck much as in *H. ochrorhynchus*, but the neck spots rather larger, the brown replaced by black, the ochraceous by olivaceous. Gastrosteges, 167; urosteges, 55. Length, $15\frac{1}{2}$ inches; tail, $2\frac{1}{4}$.

65. *Diadophis regalis*, Bd. & Gir.

Diadophis regalis, BD. & GIR., Cat. N. A. Rept., 1853, 115, 161 (Sonora).—BD., U. S. & Mex. Bound. Surv., ii, pt. ii, 1859, 22.—COPE, Proc. Acad. Nat. Sci. Phila., 1866, 310.—COPE, Check-List, 1875, 38.

From the Sonoran border; not met with by me. According to its describers, this species lacks an occipital ring; dorsal scales 17 rows; body above uniform greenish-ash; below light-yellow, with numerous small black spots.

? *Diadophis docilis*, Bd. & Gir.

Diadophis docilis, BD. & GIR., Cat. N. A. Rept., 1853, 114 (Devil's River, Texas).—BD., U. S. & Mex. Bound. Surv., ii, pt. ii, 1859, 22, pl. 21, f. 3 (Tucson, &c.).

Not seen by me. It is described as uniform ashy-gray above, yellowish-white spotted with black below, with a broad yellowish-white occipital ring, bordered with a narrow black line; the dorsal scales in 15 rows.

66. *Rhinochilus lecontii*, Bd. & Gir.

Rhinocheilus lecontei, BD. & GIR., Cat. N. A. Rept., 1853, 120, 161 (type of the genus), (San Diego, Cal.).

Rhinochilus lecontii, BD., U. S. & Mex. Bound. Surv., ii, pt. ii, 1859, Reptiles, 21, pl. 20 (San Pedro, Tex.).

Rhinochilus lecontei, COPE, Proc. Acad. Nat. Sci. Phila., 1866, 304 (variety).—COPE, Check-List, 1875, 36.

My specimens from Arizona, without indication of particular locality, represent, according to Professor Cope, a variety, having fewer (twenty) black half-rings on the body, extending to the gastrosteges and separated

by a narrow interval. Abdomen with subquadrate black spots opposite the former and their intervals.

67. *Gyalopium canum*, Cope.

PLATE XVIII, FIG. 2, 2a.

Gyalopium canum, COPE, Proc. Acad. Nat. Sci. Phila., 1860, 243.

Gyalopium canum, COPE, Proc. Acad. Nat. Sci. Phila., 1860, 310.—*Id.*, Check-List, 1875, 36.

Prefrontals triangular, not larger than preoculars. Postoculars of equal size. Anterior border of vertical not angulated. Occipitals as broad as long, truncate posteriorly. Superior labials 7, eye over third and fourth. Inferior labials 7, fourth largest. Genaials one pair, very short. Scales in 17 rows, nearly square. Gastrosteges, 130; one anal; urosteges, 28. Total length, $7\frac{1}{2}$ inches; tail, 11 lines. Above brownish-gray, crossed by 31 irregular transverse brown bands; these are from one to three scales wide on the back, and extend to the gastrosteges; anteriorly they exhibit a tendency to divide into a dorsal and two lateral series of spots; 8 transverse spots on the tail; first spot on the neck large, produced medially to the occipitals. A brown band extends from one angle of the mouth to the other across the occipitals, involving the tip of the vertical; another brown band commences on the upper borders of the lower labial shields, passes through the eye, and crosses the anterior parts of the superciliaries, and vertical and posterior parts of postfrontals and rostral. Dirty yellowish beneath, and upon the first row of scales.—*Descr. orig.*

"It is an extraordinary serpent, resembling, at first sight, a diminutive *Heterodon*", and was discovered at Fort Buchanan, Ariz., by Dr. B. J. D. Irwin, U. S. A.

68. *Sonora semiannulata*, Bd. & Gir.

Sonora semiannulata, BD. & GIR., Cat. N. A. Rept., 1853, 117 (type of genus.)—BD., U. S. & Mex. Bound. Surv., ii, pt. ii, 1859, Reptiles, 21, pl. 19, f. 3.—COPE, Proc. Acad. Nat. Sci. Phila., 1866, 310.—*Id.*, Check-List, 1875, 36.

Sonora and Southern Arizona. Not seen by me.

69. *Chionactis occipitalis*, (Hallow.) Cope.

a. OCCIPITALIS.

Rhinostoma occipitale, HALLOW., Proc. Acad. Nat. Sci. Phila., vii, 1854, 95.

Lamprosoma occipitale, HALLOW., Proc. Acad. Nat. Sci. Phila., viii, 1856, 310.—KENN. *apud* BD., U. S. & Mex. Bound. Surv., ii, pt. ii, 1859, Reptiles, 21, pl. 21, f. 1.

Chionactis occipitale, COPE, Proc. Acad. Nat. Sci. Phila., 1866, 310.

b. ANNULATUS.

Lamprosoma annulatum, KENN. *apud* BD., U. S. & Mex. Bound. Surv., ii, 1859, 22, (in text: Colorado Desert, Ariz.; name proposed if distinct from true *occipitale*, HALLOW.).

Chionactis occipitalis subsp. *annulata*, COPE, Check-List, 1875, 36.

Southern and Southwestern Arizona. Not seen by me.

70. *Contia isozona*, Cope.

PLATE XVIII, FIGS. 1, 1a.

Contia isozona, COPE, Proc. Acad. Nat. Sci. Phila., 1866, 304.—*Id.*, Check-List, 1875, 36.

Two postoculars; six rows of gular scales. Rostral rounded, slightly produced backward. Scuta $158\frac{1}{1}$, 52. Twenty black half rings, separated by equal spaces of pinkish ground color. Eye small; its diameter contained twice in length of muzzle.

Preorbital narrower above, not extending above lower margin of superciliary; loreal twice as long as high. Prefrontals and internasals much broader than long; frontal slightly angulate in front, longer than broad; parietals rather elongate, subtruncate behind. Postorbitals subquadrate; temporals 1–2. Postgenaeals minute. Superior labials seven, all higher than long; eye over third and fourth. Scales in fifteen rows, all broader than long. Tail four and two-fifths times in total length, which is 10.25 inches. Below immaculate. Tail completely six-annulate.

Resembles the *Sonora semiannulata*, B. & G., but that species has two nasals, three postoculars, the superior reaching the frontal; frontal wider behind than before, and only 149 gastroteges.—Cope.

Described from specimens in my collection. The same author indicates a variety of the species from Utah, with longer body, twenty-five black bars; body color vermilion above and yellow below; scuta $167\frac{1}{1}$, 52.

71. *Chilomeniscus ephippicus*, Cope.

PLATE XVIII, FIGS. 3, 3a.

Chilomeniscus ephippicus, COPE, Proc. Acad. Nat. Sci. Phila., 1867, 85.—*Id.*, Check-List, 1875, 35.

Scales broad, in 13 rows. Tail about one-seventh total length. Rostral plate large, entirely separating internasals, not encroaching on prefrontals;

nasal plate separating prefrontals and labials, in contact with preocular. Postoculars 2, upper only in contact with occipital. Superciliaries very narrow; occipitals as broad as long. Temporals $\frac{1}{2}$, large; labials above 7, third and fourth in orbit; these, with second, narrow, erect; first longitudinal. Inferior labials 8; first pair in contact before pregeneials; postgeneials very small. Total length, $5\frac{1}{2}$ inches. Gastrosteges, 113; separated from geneials by 4 rows of gulars; anal, 1-1; urosteges, 28-28. Above reddish or yellowish, with 21 black cross-bars to vent, which are broader than the interspaces, and do not quite reach gastrosteges. Five nearly complete rings on tail. Belly white. From occipitals to anterior part of frontal, with the labials opposite this part (except their lower edges), black.—Cope.

Originally described from Owen's Valley, California (*Dr. Horn*), and subsequently indicated as occurring in the Sonoran Region.

In the plate, Fig. 3*a* represents the position of the head shields as seen from above.

72. *Tantilla nigriceps*, Kenn.

Tantilla nigriceps, KENN., Proc. Acad. Nat. Sci. Phila., 1860, 328.—COPE, Check-List, 1875, 35.

Form more slender and head narrow than in *T. gracilis*. Vertical plate more elongate posteriorly; occipitals narrower. One anteorbital; two post-orbitals. Seven upper labials. Color (in alcohol) uniform brownish-white above, lighter beneath. Crown as far back as the occipitals deep black. No indication of a postoccipital black ring, as in *T. coronata*.

Originally described from Texas and New Mexico, and since ascertained to inhabit Arizona.

SCOLECOPHIDIA.

STENOSTOMATIDAE.

73. *Stenostoma dulce*, (Bd. & Gir.).

Rena dulcis, BD. & GIR., Cat. N. A. Rept., 1853, 142.
Stenostoma dulce, COPE, Check-List, 1875, 44.

Indicated by Professor Cope from the Sonoran Region and Texas.

B.—BATRACHIA.

ANURA.

BUFONIFORMIA.

BUFONIDAE.

74. *Bufo microscaphus*, Cope.

Bufo microscaphus, COPE, Proc. Acad. Nat. Sci. Phila., 1866, 301.—*Id.*, Check-List, 1875, 29.

Head broader than long, obtuse; muzzle descending in full arc to labial border from line of orbit. Superciliary ridges well marked, but concealed by the thick skin, plane, parallel. Postorbital not prominent. Vertical gutter narrow. Eyes large, prominent; double tympanum. Parotoids broad, smooth. Skin little roughened. Toes two-thirds webbed. Shovel very small, frequently not black-edged; outer tubercle small, heel to end of muzzle. Above blackish, a black spot on each parotoid, and dark light-centered bar on femur and tibia. A yellowish bar across front and palpebræ, and spot on nape; muzzle dark. Total length, 1 inch 5.5 lines; to postorbital ridge, 7.5 lines; fore limb, 1 inch 9 lines; hind limb, 3 inches 2 lines, femur one-third included. . . . The oval well-separated parotoids and general appearance of this species ally it to the *B. speciosus*, Girard. But in that animal the supraorbital ridges are obsolete, and the metatarsal shovel is very much stronger. The *B. dorsalis*, Hallowell (*B. woodhousei*, Gird.), is also allied, but is in all proportions and details more elongate, and has a stronger shovel and head-ridges; it always has the dorsal band, which never exists in the *microscaphus*, and never the transverse face-band of the latter.—*Descr. orig.*

Numerous specimens are in my collection from Fort Whipple, where it is the characteristic species, and very abundant.

75. *Bufo lentiginosus frontosus*, Cope.

Bufo frontosus, COPE, Proc. Acad. Nat. Sci. Phila., 1866, 301.

Bufo lentiginosus subsp. *frontosus*, COPE, Check-List, 1875, 29.

A species most allied to the *B. americanus*, but differing in the shorter

and more elevated cranium, longer and larger hind limbs, and more acuminate parotoid glands. The canthus rostrales not marked; the muzzle descending very steeply from the anterior angles of the orbits, shorter than the elevated, perpendicular muzzle. Frontal ridges higher than eyelids, rising steeply behind, terminating in two short convergent tuberosities, divergent, with interior crenations behind. Postocular ridge equally developed, sending a very small process to the anterior acuminate extremity of the parotoids. Elevation of cranium at parietal tubercle equal to length of same from the same point. Eye large; tympanum distinct, half eye; parotoid narrow, long, acuminate at both ends. Elbow to anterior margin of orbit; heel to end of muzzle. Skin everywhere with numerous small tubercles; soles rough; toes half webbed. Brown above, with pale vertebral line, and three pairs of deep-brown medium-sized spots, with paler centers. Sides and lips with small brown spots. Femur and tibia with one indistinct brown cross-bar each. Below uniform yellow. Total length, 4 inches, of which the head is 9 lines to postocular ridges; breadth between orbits, 2.5 lines; hind limb, 5 inches; sacrum, 1 inch across.—*Descr. orig.*

One specimen from Los Pinos, Rio Grande, N. Mex.; type of the species.

76. *Bufo alvarius*, Gir.

Bufo alvarius, GIR., *apud* BD., U. S. & Mex. Bound. Surv., ii, pt. ii, 1859, 36, pl. 41, figs. 1-6 (valley of the Gila and Colorado).—COPE, Check-List, 1875, 29.

Upper surface of head near plane upon its middle region; orbits bordered by a low and rounded-off ridge; its skin being thin and adhering to the skull. Parotoids well developed and subreniform. Eyes and tympanum rather large also. Tongue elongated, broadest posteriorly. Upper jaw emarginated. Two large carpal callosities. A membranous fold at the inner lower edge of the tarsus. Toes palmated; two metatarsal tubercles. Palms and soles coarsely granular. Upper surface of body exhibiting numerous glandular tubercles. A large pustular swelling upon the thighs. Color uniformly dark-green.—*Descr. orig.*

Originally described, as above, from the southern and western portions of the Territory; not observed by me.

77. *Bufo debilis*, Gir.

Bufo debilis, GIR., Proc. Acad. Nat. Sci. Phila., vii, 1854, 57.—GIR., *apud* BD., U. S. & Mex. Bound. Surv., 1859, ii, pt. ii, 27.—COPE, Check-List, 1875, 29.

Bufo insidiosus, GIR., Proc. Acad. Nat. Sci., 1854, 88.—GIR. *apud* BD., U. S. & Mex. Bound. Surv., ii, pt. ii, 1859, Reptiles, 26, pl. 41, figs. 13-18.

Upper surface of head plane and smooth. Snout subacute, protruding. Mouth moderate; upper jaw slightly emarginated. Tongue elongated, tapering toward both extremities. Tympanum inconspicuous. Parotoids large and elongated, obliquely situated across the shoulders. Limbs moderate. First finger equal to the second in length. A carpal disk and a tubercle. Toes slightly webbed at their base. Two metatarsal tubercles. No membranous fold at the inner lower edge of the tarsus. Skin papillous above, warty beneath. Above of a bluish slate, but with black markings. Beneath unicolor, of a dingy-yellow tint.—*Girard, l. c.*

Chihuahua and "Sonora" (*i. e.* Arizona).

78. *Bufo woodhousii*, Gir.

Bufo dorsalis, HALLOW., Proc. Acad. Nat. Sci. Phila., 1852, 181 (*nec Spix*).—*Id.*, Sitgreave's Rep. Exp. Zuñi & Col. Riv., 1853, 142, pl. 19.

Bufo woodhousii, GIR., Proc. Acad. Nat. Sci. Phila., 1854, 86.—*Id.*, U. S. & Mex. Bound. Surv., ii, pt. ii, 1859, Reptiles, 27.—*Id.*, P. R. R. Rep., x, 1859, Gunnison & Beckwith's Route, Reptiles, 20.—*Id.*, *ib.*, x, 1859, Whipple's Route, Reptiles, 44, pl. 25, f. 1.

Head short and thick; upper central surface but little depressed, not to say grooved; the suborbital ridge being slightly elevated. The occipito-temporal ridge is thicker, and hence a little more conspicuous. Snout rounded; nostrils terminal. Mouth wide; upper jaw emarginated. Tympanum and parotids of moderate size. Limbs rather short and stout; first finger much longer than the second; a large metacarpal disk; toes semipalmated; two metatarsal tubercles, a very large and a very small one; no membranous fold at the inner lower edge of the tarsus. Papillæ of medium size upon the back. Inferior surface with rather small, crowded, granular warts. Above dark-brown, with numerous lines of yellow. A dorsal yellowish vitta running the whole length of the body. Transverse blotches of black upon the thighs and forearms. Beneath ochraceous.—*Girard.*

A species which appears to be of very general distribution in the South-

west, and also in Sonora, hence undoubtedly occurring in Arizona, although I am not aware that as yet specimens have actually been taken within the limits of the Territory.

ARCIFERA.

SCAPHIOPIDAE.

79. *Spea hammondi*, (Bd.), Cope.

Scaphiopus hammondi, Bd., P. R. R. Rep., x, 1859, Williamson & Abbott's Route, Reptiles, 12, pl. 28, f. 2 (Fort Reading, Colo.).

Spea hammondi, COPE, Jour. Acad. Nat. Sci. Phila., 1866, 81.—COPE, Proc. Acad. Nat. Sci. Phila., 1866, 301.—COPE, Check-List, 1875, 31.

Tongue very large, orbicular, without notch behind. Spade highly developed. Color above dark olive-brown, with very indistinct blotches of darker. Summits of dorsal pustulation whitish. Beneath whitish, the chin black. Head and body, 2 inches long; hind leg, $2\frac{1}{2}$. This species is easily distinguished by its nearly uniform and very dark color, without the light lines of *S. holbrookii*.—*Descr. orig.*

Two specimens of this species were taken *in coitu* in June, 1864, near Fort Wingate, N. Mex., considerably extending the previously known range, and indicating the period at which the sexes come together. The animals were found on dry land at a distance from water, in this respect differing from the species of *Bufo*, which, at the period of sexual excitement, seek the water.

HYLIDAE.

80. *Hyla arenicolor*, Cope.

Hyla affinis, Bd., Proc. Acad. Nat. Sci. Phila., 1854, 61 (*nec Spix*).—*Id.*, U. S. & Mex. Bound. Surv., ii, pt. ii, 1859, Reptiles, 29, pl. 38, figs. 4-7.

Hyla arenicolor, COPE, Jour. Acad. Nat. Sci. Phila., 1866, 84.—*Id.*, Proc. Acad. Nat. Sci. Phila., 1866, 301.—*Id.*, Check-List, 1875, 31.

Body rough. Tympanum two-thirds the size of eye. Tibia not quite half the length of the body, but reaching more than half way from anus to center of eyes. Color ashy-gray or green, with numerous rounded, dorsal blotches. Three transverse bands on each thigh and leg. No vermiculation on anterior and posterior faces of hind legs, nor on lower part of sides. A light spot under the eye. Web of hand extending only to the third joint of

the second finger. Arm from elbow less than tibia, but longer than hind foot; about $1\frac{1}{2}$ inches long.—*Baird, l. c.*

The above description makes no mention of the bright-yellow tint of the sides of the abdomen and inner surface of the thighs, which is conspicuous in life.

My specimens are from Fort Whipple. The species was originally described (as *H. affinis*) from Northern Sonora.

RANIFORMIA.

RANIDAE.

81. *Rana halecina*, *Bosc.* (var.?)

Rana pipiens, *Gmel.*, *Syst. Nat.*, 13th ed., 1788, 1052 (not of authors generally).

Shad Frog, *Bartram's Travels*, 1790, 274.

Rana halecina, *Kalm.*—*Daudin*, *Hist. Nat. Rept.*, viii, 1803, 122.—*Holbr.*, *N. A. Herp.*, iv, 1842, 91, pl. 91.—*Storer*, *Mass. Rept.*, 2d ed., 237.—*Bd.*, *P. R. R. Rep.*, x, 1859, Whipple's Route, Reptiles, 45.—*Coop. & Suckl.*, *Nat. Hist. Wash. Terr.*, 1860, 304, pl. 29, f. 7.—*Hayd.*, *Trans. Am. Phil. Soc.*, xii, 1863, 177.—*Cope*, *Proc. Acad. Nat. Sci. Phila.*, 1866, 301.—*Allen*, *Proc. Bost. Soc. Nat. Hist.*, xvii, 1874, 70 (and of authors generally).

Rana utricularis, *Harlan*, *Am. Jour. Sci.*, x, 1825, 60.—*Id.*, *Med. & Phys. Res.*, 1835, 102, 224.

Rana berlandieri, *Bd.*

Specimens from the Rio Gallo, near Fort Wingate, N. Mex., and along the Zuni River, where the species is common. They are probably referable to the subspecies *berlandieri*.

CADUCIBRANCHIATA.

AMBLYSTOMATIDAE.

82. *Amblystoma mavortium*, *Bd.*

a. MAVORTIUM.

Ambystoma mavortia, *Bd.*, *Jour. Acad. Nat. Sci. Phila.*, 2d ser., i, 1849, 284, 292 (New Mexico).

Ambystoma mavortium, *Hallow.*, *Jour. Acad. Nat. Sci. Phila.*, iii, 1858, 352.

Amblystoma mavortium, *Bd.*, *P. R. R. Rep.*, x, 1859, Gunnison & Beckwith's Route, Reptiles, 20.—*Cope*, *Proc. Acad. Nat. Sci. Phila.*, 1867, 184.—*Allen*, *Proc. Bost. Soc. Nat. Hist.*, xvii, 1874, 70.

Amblystoma proserpina, *Bd. & Gir.*, *Proc. Acad. Nat. Sci. Phila.*, 1852, 173.—*Bd.*, *U. S. & Mex. Bound. Surv.*, ii, pt. ii, 1859, Reptiles, 29, pl. 35, figs. 7-14.

Ambystoma proserpine, HALLOW., Jour. Acad. Nat. Sci. Phila., iii, 1858, 354.

Ambystoma maculatum, HALLOW., Jour. Acad. Nat. Sci. Phila., iii, 1858, 355.—*Id.*, Proc. Acad. Nat. Sci. Phila., 1857, 215.

Desmlostoma maculatum, SAGER, Penins. Jour. Med., 1858, 428.

Camarataxis maculata, COPE, Proc. Acad. Nat. Sci. Phila., 1859, 123.

Ambystoma nebulosum, HALLOW., Proc. Acad. Nat. Sci. Phila., 1852, 209.—*Id.*, Jour. Acad. Nat. Sci. Phila., iii, 1858, 352.—*Id.*, Sitgreave's Exp. Zuñi & Col. Riv., 1853, 143, pl. 20.

Amblystoma? nebulosum, COPE, Proc. Acad. Nat. Sci. Phila., 1866, 300.

b. CALIFORNIENSE.

Ambystoma californiense, GRAY, Proc. Zool. Soc. Lond., 1853, 11, pl. 7 (Monterey).—HALLOW., Jour. Acad. Nat. Sci. Phila., iii, 1858, 355.

In the *Siredon* stage differing from the *S. gracilis*, Baird, in its oblique branchial arches, with finer pectinations, and in coloration. On the anterior side of the third arch, twenty pectinations, or rakers, may be counted; in the *S. pisciformis* (or *mexicanus*) there are but twelve. . . . Male about seven inches long. Branchiæ well developed. Gular derm free half way to symphysis mandibuli. Twelve costal folds. Muzzle slightly narrowed; jaws equal. Lateral and dorsal pertonæum black. The lungs extend to opposite the inguinal region. Corpus adiposum extending on testes to their anterior extremity. Testes undivided, broad; length equal to half that from axilla to anus; efferent vessels numerous, not entering directly the vas uro-spermatikus. The latter is very slender, lying along the outer margin, but not in contact with the narrow kidney; opposite the latter recurrently convolute, anterior to it straight, and extending to opposite axilla with decreasing diameter. It empties into the rectum near the cloaca. Cloaca protected on each side by a large, vertical, compressed gland, which is fringed on its inferior border (which is received into the lip of the cloaca), and also on its superior margin, which lies next the caudal vertebræ; it is continuous in front of anus; behind the two edges are pressed together. Integument of cloaca thrown into numerous appressed vertical plicæ, as in other *Siredons*. Stomach straight, extending to the left groin, filled with larvæ of *Diptera Nematocera*. Intestines long; rectum large. Female smaller; many of the ova black.

In these animals, the tarsal and carpal bones are fully formed, but cartilaginous. The palatine and pterygoid teeth in continuous series; the

latter slightly separated medially, and concentric with maxillary series. On this character, preserved in a stage of all allied species without branchiæ, I proposed the genus *Camarataxis*, the validity of which can only be established when the development of all our *Amblystomas* is known. It is a stage nearer the larval condition than the transverse series of *A. opacum*, while the A-shaped series of *A. luridum* is intermediate.—Cope.

Several specimens of this interesting animal are contained in my collections; Nos. 455, 456, ♀, from Jacob's Well, nearly on the boundary between Arizona and New Mexico, and No. 491, ♂, from water holes in the San Francisco Mountains. The foregoing is Professor Cope's notice of these specimens. They are still in the *Siredon* stage, though they have attained a length of six or eight inches, and were confined to the water; on being exposed to the air, the skin dried with remarkable rapidity, but would soon regain its natural condition upon re-immersion. They lived for a half hour or so in the air. The color in life was shining-green above and silvery greenish-white beneath, shading into yellowish about the head and gills, with a few obsolete black spots on the head and back. The now well-known variations in color of this wide-ranging species have necessitated the reduction to synonyms of several species at one time current as valid. Specimens which I lately procured in the northern portions of Dakota and Montana, where they were common in suitable situations, were darker in color than these, more boldly blotched with black, and showed no yellowish hue. They had all completed the metamorphosis at a length of three or four inches, and were often found in damp places at a distance from water.

Amblystoma trisruptum, Cope, Proc. Acad. Nat. Sci., Phila., 1867, 194, from the Ocate River, New Mexico, is a species which may be expected to occur in Arizona.

CHAPTER VI.

REPORT
UPON
THE COLLECTIONS OF FISHES
MADE IN PORTIONS OF
NEVADA, UTAH, CALIFORNIA, COLORADO, NEW MEXICO, AND ARIZONA,
DURING
THE YEARS 1871, 1872, 1873, AND 1874.
BY
PROF. E. D. COPE AND DR. H. C. YARROW.

CHAPTER VI.

This report is based upon the entire collection of fishes made in Nevada, Colorado, Utah, New Mexico, Arizona, and California, during the years 1871, 1872, 1873, and 1874, by the different naturalists attached to the expedition.

Of the collection of 1871, made by Mr. F. Bischoff, but few specimens remain to attest the painstaking industry of this well known collector, most of them having been destroyed by fire before reaching this office. Fortunately, with the exception of one can of specimens destroyed by leakage of alcohol, the collection of 1872 reached Washington in good condition, as did that of 1873; and it will be found that, from this material, most valuable information has been acquired relative to the western forms of ichthyic life.

As one of the most valuable results derived from a study of the collection, it appears that the basin of the Colorado River is the habitat of a small group of fishes of the family *Cyprinidæ*, which may be called the *Plagopterinae*, which embraces three genera—*Plagopterus*, Cope; *Lepidomeda*, Cope; and *Meda*, Girard. The group differs from others of the family in the possession of two strong osseous rays of the dorsal fin, the posterior of which is let into a groove in the hinder face of the anterior without being coössified with it, thus constituting a compound defensive spine. The rays of the ventral fin, excepting the first and second, are similarly modified. The greater part of their length consists of an osseous dagger-shaped spine, with grooved posterior edge, which overlaps the border of the succeeding ray, when the fin, like a fan, is closed up. The articulated portion of the ray either emerges from the groove below the free acute apex of the spine, or appears as a continuation of the apex itself. It is worth observing that the only other instance of this ossification of the ventral rays is to be seen in

the extinct family of the *Saurodontidae* of the Cretaceous period; the nearest approach among recent fishes being the internal spine in the ventral fin of *Amphacanthus*. The dentition and intestines of these fishes show them to be of carnivorous habits. Interest attaches to the *Plagiopterinæ* as the only type of fishes not known from other waters than those of the Colorado and San Luis basins.

Another result is the discovery in the West of *Ceratichthys biguttatus*, Kirtland; Dr. H. C. Yarrow obtaining a number of specimens of this abundant eastern fish at Harmony, in Southern Utah. This is an unexpected discovery, giving the species the greatest known range of any of our *Cyprinidæ*, the *Semotilus corporalis* accompanying it to the eastern slope of the Rocky Mountains. The Smoky Hill River was previously the most western locality for the *C. biguttatus*.

Coregonus williamsonii, Girard, was found singularly abundant in the Provo River, a stream running into Utah Lake; it being known to the settlers under the name of "Mountain Herring". During the fall of the year, it bites readily at a hook baited with "Leatherside Minnows," (*Gila tania*, Cope,) and thousands are annually captured and sent to the Salt Lake City market, being there justly esteemed as a most valuable food fish.

This species was established by Girard upon specimens taken in Des Chutes River, Oregon. In 1871, Mr. Campbell Carrington, of the United States geological survey of the Territories, found it, but the locality is not noted; and in 1872 it was found in the Provo River, as already noted. This is the first and only time it has been observed in the valley of the Great Salt Lake. *Salmo virginialis*, Girard, the characteristic and most valuable food fish of Utah, was found exceedingly abundant in the fresh-water lakes, notably Utah and Panquitch Lakes, and furnishes a large proportion of the subsistence of the Mormon settlers.

Another interesting discovery was that of a new species of Cottoid, named *Uranidea wheeleri*, Cope, which is the only Physoclystous or spinous-rayed fish as yet found in the Great Basin of Utah.

It will be seen by an examination of this report that the material secured has enabled us to establish three new genera and nineteen new species of fishes, besides several varieties from the Western Territories, and no rea-

sonable doubt exists but that this list may be largely increased by future explorations.

It is proper to add that in the preparation of this report Prof. E. D. Cope has examined and described the new genera, and nearly all the species, and Dr. H. C. Yarrow has made certain needful comparisons, and prepared the synonymy and bibliography, besides furnishing the lists, with notes upon the different specimens enumerated.

CHONDROSTEI.

SCAPHIRHYNCHOPS PLATYRHYNCHUS, Raf.

Acipenser platyrhynchus, RAFIN., Ichthy. Ohiens, 1820, 80.—KIRTLAND, Rep. Zoöl. Ohio, 1838, 196.—*Id.*, Bost. Jour. Nat. Hist., v, 1845, 25, pl. viii, f. 1.—STORER, Synopsis, 1846, 249.

Scaphirhynchus rafinesquii, HECK, Ann. Wien. Mus. Naturg., i, 1835.—*Id.*, Zoöl. Abhandl. Ann. Wien. Mus. Naturg., i, 1841, 72, pl. viii.

Scaphirhynchus platyrhynchus, BD., Iconogr. Encycl., ii, 1850, 238.—GIRARD, P. R. R. Rep., x, 1859, Ichthy., 357.

Two specimens (L 51), obtained from the Rio Grande, near Albuquerque, by Dr. Oscar Loew, differ in minor and only individual characteristics from typical specimens from the Ohio River. The range of this sturgeon is thus extended farther west than has heretofore been observed. It is not included in the enumeration of fishes of the Rio Grande in Girard's Ichthyology of the United States and Mexican Boundary.

PHYSOSTOMI. GINGLYMODI.

Descriptions received from various intelligent persons indicate that a species of gar occurs in the Rio Grande; but no specimens were obtained by the expedition.

ENCHELYCEPHALI.

ANGUILLA TYRANNUS, Gir.

Anguilla tyrannus, GIR., U. S. & Mex. Bound. Surv., ii, Ichthyology, 75.

Three specimens from near Santa Fé (Dr. H. C. Yarrow).

NEMATOGNATHI.

AMIURUS NEBULOSUS, Les.

Amiurus nebulosus, LESUEUR, COPE, Proc. Am. Phil. Soc. Phila., 1870, 485-486.

A specimen resembling those described by Professor Gill, from Minnesota, as *A. obesus*, which we regard as a variety of the common eastern "catfish".

Radii: D. I. 6; A. 17; V. 8.

Arkansas River, Pueblo, Colo. (Mr. C. E. Aiken).

PLECTOSPONDYLI.

PLAGOPTERUS, Cope.

Pharyngeal teeth, 2.5-4.2; raptorial uncinat, without masticatory surface. A terminal maxillary barbel. Scales, none; lateral line well developed. Dorsal fin with a strong spine composed of two, the posterior received into a longitudinal groove of the anterior. Ventral fins originating (in the type species) a little anterior to the line of the dorsal, attached to the abdomen by a wide basis and length of inner radius. Superior labial fold continued round the end of the muzzle.

This genus resembles *Meda*, Girard, in the presence of the dorsal spine, the adhesion of the inner border of the ventral fin, and the absence of scales, and differs in the presence of barbels, and the inner dental series being 5-4 instead of 4-4. Physiognomy of *Rhinichthys*.

PLAGOPTERUS ARGENTISSIMUS, Cope.

PLATE XXVI, FIGS. 3, 3a.

Plagopterus argentissimus, COPE, Proc. Am. Phil. Soc. Phila., 1874, 130.—*Id.*, Rep. Plagop. & Ichthy. Utah, 1874, 4.

This is a small fish, of slender proportions, with a rather broad head, with slightly depressed muzzle overhanging by a little a horizontal mouth of moderate size. The caudal peduncle is of medium depth, and the caudal fin is deeply forked. The eye is somewhat oval, and enters the length of the side of the head 4.2 times and the interorbital width 1.5 times. The greatest depth (near the ventral fin) enters the total length nearly six times,

or five and three-fourths exclusive of the caudal fin. The latter measurement is four times the length of the head. The origin of the dorsal is entirely behind the proper basis of the ventral; its first spine is curved and longer than the second, and its basis is intermediate between the base of the caudal and the end of the muzzle. The dorsal rays behind the spine have the basal two-thirds to one-half thickened and completely ossified; the articulated portions issuing from the apices of the spines. Radial formula: D. II. 7; C. 19; A. I. 10-9; V. 2. V; P. 16. The first or osseous ray of the anal is rudimental; the fifth spinous ray of the ventral is bound by nearly its entire length to the abdomen by a membrane. The pectoral rays from the second to the sixth exhibit a basal osseous spinous portion, which is not nearly so marked as in the ventrals. The pectorals reach the basis of the latter.

The lateral line is complete, and is slightly deflexed opposite the dorsal fin. The lips are thin, and the end of the maxillary bone extends to the line of the front of the orbit. Total length, 0^m.071; length to middle of basis of caudal fin, 0^m.0565; to anterior basis of anal fin, 0^m.040; to basis ventral, 0^m.021; of head, 0^m.0145; of muzzle, 0^m.004; width at posterior nares, 0^m.006; at middle of pterotic, 0^m.0078. Color, pure silver for a considerable width above the lateral line. Dorsal region somewhat dusky from minute chromatophoræ.

The plate affords a view of this species in profile and of the ventral aspect.

Numerous specimens from the San Luis Valley, Western Colorado.

MEDA, Gir.

Meda, GIR., Proc. Acad. Nat. Sci. Phila., 1856, 192.—*Id.*, U. S. & Mex. Bound. Surv., Ichthyology, 50.

This genus resembles *Plagopterus* in the absence of scales, while it differs in the absence of barbels and the reduction of the number of teeth of the larger pharyngeal series to 4-4. Girard also asserts twice that the dorsal spine is "articulated", a character not observed by us in any species of the group. His figure of *M. fulgida* represents the ventral radii as articulated; but as there are other points in which it differs from the description, it is probably inaccurate.

MEDA FULGIDA, Gir.

Meda fulgida, GIR., Proc. Acad. Nat. Sci. Phila., 1856, 192.—*Id.*, U. S. & Mex. Bound. Surv., Ichthyology, 50.—COPE, Proc. Am. Phil. Soc. Phila., 1874, 131.—*Id.*, Rep. Plagop. & Ichthy. Utah, 1874, 5.

A small species from the Rio San Pedro, a tributary of the Gila, in Southern Arizona.

LEPIDOMEDA, Cope.

Lepidomeda, COPE, Proc. Am. Phil. Soc. Phila., 1874, 131.—*Id.*, Rep. Plagop. & Ichthy. Utah, 1874, 5.

Dorsal fin originating behind the line of the ventrals, which adhere to the belly by the inner ray; body scaled, lateral line present; pharyngeal teeth 4-4 in the inner row; no barbels; premaxillary series complete.

This genus has the physiognomy of *Clinostomus*. The presence of scales distinguishes it from *Meda*. The spinous rays are not articulated.

LEPIDOMEDA VITTATA, Cope.

PLATE XXVI, FIGS. 2, 2a.

Lepidomeda vittata, COPE, Proc. Am. Phil. Soc. Phila., 1874, 131.—*Id.*, Rep. Plagop. & Ichthy. Utah, 1874, 5.

Form moderately stout; the greatest depth (at the first dorsal ray) entering the length to the basis of the caudal fin four and a quarter to a third times. The head is wide and flat above, with decurved pterotics, and slightly depressed behind the interorbital region; muzzle obtusely descending, not prominent; mouth terminal and descending to a point below the anterior line of the pupil. Length of head 3.75 times in total length to basis of caudal fin; orbit round, 3.75 times in length of head, and 1.3 times in interorbital width. The latter is not uniform, but the middle plane is elevated a little above the superciliary ridges, and separated from them by a shallow groove. Nares sublateral. Teeth 2.4-4.2. Preorbital trapezoid.

Scales small, covering the whole body, except a space behind the pectoral fin, in twenty-six series above the lateral line, and fifty-six transverse in front of the dorsal fin. Radial formula: D. II. 7; C. 19; A. I. 8; V. 1. VI; P. 15. There are several peculiarities in the constitution of the spines of the fins in which the species differs from *Plagopterus argentissimus*. Thus

the second dorsal spine is wider than the first, and so deeply grooved behind as to represent a V in section; it also extends to the extremity of the first, while it is shorter in *P. argentissimus*. The remaining dorsal spines are less distinctly enlarged and ossified; those of the ventrals are less developed, and their apices, instead of being free, continue into the terminal articulated portion. The pectoral radii are scarcely enlarged at all. The base of D. I. is nearer the basis of the caudal fin than the end of the muzzle by the length of the latter to the posterior nares. Caudal fin deeply forked. Total length, 0^m.085; length to the basis of the caudal fin, 0^m.0685; to the basis of the anal, 0^m.047; to the basis of the ventral, 0^m.0325; length of the head, 0^m.018; length to the orbit, 0^m.043; width at the posterior nares, 0^m.006; at the middle of the pterotic, 0^m.009. Color silver to half way between lateral and dorsal lines; the upper part of it underlaid by a lead-colored band; a median dorsal black band from front to caudal fin.

The plate affords a view of this species in profile and of the ventral aspect.

Numerous specimens from the Colorado Chiquito River, Arizona, collected by H. W. Henshaw, No. 5, X. P. The largest species of the group.

LEPIDOMEDA JARROVII, Cope.

PLATE XXVI, FIGS. 1, 1a.

Lepidomeda jarrovi, COPE, Proc. Am. Phil. Soc. Phila., 1874, 133.—*Id.*, Rep. Plagop. & Ichthy. Utah, 1874, 6.

A species resembling the last in many respects, but differs in a greater elongation of form, weakness of squamation, and peculiarity of coloration. The fin radii are similar in number and character, but the dorsal is furnished with more slender spines. The chin projects a little beyond the upper lip when the mouth is closed. The depth of the body at the ventral fins enters the length of the basis of the caudal 5 to 5.25 times, and the head enters the same four times. The eye is larger than in *L. vittata*, entering the length of the head 3.25 times and equaling the interorbital width. The end of the maxillary bone reaches the line of the anterior border of the orbit. The pectoral fin reaches the ventral, but the latter does not attain the vent. The scales are difficult to detect; there are 51 transverse series between the head and the dorsal fin. Total length, 0^m.081; length

to the caudal fin, 0^m.065; to the anal, 0^m.0465; to the ventral, 0^m.032; length of the head, 0^m.0165; length to the orbit, 0^m.0048; width between the orbits, 0^m.005; between the middle of the pterotics, 0^m.008.

Color olivaceous above, with a median black vertebral band; sides to above lateral line silvery, leaden edged above; bases of ventral fins red.

Dedicated by Professor Cope to Dr. Henry C. Yarrow, zoölogist of the surveys west of the 100th meridian.

No.	Locality.	Date.	Collector.
505	Colorado Chiquito River, Ariz.....	July, 1873	H. W. Henshaw.
5 X	.....do.....	.....do.....	Do.

RHINICHTHYS, Agass.

RHINICHTHYS MAXILLOSUS, Cope.

PLATE XXVII, FIGS. 1, 1a.

Rhinichthys maxillosus, COPE, Proc. Acad. Nat. Sci. Phila., 1864, 278.

This is the common *Rhinichthys* of New Mexico, and was collected in considerable numbers. Scales, $\frac{13}{13}$; anal radii, I. 7; dorsals always I. 8, or one less than in the typical *Apocope henshawi* of Utah Lake. The largest specimen is from the Rio Chama at Abiquiu, and measures five inches in length. Numerous specimens from the Upper Rio Grande and the Rio Chama. Radii: D. I. 8; A. I. 7. Scales: (No. 1) $\frac{13}{13}$ 70; (No. 2) $\frac{13}{14}$ 72.

No.	Locality.	Date.	Collector.
247 E	Tierra Amarilla, N. Mex.....	Sept., 1872	Dr. H. C. Yarrow.
120	Twin Lakes, Colo	July, 1873	Dr. J. T. Rothrock.
52 E	Colorado Springs, Colo	July, 1874	John Yarrow.
L 6	Abiquiu, N. Mex.....	Aug., 1874	Dr. O. Loew.
227 A	Nutria, N. Mex .....	.....do.....	W. G. Shedd.
126	Costilla Creek, N. Mex .....	.....do.....	Prof. E. D. Cope.
113	Taos, N. Mex .....	.....do.....	Dr. H. C. Yarrow.
239	San Ildefonso, N. Mex.....	.....do.....	Do.

APOCOPE, Cope.

Apocope, COPE, U. S. Geol. Surv. Terrs., 1871, 472.

A fish referred below to the *Apocope vulnerata*, Cope, five inches in length, presents a completed lateral line, and is thus different from the types of

Apocope; but the specimens originally described under this name from Logan, Utah, are not fully grown. I suspect that in adults of this genus the lateral line will be found to be developed. The genus will then require to be further defined in expression of its distinctive features as compared with *Ceraticthys*. The character to be added is the position of the dorsal fin, which is behind the line of the ventrals, as in *Rhinichthys*, while in *Ceraticthys* the dorsal is on or before the line of the ventrals. The known species of *Apocope*, Cope, are these: *A. carringtonii*, Cope; *A. henschavii*, Cope; *A. vulnerata*, Cope; *A. couesii*, Yarrow; *A. ventricosa*, Cope; and *A. oscula*, Girard.

The species of this genus are all of small size, and difficult of determination. For the purpose of aiding the student, the following synoptic table is given:

- A. The lateral line very short.....*Apocope*.
 Scales larger, $\frac{10}{11}$ 60; muzzle short; D. I. 8*A. carringtonii*.
 AA. The lateral line complete or imperfect on a part of the caudal peduncle,
Eritrema.
 Scales medium, $\frac{16}{12}$ 67; D. I. 9.....*A. henschavii*.
 Scales $\frac{15}{12}$ 70; lateral line imperfect; muzzle short; D. I. 8, *A. vulnerata*.
 Scales $\frac{10}{10}$ 63; lateral line sometimes imperfect; muzzle long; D. I. 8,
A. oscula.
 Scales small, $\frac{13}{10}$ 80; muzzle long; D. I. 8*A. couesii*.
 Scales very small, $\frac{16}{14}$ 89-95; muzzle not elongate; D. I. 8, *A. ventricosa*.

APOCOPE CARRINGTONII, Cope.

Apocope carringtonii, COPE in Rep. U. S. Geol. Surv. Montana, &c., 1871, 472.

Warm Springs, Utah.

APOCOPE HENSHAVII, Cope.

PLATE XXVIII, FIGS. 2, 2a.

Rhinichthys henschavii, COPE, Proc. Am. Phil. Soc. Phila., 1874, 133.—*Id.*, Plagop. & Ichthy. Utah, 1874, 7.

An elongate species, with small scales and overhanging but obtuse muzzle, resembling a *Ceraticthys* of the group of *C. nubilus* (*Rhinichthys*),

Girard. The depth enters the total length 5.5 to 6 times, the head entering the same five times; eye 4.3 times in length of head, 1.5 times in interorbital width. The base of the D. I. is intermediate between the base of the caudal fin and the anterior nostril. The ventral fins reach the anal, but are not reached by the pectoral. Dorsal fin originating behind the base of the ventrals. Radii: D. I. 9; A. I. 7; V. 8; P. 12. Scales, $\frac{16}{67}$. Color white, with a few dark clouds on the caudal peduncle. Inferior fins reddish. The more anterior position of the dorsal fin is one point of difference from *R. maxillosus*.

Found abundant at Provo, Utah, in 1872, by Dr. H. C. Yarrow and H. W. Henshaw, to which latter gentleman the species is dedicated.

No.	Locality.	Date.	Collector.
48 A	Provo, Utah	Nov., 1872	Dr. H. C. Yarrow and H. W. Henshaw.

The fish which I referred to the *Argyreus nubilus* of Girard (Hayden's Report, l. c., 472), from Grass Creek, Idaho, may for the present be regarded as a variety of this species, with rather larger scales; they number $\frac{14}{10}$ 62. Radii: D. I. 9; A. I. 7.

APOCOPE VULNERATA, Cope.

PLATE XXVI, FIGS. 4, 4a.

Apocope vulnerata, COPE in U. S. Geol. Surv. Terr., 1871, 473.

Tigoma rhinichthyoides, COPE, l. c., 473.

Alburnellus rhinichthyoides, COPE, Rept. Plagop. & Ichthy. Utah, 1874, 7.

DESCRIPTION.—Size small; form elongate. Head 4.3 times in length, excluding caudal; depth 5.2 times in same. Muzzle obtuse, not projecting; mouth inferior, horizontal; maxillary not reaching line of orbit. Head nearly four times longer than diameter of orbit, which equals length of muzzle, and is 1.5 times interorbital space. Teeth, 1.4–4.1. Scales, $\frac{12}{65}$, 12–14, lateral line with occasional interruptions at the posterior part. Dorsal fin behind line of ventrals nearer basis of caudal fin than end of muzzle. Color olive-brown above, yellow below; a broad brown lateral band and

longitudinal blackish line on the thoracic region on each side. The median band is darker spotted, and there are blackish spots on the dorsal region. Head black above; chin red. Upper lip separated by a fold.

Abundant at Provo, Utah. Also from Logan, Utah. This species sometimes lacks the maxillary barbels. A specimen of this character, with a slight scale variation, gave rise to the second name above cited.

APOCOPE OSCULA, Gir.

?*Argyreus osculus*, GIR., U. S. & Mex. Bound. Surv., pt. ii, Ichthyology, 47, pl. xxvii, figs. 9-12.

Rhinichthys henshavi, var II, COPE, Proc. Am. Phil. Soc. Phila., 1874, April, 133.

This species differs from the typical *A. henshavi* in having longer and more attenuated body and narrow sharp pointed muzzle. Depth enters total length 7.5 times; the head entering the same 4.75 times. Eye 4.50 in length of head; 1.5 in interorbital width. The base of the Dorsal I is intermediate between the base of the caudal fin and end of the snout. Ventral fins nearly reach the anal, but are not reached by the pectoral. Dorsal fin originating behind the base of the ventrals. Radii: D. I. 8; A. I. 7; V. 8; P. 12. Scales small, $\frac{10}{63}$. Color yellowish-white on back, bright-yellow on belly; broad blackish band extending from occiput to Dorsal I; broad lateral band from posterior rim of orbit to a line drawn vertically from insertion of anal; narrow black stripe extending from anterior rim of orbit around end of muzzle beneath nostrils. Under lip in life light-red. Inferior fins crimson.

No.	Locality.	Date.	Collector.
281 A	Provo, Utah.....	Nov., 1872	Dr. H. C. Yarrow and H. W. Henshaw.
5 X I	.....do.....	.....do.....	Do.
C C C I	Arizona.....	Aug., 1873	Dr. C. G. Newberry.
505 A	Camp Apache, Ariz.....	.....do.....	H. W. Henshaw.
506 A	.....do.....	.....do.....	Do.
N N	Zuñi, N. Mex.....	.....do.....	G. M. Keasbey.
204 A	Rio Grande, Colo.....	Oct., 1873	Dr. J. T. Rothrock.
52	Neutria, N. Mex.....	Sept., 1874	W. G. Shedd.
272 B	Pagosa, Colo.....	.....do.....	Dr. H. C. Yarrow and C. E. Aiken.

APOCOPE COUESII, Yarrow, *sp. nov.*

PLATE XXVII, FIGS. 2, 2a.

Rhinichthys henshavi, var. III, COPE, Proc. Am. Phil. Soc. Phila., 1874, April, 133.

This species might almost be considered a variety of *Apocope henshavi*, Cope; but on considering the differences between the specimens examined and those of the last named species, I believe it to be entitled to be retained as a separate species. Form elongate, but broader than *A. henshavi*, with overhanging, obtuse, but broader muzzle, scales larger. Depth enters the total length, including caudal fin, 5.75 to 6.25 times, the head entering the same 4.50 to 5 times. Eye 6 times in length of head; 1.75 in interorbital width. Base of Dorsal I. is nearer insertion of caudal than end of snout. Ventral fins nearly reach the anal, and are nearly reached by the pectorals. Dorsal fin originating behind the base of the ventrals. D. I. 8; A. I. 7; V. 7; P. 12. Scales, $\frac{14}{67}$, $\frac{12}{12}$. Color whitish-yellow, with numerous large bluish-black spots on back and sides, increasing in intensity toward occiput; no dark stripe on sides. Inferior fins yellowish.

This species is named in honor of Dr. Elliott Coues, U. S. A., the distinguished naturalist of the Northern Boundary Commission, to whom this expedition is indebted for many favors.

Was found very abundant in mountain streams of Arizona.

No.	Locality.	Date.	Collector.
754	Near Camp Apache, Ariz	Oct. 11, 1873	H. W. Henshaw.

APOCOPE VENTRICOSA, Cope.

PLATE XXVIII, FIGS. 1, 1a.

Ceratichthys ventricosus, COPE, Proc. Am. Phil. Soc. Phila., 1874, April, 136.—*Id.*, Rep. Plagop. & Ichthy., Utah, 1874, 10.

This species resembles a *Rhinichthys* in its small scales and rather elongate form and in coloration. The muzzle does not overhang the mouth, but the lower jaw is received within the upper. The head is not wide, and is narrowed anteriorly, but the muzzle is obtuse both on the vertical and lateral view. Orbit four times in length of head, and 1.33 times in interorbital width

and length of muzzle. Length of head four, and depth of body four and three-quarters times in length without caudal fin. Radii: D. I. 8; A. I. 7; the first dorsal ray intermediate between the base of the caudal fin and the posterior border of the orbit, and a little behind the line of the basis of the ventral fins. Pectorals reaching three-fifths the distance to the ventrals; the latter not quite reaching the anal. Caudal peduncle stout. The barbels are small, and in some specimens appear to be wanting on one side or both. Scales very small, $\frac{18}{89}$. Isthmus wide. Color dusky olive above, white below. A dark band along the side of the head through the orbit. A similar black band occupies the middle of the sides on the posterior two-thirds of the length, which is well defined above and below, and is sometimes irregularly shaded.

Length of a specimen to base of caudal, 0^m.061; length to base of anal, 0^m.043; to base of ventral, 0^m.033; to base of dorsal, 0^m.035; length of head, 0^m.0162; width of head between orbits, 0^m.0045; at middle of pterotics, 0^m.0073.

A red spot in the axils of the ventral and pectoral fins, one at the superior canthus of the branchial fissure, and one on the side of the muzzle. Length three inches.

Specimens from Arizona and New Mexico.

ALBURNELLUS, Gir.

This genus was established by Girard in Proc. Acad. Nat. Sci. Phila., 1856, 193, and represents and nearly resembles the *Alburnus* of the Old World. The dental formula is 2.4-4.2; the teeth without masticatory surfaces. The dorsal fin rises behind a point opposite to the basis of the ventrals.

ALBURNELLUS SIMUS, Cope, *sp. nov.*

PLATE XXXI, FIGS. 2, 2a.

Represented by many individuals from the Rio Grande. It is of rather stout form for the genus, and resembles especially the typical forms of *Hybopsis* in its decurved, obtuse muzzle. It is, however, a true *Alburnellus* as indicated by the dentition and position of the ventral fins. The first dorsal ray stands above the last ray of the ventrals, and the latter fins, appressed, reach the line of the last ray of the dorsal. The teeth are 4.1-1.4 of the

raptorial type, and without grinding surface; but it is rare to find all the teeth of the longer row in functional use at one time. In fact, in several specimens examined, I found the upper tooth wanting; in one, the lower tooth was not anchylosed.

Dorsal outline but little arched; caudal peduncle a little contracted, Head short and wide; the muzzle abruptly descending to the terminal mouth. Mouth descending a little posteriorly; the end of the maxillary extending a little beyond the anterior margin of the orbit. Eye rather small for the genus, 4.2 times in length of head, 1.2 in length of muzzle, and twice in interorbital width. Head 4.2 times in the length to the basis of the caudal fin, or 5.4 times including the large caudal fin. Depth of body equal the length of the head; width of latter behind equal 0.6 of its length. Scales, $\frac{8}{35}$; 22 cross-rows in front of dorsal fin. Radii: D. I. 8; A. I. 9, sometimes I. 10; V. 8, not reaching vent; pectorals extending 0.6 the distance to the ventrals. Total length, 0^m.084; length to basis of caudal fin, 0^m.067; to basis of first ray of dorsal, 0^m.038. In life, entirely silvery, with a broad band on the side, of a more brilliant hue of the same.

No.	Locality.	Date.	Collector.
158 A	San Ildefonso, N. Mex	Aug., 1874	Dr. H. C. Yarrow and Prof. E. D. Cope.

ALBURNELLUS JEMEZANUS, Cope, *sp. nov.*

PLATE XXXI, FIGS. 3, 3a.

A species of the usual typical form of the genus, viz, with slender body, and mouth descending obliquely backward. Scales large, $\frac{5}{34.5}$; 19 rows between dorsal fin and occiput. First dorsal ray opposite base of last ventral ray; ventral fin appressed, reaching a little beyond last dorsal, but not to vent; pectoral extending three-fourths the distance to the ventral. Radii: D. I. 8; A. I. 10; V. 8; caudal long and deeply forked. Muzzle acuminate; in profile gently descending from the nares to the lip. Maxilla extending beyond line of orbit. Symphysis mandibuli acuminate. Orbit 3.6 times in length of head, once in muzzle, and 1.25 times in interorbital

width. Width of head behind one-half the length. Length of head entering 4.2 times total to base of caudal; greatest depth of body nearly six times in the same. Total length, 0^m.082; length to basis of caudal fin, 0^m.60; to basis of dorsal fin, 0^m.033.

Color silvery, with a broad, silvery, lateral band, which has a leaden superior margin; a dusky dorsal band.

The dentition of this species, like that of the *Gila ?egregia*, is frequently anomalous; normally 4.1–1.4, it is sometimes on one side 4.3.2–, 1.4.1–, and 2.2.2. It seems to be nearly allied to the eastern *A. jaculus*.

No.	Locality.	Date.	Collector.
158 B	San Ildefonso, N. Mex	Aug., 1874	Dr. H. C. Yarrow and E. D. Cope.

CERATICHTHYS, Bd.

CERATICHTHYS BIGUTTATUS, Kirt.

PLATE XXIX, FIG. 1.

Semotilus biguttatus, KIRT., Bost. Jour. Nat. Hist., iii, 1840, 3, 44.

Ceratichtchys biguttatus, GIR., P. R. R. Rep., Fishes, x, 1859, 253.—COPE, Cyprinidæ of Penna., Oct., 1866, 366, tab. xi, f. 5.—*Id.*, Proc. Am. Phil. Soc. Phila., 1874, 136.—*Id.*, Plagop. & Ichthy. Utah, 1874, 10.

Ceratichtchys biguttatus var. *cyclotis*, COPE, Proc. Acad. Nat. Sci. Phila., 1864, 278.

As already noted, this common eastern species was unexpectedly discovered by Dr. H. C. Yarrow at Harmony, in Southern Utah, in 1872. Up to this time, the Smoky Hill River was the western limit of its distribution.

No.	Locality.	Date.	Collector.
P X	Harmony, Utah	Nov., 1872	Dr. H. C. Yarrow and H. W. Henshaw.

CERATICHTHYS PHYSIGNATHUS, Cope, *sp. nov.*

A large-scaled species, with slender body and wide, depressed head. The dorsal line is but little arched, and the profile of the muzzle descends steeply to the lip. The upper lip extends beyond the lower, and the maxillary bone reaches the line of the anterior border of the orbit. The beards are well developed, and the teeth number 4.2–2.4. Eye 4.6 in length of

head, 1.5 times in muzzle, and 1.75 in interorbital width. Length of head 3.6 in total length without caudal fin; greatest depth nearly five times in the same. Caudal peduncle stout. Scales, $\frac{5}{49}$; 23 rows in front of dorsal fin. Radii: D. I. 8; A. I. 8; V. 8. The dorsal fin originates in front of the line of the ventrals; the latter nearly reached the anal, but are not reached by the pectoral fins. Isthmus moderately wide. Color olive above, white below; a lead-colored band extending from the end of the muzzle to the base of the caudal fin; no basal caudal spot. Fins unicolor. Length, 2 inches.

No.	Locality.	Date.	Collector.
361	Arkansas River, at Pueblo.....	Oct., 1874	C. E. Aiken.

CERATICHTHYS STERLETUS, Cope, *sp. nov.*

PLATE XXVII, FIGS. 3, 3a.

A large-scaled species, well distinguished by its projecting muzzle, slender caudal peduncle, and large fins. The general form is slender, the greatest depth entering the total length six times; the length of the head entering nearly five times, or nearly four times without the caudal fin. The least depth of the caudal peduncle enters that of the body nearly three times. Teeth, 4-4. Barbels conspicuous. Muzzle very protuberant and broadly rounded; end of maxillary bone not reaching line of orbit. Isthmus moderately narrow. Orbit 4.5 times in length of head; 1.5 times in length of muzzle; 1.2 times in interorbital width. Scales, $\frac{6}{36}$. Radii: D. I. 8; A. I. 7; V. I. 8. Ventrals reaching line of first dorsal ray, but not the ventrals; the latter reach the anal. Caudal long and deeply forked.

In life this fish is silvery, with a few dusky scales; no color bands visible; top of head from orbits forward pink. Length, 0^m.075; length to base of dorsal fin, 0^m.030; to basis of caudal, 0^m.060. Not uncommon in the Rio Grande at San Ildefonso. Taken by H. C. Yarrow and E. D. Cope. It is to be compared with the *C. æstivalis* (*Gobio æstivalis*, Gir.), from Nuevo Leon, Mexico.

POGONICHTHYS, Gir.

POGONICHTHYS COMMUNIS, Gir.

Pogonichthys communis, GIR., P. R. R. Rep., x, 247, pl. lv.

A variable species, heretofore recorded only from the tributaries of the Missouri, but now obtained by Mr. Aiken in the upper waters of the Arkansas. The grinding surface of the pharyngeal teeth is only well developed in adults; in young up to four inches long it is often wanting; number 4.2–2.4. Scales from $\frac{6}{4}$ to $\frac{8}{5}$.

No.	Locality.	Date.	Collector.
279	Pueblo, Colo	July, 1874	C. E. Aiken.

HYPHILEPIS, Baird.

HYPHILEPIS IRIS, Cope, *sp. nov.*

PLATE XXXI, FIGS. 4, 4a, 5, 5a.

Dorsal fin above the ventrals; teeth, 4–4, with masticatory surfaces well developed; anal radii, I. 9.

This fish has the general characters of the species referred by Dr. Girard to the genus *Moniana*, but differs in the replacement of the pectinate edges of the pharyngeal teeth by grinding faces. It thus resembles the *Hypsilepides*, with which it also agrees in the forms of the scales and the coloration; but no known species of *Hypsilepis* exhibits but a single row of teeth. In *H. anolostanus*, there is but one of the lesser row, and it is certain that the number of such may be irregular in the same genus.

The present fish is, perhaps, the most brilliantly colored species of New Mexico. Outline shortly fusiform; body compressed; head entering length to basis of caudal three and three-fourths times; the greatest depth entering the same three and one-fourth times. Orbit entering length of head four times; interorbital width 1.5 times, and muzzle 0.8 time. Front and vertex of males bearing dermal tubercles. Mouth oblique; lips subequal; maxillary bone reaching line of orbit. Dorsal line well arched. Scales narrowly exposed on the sides, $\frac{5}{33}$; 17 rows in front of dorsal fin. Radii: D. I. 8; A. I.

9; V. 8; pectoral fin reaching ventrals; ventrals extending beyond first anal rays; dorsal and caudal fins short. Total length, 0^m.068; length to basis of caudal fin, 0^m.055; length to basis of first dorsal ray, 0^m.030.

Color of back and upper part of sides malachite-green, sending a darker green band down behind operculum. Head and belly vermilion-red, sending upward a large quadrate vermilion spot behind the scapular green band. Paired and anal fins crimson; caudal vermilion; dorsal fin olivaceous.

Specimens of the above character were very abundant at San Ildefonso in September. At the same time, individuals were equally common, which differ from them in the uniform olive and silvery coloration, and in the usually one less ray in the anal fin. In eleven specimens selected at random, I find eight with anal radii I. 8, and three with I. 9. There are transitions to the other type, and I believe these forms to be the males and females of one species.

No.	Locality.	Date.	Collector.
156 ♂ and 159 ♀	San Ildefonso, N. Mex	Aug., 1874	Dr. H. C. Yarrow and Prof. E. D. Cope.

HYPSILEPIS JUGALIS, Cope.

Moniana jugalis, COPE, Ann. Rep. U. S. Geol. Surv. Terrs. 1870, 439.

General characters identical with type specimens from the Missouri River, but different in the existence of a masticating face on the teeth of adults, and the frequent occurrence of only I. 8 rays in the anal fin.

No.	Locality.	Date.	Collector.
A 1	Pueblo, Colo., on Arkansas River	July, 1874	C. E. Aiken.

HYBOPSIS, Agass.

Hybopsis, COPE, Synopsis of Cyprinidæ of Pennsylvania, 356–379.

HYBOPSIS TIMPANOGENSIS, Cope.

Hybopsis timpanogenesis, COPE, Proc. Am. Phil. Soc. Phila., 1874, 134.—*Id.*, Plagop. & Ichthy. Utah, 1874, 10.

A rather compressed species, with mouth obliquely descending, and teeth 2.4–4.2, with strongly developed masticatory surfaces. The lateral

line of tubules is imperfect in all the specimens; often only represented by a short series in front of the dorsal fin. In larger specimens, it is better developed, and in still larger it may be complete, a point which remains as yet uncertain. In the smaller specimens of *Myloleucus parovanus*, the series is imperfect for a short distance in front of the caudal fin, while it is complete in adults. The same has been observed in the *Hypsilepis analostanus*, Girard. Scales small, $\frac{13}{52}$. The dorsal fin originates a little in front of a line drawn from the base of the first ventral ray. The pectorals do not reach the ventrals, while the latter attain the vent. Radii: D. I. 9; A. I. 8; V. 8.

The depth is one-fourth the length less that of the caudal fin, and the length of the head enters the same 3.66 times. Orbit 3.3 times in length of head, 1.2 times in interorbital width; longer than muzzle. Preorbital bone trapezoid. Total length, 0^m.047; length to basis of dorsal, 0^m.0215; of head, 0^m.011; width at pterotics, 0^m.005.

There is a narrow leaden line from the pterotic region to the base of the caudal, below which the color is yellowish and above brownish, all dusted with black points. Cheeks silvery. Fins dusky.

Numerous specimens were taken at Provo by Dr. H. C. Yarrow and H. W. Henshaw, and at Gunnison (No. 668) by F. Klett and H. W. Henshaw.

The specimens taken at Gunnison were found in a small ditch having no visible inlet or outlet, situated about one mile from the Sevier River. The water in this ditch was stagnant and alkaline, yet it fairly teemed with these little fishes.

No.	Locality.	Date.	Collector.
666, 2	Provo, Utah.....	Aug., 1872	Dr. H. C. Yarrow and H. W. Henshaw.
668	Gunnison, Utah .....	.... do	Francis Klett.
48 B B	..... do	Sept., 1872	H. W. Henshaw.

HYBOPSIS SCYLLA, Cope.

Hybopsis scylla, COPE, Ann. Rep. U. S. Geol. Surv. 1870, 438 (var.).

Specimens agreeing in form of body, fin radii, squamation, and color with this species, but with a relatively longer head and larger orbit. Scales,

$\frac{6}{34}$; radii, D. I. 8; A. I. 7. Depth 4.6 in length without caudal fin; length of head four times in the same. Orbit one-third length of head, equal to interorbital width. Side of muzzle, top of head, and scales above lateral line dusted with black.

No.	Locality.	Date.	Collector.
52 E 1	Fountain Creek, Colo	July, 1874	John Varrow.

GILA, Bd. & Gir.

Professor Cope has long been satisfied that the species included in the genera *Gila*, Bd. & Gir., and *Clinostomus*, Gir., by Girard, could not be retained in distinct genera, and that the greater number of the *Tigomæ* of the same author must be included in the same natural genus. Such a genus will then include *Cyprinidæ*, with the external series of teeth 5-4 of the raptorial type, and without grinding surface; no barbels; dorsal fin behind the line of the ventrals, without strong or separated spine. The typical *Gilæ* have a peculiar physiognomy, but the transition to the *Clinostomus* type is complete through *G. nacreæ*, Cope, and *G. (Clinostomus) pandora*, Cope.

From the last to the large-scaled species, the transition is equally uninterrupted. The species of the genus then are the following:

- Gila phlegethontis*, Cope (*Clinostomus*).
- Gila affinis*, Girard (*Clinostomus*).
- Gila funduloides*, Girard (*Clinostomus*).
- Gila margarita*, Cope (*Clinostomus*).
- Gila proriger*, Cope (*Clinostomus*).
- Gila tænia*, Cope (*Clinostomus*).
- Gila montana*, Cope (*Clinostomus*).
- Gila hydrophlox*, Cope (*Clinostomus*).
- Gila ardesiaca*, Cope.
- Gila humboldtii*, Girard (*Tigoma*).
- Gila pandora*, Cope (*Clinostomus*).
- Gila gula*, Cope.

Gila nigra, Cope.
Gila egregia, Girard (*Tigoma*).
Gila nacreata, Cope.
Gila seminuda, Cope and Yarrow.
Gila gracilis, Baird and Girard.
Gila grahamii, Baird and Girard.
Gila elegans, Baird and Girard.
Gila robusta, Baird and Girard.

GILA PHLEGETHONTIS, Cope.

PLATE XXVII, FIGS. 4, 4a.

Clinostomus phlegethontis, COPE, Proc. Am. Phil. Soc. Phila., 1874, 137.—*Id.*, Rep. Plagop. & Ichthy. Utah, 1874, 11.

Teeth, 1.5–4.2. Body deep, short. Scales larger than in any other species of the genus, viz, eleven longitudinal and thirty-seven transverse series. There is no lateral line, which may be due to the immature state of the only specimen at my disposal. The depth enters the length without the caudal fin 3.5 times, while the length of the head is counted in the same four times. The orbit is large, entering the head 2.75 times, and 0.2 greater than interorbital width; in older fishes the orbit will be found, as usual, relatively smaller. The lips are even, and the mouth quite oblique; the end of the maxillary reaching the line of the orbit. Radii: D. I. 7; A. 1. 8; the ventrals originate in front of the line of the dorsal, and extend to the vent, and are not nearly reached by the pectorals. Length without caudal fin, 0^m.034; length to basis of dorsal, 0^m.0186; length of head, 0^m.008; width of head at pterotics, 0^m.0038. A broad plumbeous band on the side, below which the color is golden, above it is probably translucent in life, with a dusky median dorsal line.

Discovered in Beaver River, Utah, with the *Myloleucus parovanus*, by Dr. H. C. Yarrow and H. W. Henshaw; abundant.

GILA MONTANA, Cope.

Clinostomus montanus, COPE, U. S. Geol. Surv. Montana & Adjacent Territories, 1871, 476.—*Id.*, Proc. Am. Phil. Soc. Phila., 1874, 136.—*Id.*, Rep. Plagop. & Ichthy. Utah, 1874, 10.

Muzzle decurved, obtuse; jaws equal; end of maxillary extending

beyond margin of orbit. Orbit large, entering the head 3.5 times and the interorbital region once. Length of head one-fourth length to caudal fin; depth nearly equal. Scales, 11–12–56–6. Radii: D. I. 9; A. II. 12. Length, 3.5 inches.

Olive above, a dark band extending from epiclavicular region above caudal line to caudal fin. Sides crimson as high as lateral line. Differs from *C. hydrophlox* in the obtuse muzzle, large eye, and smaller scales above the lateral line.

Very abundant at Provo, Utah.

No.	Locality.	Date.	Collector.
44 B	Provo River, Utah	Nov., 1872	Dr. H. C. Yarrow.
555	Arizona! .....	.... do	H. W. Henshaw.

GILA HYDROPHLOX, Cope.

Clinostomus hydrophlox, COPE, U. S. Geol. Surv. Montana & Adjacent Territories, 1871, 475.—*Id.*, Proc. Am. Phil. Soc. Phila., 1874, 133.—*Id.*, Rep. Plagop. & Ichthy. Utah, 1874, 7.

DESCRIPTION.—Length of head 4.75 times in total, exclusive of caudal fin; depth of body 4.5 times in same. Eye 5 times in head, $1\frac{1}{2}$ times in interorbital width. Front straight; lower jaw projecting beyond upper; mouth descending; end of maxillary just reaching line of orbit. Isthmus narrow. Teeth 5.2–2.4. Scales, 15–58–7. Radii: D. I. 8; A. I. 11. Ventrals not reaching anal. Length 6 inches. Color above olive, with a blackish inferior border, extending from the superior margin of the orbit. Below this a crimson band, and still lower a blackish band, passing from the epiclavicular region above the lateral line to the basis of the caudal fin. Below this crimson in front, silvery behind. Fins unspotted. Suborbital bones crimson; cheek golden. This description is given for purposes of comparison.

GILA TAENIA, Cope.

PLATE XXVII, FIGS. 5, 5a.

Clinostomus tania, COPE, Proc. Am. Phil. Soc. Phila., 1874, 133.—*Id.*, Rep. Plagop. & Ichthy. Utah, 1874, 7.

A smaller species than the last, distinguished by the smaller number of

anal radii, the elegant coloration, and other characters. Body of average proportions, its depth entering the length without caudal fin four and one-third times, and exactly equal to the length of the head. The head is compressed and the lips equal; the mouth is oblique, the end of the maxillary attaining the anterior line of the orbit. The orbit is large, entering the head three times and a fifth, and equaling the width of the convex inter-orbital space. Scales, $\frac{12}{58}$; 33 in front of dorsal fin. Lateral line complete, deflexed between pectoral and ventral fins. Radial formula: D. I. 9; A. I. 10; V. 9; P. 11; reaching ventrals, which reach vent. Dorsal first ray equidistant between the basis of the caudal and the anterior nostril.

Total length, 0^m.073; length to anal fin, 0^m.042; to ventral, 0^m.031; length of head, 0^m.014; length to orbit, 0^m.0036; width to posterior nostrils, 0^m.004; width at middle of pterotic, 0^m.0062. The sides are pure silvery to the lateral line of pores, above which a blackish vitta extends from the end of the muzzle to the caudal fin. Above this is a narrow very white line, which extends to the base of the caudal fin, and above this the entire dorsal region is blackish. Fins unspotted.

Numerous specimens from Provo near the lake (No. 667, 667 S., and 666). Collected by Dr. H. C. Yarrow and H. W. Henshaw.

This little fish is called by the Mormon settlers Silver-side or Leather-side Minnow, and is very common in Provo River. Is from three to five inches in length; male of an iridescent green color, blackish back. Silvery stripe commencing just above middle third of body; just below a bright orange yellow stripe, and under this a fine black stripe. Belly white; iris black; female without the bright lines, and much larger. This beautiful little fish is very abundant in the rocky holes of the Provo River, and is the favorite food of the trout, inhabiting the same locality. They are found on the whole course of the river, from just below the fall, in Provo Cañon, to the mouth, but strange to say are seldom seen in Lake Utah, into which this river empties.

We are inclined to believe that the trout *Salmo virginalis*, as mentioned previously, visit the mouth of the river not only to get into cooler water, but to feed upon these minnows. Their spawning time is early in

June, and at this period they are extremely wary, and are caught with difficulty. They run up the river, returning late in July. After an entire morning's labor, we succeeded in taking only about two dozen, notwithstanding we used three different kinds of nets. It is said that the male fish constructs the nest displacing pebbles and gravel by convulsive movements of the body, and that after the eggs are deposited watches over them. We know by personal experience that this watch is carefully kept up, as we have driven fish away from certain localities with our net, and in a few minutes found the same individuals to return.

In the stomach of the trout of Provo River, we have found eight or ten of these fishes.

Also found in Beaver River, Middle Utah.

GILA ARDESIACA, Cope, *sp. nov.*

PLATE XXX, FIGS. 1, 1a.

The *Gila ardesiaca* is a fish of the compressed form, characteristic of *G. hydrophlox*, and the mouth is short and directed obliquely upward. The muzzle is short, but not descending, and is not longer than the diameter of the large eye. Scales, $\frac{17}{63}$; anal radii, I. 8. Base of first dorsal ray measuring the middle point between the basis of the caudal fin and the posterior border of the orbit. Pectoral fin with enlarged radii, nearly reaching the ventral; the latter not quite reaching anal orbit one-fourth of length of head, equal to the interorbital width. Head 3.5 times in length to basis of caudal fin; greatest depth 4.2 in the same. Dental formula 4.2-2.5.

Olive above, with a lead-colored band from the upper canthus of the branchial fissure to the base of the caudal fin; head dusky; the operculum steel-blue. Length, 0^m.095. Locality of the single specimen unknown.

This fish is of the same group as the *G. montana*, but from this and the *G. hydrophlox* it differs in the shorter anal fin with but few rays.

GILA PANDORA, Cope.

Clinostomus pandora, COPE, Ann. Rep. U. S. Geol. Surv. Terrs., 1871, 475.

This is the common chub or pescadito of the Rio Grande and its tribu-

taries, and is the most abundant fish in New Mexico. It is a variable species, frequently exhibiting a dental formula of 4.1-1.4; indeed, usually so in small or immature individuals. The second tooth frequently displays a small grinding face. The variation in squamation is given below.

Var. I. Scales, $\frac{18}{65}$; eye six times in head, twice in interorbital width; form stout.

No.	Locality.	Date.	Collector.
207	Pagosa, Colo	Sept., 1874	C. E. Aiken.

Var. II. Scales of lateral line 59-63; eye 4.75 in head, 1.5 in interorbital width.

Teeth 4-5 and 4-4 in external row; scales, $\frac{19}{63}$.

No.	Locality.	Date.	Collector.
107	Rio Grande, mouth of Rio Honda	Aug., 1874	Prof. E. D. Cope.

Scales, $\frac{17}{59}$.

No.	Locality.	Date.	Collector.
(?)	Rio Grande, near San Ildefonso, N. Mex .....	.....	Dr. H. C. Yarrow.

GILA GULA, Cope, *sp. nov.*

PLATE XXX, FIGS. 2, 2a.

Allied to the last, and similar in squamation, but distinguished by a robust habit, especially a large head, with wide front and wide mouth. The eye enters the side of the head five times, and the interorbital width twice. Head only three and one-half times in length, exclusive of caudal fin; the same is one-fourth this length in *G. pandora*. The depth enters the same in *G. gula* four and two-thirds times. Teeth, 4.2-2.5. Scales, $\frac{16}{60}$. Radii:

D I. 8; A. I. 8. First ray of dorsal half way between base of caudal fin, and posterior border of orbit. Total length, 7 inches (0^m.17). Color dusky-olive to below the lateral line; belly silvery; axils of fins crimson. Region between the lateral line and pectoral fin dusky to beyond the ventrals.

No.	Locality.	Date.	Collector.
44	Rio de Acama	July, 1874	H. W. Henshaw.
44 A	Near Fort Wingate, N. Mex.....	.... do	Do.

GILA EGREGIA, Cope.

? *Gila egregia*, GIR., ? *Tigoma egregia*, GIR., P. R. R. Rep., x, 1859, 291.

Hybopsis egregius, COPE, Ann. Rep. U. S. Geol. Surv. Terrs. 1870, 438.

Alburnellus?, COPE, Proc. Am. Phil. Soc. Phila., April, 1874, 133.

An abundant species in the Rio Grande, much resembling the *G. pandora*, but differing constantly in the smaller and more numerous scales. In two specimens, they number $\frac{17}{81}$ and $\frac{18}{77}$. The head enters the length without the caudal fin four times. The outer rows of pharyngeal teeth are often 4-4, but 5-4 in large specimens. Abnormal developments of the teeth are common in the young specimens of this fish from the Rio Grande. Thus, by the incurvature of the external row, I found the teeth to count (No. 1) 3.3.1-3.2.2-1.4.3-2.2.3-2.4.2, and unsymmetrical.

This species is represented in the collection, also, by a great number of individuals from the Beaver River, Utah, visited by the expedition. These compare favorably with Girard's descriptions. Scales, $\frac{18}{77}$. Anal radii, 1-8-7. Teeth, 2.4-4.2. Very abundant in pools of the river.

No.	Locality.	Date.	Collector.
30	Beaver River, Utah	Aug., 1872	Dr. H. C. Yarrow and H. W. Henshaw.
26	.... do	Sept., 1872	Do.
281	.... do .....	.... do	Do.
31	.... do	Nov., 1872	Dr. H. C. Yarrow.
204	Loma, Rio Grande, Colo.....	Oct., 1873	Dr. J. T. Rothrock.

GILA NIGRA, Cope, *sp. nov.*

PLATE XXX, FIGS. 3, 3a.

This species, which is represented by a number of specimens in the collection of the survey, resembles those last enumerated, and differs from the *G. pandora* in the considerably more numerous scales; from the *G. egregia* it differs in the relatively larger head, which enters the length minus the caudal fin only three and one-half times, instead of four times. The dental series is found to be in several specimens 4.2–2.5. Scales, $\frac{21}{12}, \frac{20}{11}, \frac{20}{11}$, in three specimens. General shape fusiform; profile gradually descending, then decurved to the upper lip, which overhangs the lower by a little; mouth slightly descending. Teeth, 4.2–2.5; isthmus rather wide. Eye not large; in adults six times in length of head, 1.75 times in muzzle, and twice in interorbital width. The fins are all rather small, including the caudal; the pectorals reach 0.6 the distance to the ventrals, and the latter 0.6 the distance to the anal. Radii: D. I. 8; A. I. 8; V. 9. Least depth of caudal peduncle 2.6 times into greatest depth (in front of dorsal fin), which enters the length without the caudal fin four times. Total length, 0^m.235 (7½ inches); length to basis of first dorsal ray, 0^m.113; length to basis of caudal fin, 0^m.200.

General color black. Lower surfaces olive.

No.	Locality.	Date.	Collector.
204	Ash Creek, Ariz	July, 1874	Dr. J. T. Rothrock.
1019	San Carlos, Ariz	Oct., 1874	H. W. Henshaw.

GILA ROBUSTA, Bd. & Gir.

Gila robusta, BD. & GIR., Proc. Acad. Nat. Sci. Phila., vi, 1853, 369.—*Id.*, Sitgreave's Exp. Zuñi & Col. Riv., 1853, Fishes, 148, pl. 1, f. 1.—*Id.*, P. R. R. Rep., x, 1857, Fishes, 285.

A comparison of two good specimens with Baird and Girard's description reveals some trifling differences with regard to number of radii. Specimen No. 504, from Zuñi River, New Mexico, has the following formula:

Br. 3 on each side; D. 1-10; A. 1-11; C. 8-1-8-8-1-8; V. 1-8; P. 13; teeth 4.1-5.2. In this specimen, the head enters the total length including caudal fin 4.50 times; eye entering length of side of head 7 times; base of anal fin 11.50 in total length.

Specimen No. 504 A, from same locality, has: Br. 3-3; D. 1-11; A. 1-10; C. 8-1-8-8-1-7; V. 1-8; P. 13; teeth 4.2-4.2. Head enters total length 4.50 times; eye in length of side of head 7.75; base of anal fin 10.50 of total length. All the individuals of this species which have been examined possess on the end of the snout a little behind its anterior margin and on the median line of the head, a peculiar knob or tubercle, which is more plainly visible in alcoholic than fresh specimens. *Gila gracilis* possesses it in a much less marked degree.

No.	Locality.	Date.	Collector.
45	Arizona.....	—, 1871	F. Bischoff.
8XXX	.....do.....	.....do.....	Do.
504	Zuñi River, N. Mex.	July, 1873	H. W. Henshaw.
504 A	.....do.....	.....do.....	Do.
2 A 2	Gila River, Ariz	Sept., 1873	Do.

GILA ELEGANS, Bd. & Gir.

Gila elegans, BD. & GIR., Proc. Acad. Nat. Sci. Phila., vi, 1853, 309.—*Id.*, Sitgreave's Exp. Zuñi & Col. Riv., 1853, 150, pl. ii.—GIR., Proc. Acad. Nat. Sci. Phila., viii, 1856, 205.—*Id.*, U S. & Mex. Bound. Surv., pt. ii, 1859, Ichthyology, 61.—COPE, U. S. Geol. Surv. Terr., 1870, 441.

This species, resembling the preceding, but more elongated in form, and having larger scales, has been but sparingly observed by the members of this expedition; the only specimen having been brought from Southwestern Arizona by F. Bischoff of the expedition of 1871. This is in such bad condition that the distinctive characters can hardly be made out.

No.	Locality.	Date.	Collector.
54 Z	Southwestern Arizona	—, 1871	F. Bischoff.
381 A	San Juan River, N. Mex.	—, 1874	Lt. R. Birnie.

GILA GRACILIS, Bd. & Gir.

Gila gracilis, BD. & GIR., Proc. Acad. Nat. Sci. Phila., vi, 1853, 369.—*Id.*, Sitgreave's Exp. Zúñi & Col. Riv., 1853, Fishes, 151, pl. iii.—GIR., Proc. Acad. Nat. Sci. Phila., viii, 1856, 205.—BD. & GIR., P. R. R. Rep., x, 1859, Fishes, 287.—GIR., U. S. & Mex. Bound. Surv., pt. ii, Ichthyology, 1859, 61.—COPE, U. S. Geol. Surv. Terr., 1870, 441.

A number of specimens of this species have been obtained which correspond very nearly with the description given by Baird and Girard.

In two specimens, 570 and 571, from White River, Arizona, the teeth formulæ are as follows: 4.2-5.2—5.2-5.2. The head enters total length 4.25 times; the eye in length of side of head 6 times; the base of anal fin 9.25 times of total length including caudal. Radii: D. 2-9; A. 3-9; C. 8-1-10-8-1-11; V. 1-9; P. 16. This species is intermediate in form between *Gila robusta* and *Gila elegans*, and the scales are smaller than either; is found abundant in many of the deep pools of streams of Arizona; is sluggish in habits, and may be readily taken by hook baited with almost any substance, pork, grasshopper, or even a piece of fish. Many were taken by seine also. Are an excellent food fish, flesh being firm, but so full of bones as to render it hazardous to eat without care. These fishes are extremely hostile to the trout (*Salmo pleuriticus*), driving them and other fishes to the shallower and more rapid parts of the streams if they approach them. No female taken in roe.

No.	Locality.	Date.	Collector.
570	White River, Ariz.	Aug. 12, 1873	H. W. Henshaw.
606	..... do	Aug. 23, 1873	Do.
571	..... do ..... ..	..... do	Do.

GILA GRAHAMII, Bd. & Gir.

Gila grahamii, BD. & GIR., Proc. Acad. Nat. Sci. Phila., vi, 1853, 389.—GIR., Proc. Acad. Nat. Sci. Phila., viii, 1856, 205.—*Id.*, U. S. & Mex. Bound. Surv., x, pt. ii, Ichthyology, 1859, 61, pl. xxiv, figs. 7-12.—COPE, U. S. Geol. Surv. Terr., 1870, 441.

A number of specimens of this beautiful species was secured during the expedition in different parts of Arizona and New Mexico; notably in the White River, near Camp Apache, a branch of the Gila. After an exam-

ination of specimens, they have been found to correspond better with Girard's description than any other species of this genus. Is found abundant in same stream as preceding.

No.	Locality.	Date.	Collector.
64	Camp Apache, Ariz	June, 1873	Dr. O. Loew.
65	..... do .....	..... do	Do.
5	Colorado Chiquito, N. Mex	July, 1873	Dr. C. G. Newberry.
653 C	White River, Ariz	Aug. 29, 1873	Dr. O. Loew.
653 A C	..... do .....	..... do	H. W. Henshaw.
43	..... do	July, 1874	Jas. M. Rutter.
54	Zuñi River, N. Mex .....	..... do	H. W. Henshaw.
204 A	Ash Creek, Ariz .....	..... do	Dr. J. T. Rothrock.
1269	Gila River, Ariz.	Aug., 1874	Jas. M. Rutter.
910	(?)	..... do	Dr. J. T. Rothrock.

GILA NACREA, Cope.

Gila nacreæ, COPE, U. S. Geol. Surv. Terr., 1870, 441.

This species is closely allied to the foregoing, but differs in a less depressed cranium and much larger eye. The head is very nearly like that of *Ceratichthys* and other ordinary *Cyprinidæ*. From Green River, Wyoming.

GILA SEMINUDA, Cope & Yarrow, *sp. nov.*

PLATE XXXI, FIGS. 1, 1a.

This species is established upon a number of specimens secured from the Rio Virgen River, an affluent of the Colorado; the exact locality where taken being a little south of Washington, Southern Utah. The species is by no means scarce, as several hundreds were observed captured by boys with hook and line. This species is closely allied to *G. nacreæ*, Cope, but has a larger eye and shorter head.

Radii: D. 2-10; C. 34; A. 1-10; V. 10; P. 15. Teeth, 5.2-2.4. Scales, 21-12, small and subcircular; none on belly. Length of head 5 times in total length, including caudal. Depth at dorsal fin 5.75 of total length. Ventral fins originating slightly in advance of dorsal fin. Least

depth of caudal peduncle $3\frac{1}{2}$ times into depth at ventral. Profile and inter-orbital region slightly convex; width of latter 3 times in length of head. Diameter of eye 4 times in greatest length of head and 1.1 times in length of muzzle. End of maxillary not reaching posterior rim of orbit. Total length, 0.140 meter. Color purplish-brown on dorsal region; lower fins yellowish-pink.

GILA EMORII, Bd. & Gir.

Gila emorii, Bd. & Gir., Proc. Acad. Nat. Sci. Phila., vi, 1853, 388.—Gir., Proc. Acad. Nat. Sci. Phila., viii, 1856, 205.—*Id.* U. S. & Mex. Bound. Surv., ii, Ichthyology, 1859, 62.

This beautiful species, resembling *G. grahamii*, although said to be numerous in the Gila River, was not brought in by survey, but it is believed numbers were taken with the other species of *Gila* in that stream.

SIBOMA, Gir.

Proc. Acad. Nat. Sci. Phila., 1856, 208.

SIBOMA ATRARIA, Gir.

Siboma atraria, Gir., Proc. Acad. Nat. Sci. Phila., viii, 1856, 203.—*Id.*, P. R. R. Rep., x, 297, 277.—COPE, U. S. Geol. Surv. Montana & Adjacent Territories, 1871, 475.—*Id.*, Proc. Am. Phil. Soc. Phila., 1874, 132.—*Id.*, Rep. Plagop. & Ichthy. Utah, 1874, 10.

The specimens in our collection correspond well with Girard's description, except that in some instances we find the dorsal fin to have 10 rays; the ventrals 9.

Very abundant in streams throughout entire Rocky Mountain basin. This species is very common in Utah Lake, and is called by the Mormon settlers in Utah the Mullet, but resembles in no wise the well known marine form. Although not specially fished for, great numbers are taken every year in the trout nets.

In summer, the flesh is soft and insipid; but in the cold months of the year, it is firm and well-flavored, and they are sold to a considerable extent in the Salt Lake City market, the price being, as an average, about three cents per pound. They spawn in April, and run up the rivers, returning in June.

Do not often take the hook, except when baited with grubs, of which food they are fond. Feed on the bottom and are sluggish in their movements. Largest seen weighed seven pounds, and were twenty inches long, but will average only one pound apiece. Many of these fishes, which must eventually become of considerable importance to the settlers, are simply wasted; little care being taken to return them to the water when not wanted, a practice which should be prevented by law.

No.	Locality.	Date.	Locality.
218	Iron Springs, Utah.....	Aug., 1872	Dr. H. C. Yarrow.
500	Utah Lake, near Provo, Utah.....	.... do	Dr. H. C. Yarrow and H. W. Henshaw.
501	.... do .....	.... do	Do.
502	.... do .....	.... do	Do.
139	Gunnison, Utah.....	Sept., 1872	H. W. Henshaw.
66 X	Denver, Colo.....	May, 1873	Do.
504 A	Zuñi, N. Mex	July, 1873	Do.
503	.... do .....	.... do	Do.
503 X	.... do .....	.... do	Do.
505	.... do .....	.... do	Do.
505 P	Colorado Chiquito, N. Mex.....	—, 1873	Do.
505, 2	.... do	—, 1873	Do.

SIBOMA ATRARIA var. LONGICEPS, Cope.

PLATE XXIX, FIG. 4.

This form differs from the typical in having the head longer and the scales larger. Scales, $\frac{12}{56}$. Colors same as *S. atraria*.

This variety was discovered by Dr. H. C. Yarrow in Snake Creek Valley, Nevada, who remarked that, while very abundant and the only species of this creek, in Schell Creek Valley, not far distant, no fishes whatever are found. The conditions of life being apparently similar in both streams, their difference in this respect was not explained.

No.	Locality.	Date.	Collector.
312	Snake Creek, Nev	Aug., 1872	Dr. H. C. Yarrow.
121	.....do.....	.....do.....	Do.
5 F	.....do.....	.....do.....	Do.
5 D	.....do.....	.....do.....	Do.
240	Utah	—, 1872	Do.
507	Virgen River, Utah	Oct., 1872	Do.
5 E	Colorado Chiquito, N. Mex	Sept., 1873	Dr. C. G. Newberry.

MYLOLEUCUS, Cope.

A new genus, established by Professor Cope in 1871 upon specimens received from Warm Springs, Utah.

“Teeth raptorial, but with well-developed masticatory surface; 5–4 in outer row. No barbels; lateral line well-developed. Dorsal fin above or in front of line of ventrals. This genus is *Siboma*, with developed grinding surfaces of the teeth.”

MYLOLEUCUS PULVERULENTUS, Cope.

Myloleucus pulverulentus, COPE, U. S. Geol. Surv. Montana & Adjacent Territories, 1871, 475.

Seen by members of the survey, but no specimens received in Washington.

MYLOLEUCUS PAROVANUS, Cope.

Myloleucus parovanus, COPE, Proc. Am. Phil. Soc. Phila., 1874, 136.—*Id.*, Rep. Plagop. & Ichthy. Utah, 1874, 10.

PLATE XXVIII, FIGS. 3, 3a.

With a general similarity to *Gila montana*, this fish may be readily determined by the generic characters of the teeth and fins, as well as by the reduced number of radii of the anal fin. The genus *Myloleucus* was established, as already noted, in 1871, for species resembling *Siboma*, in having the pharyngeal teeth of the longer row 4–5, and the origin of the dorsal fin situated in advance of the ventral, but differing in the possession of well defined masticatory surfaces on the teeth. The typical species of *M. pulverulentus*, Cope, is from the Warm Springs of Utah; a fish which differs from the present one in the greater stoutness of form and smaller and more numerous scales.

Form moderately stout; muzzle short, conical; lips even; mouth very oblique, maxillary bone reaching anterior line of orbit. Profile of head and back gently arched. Depth of body equal length of caudal fin, and measuring 4.25 in the total length, less that fin; length of head 3.5 or 6 times in the same. Orbit large, 3.1 times in length of head; greater than muzzle; equal interorbital width. Scales, $\frac{11}{48}$; the lateral line decurved in front, and continued to base of caudal fin. Radii: D. I. 9; A. I. 8; V. 9. The pectorals reach little more than half way to the ventrals; the latter just attain the vent. Caudal well forked. The color is transparent, with a plumbeous lateral band; the ventral and pectoral fins dusky; the dorsal and caudal shaded with the same. Total length, 0^m.0648; length to base caudal, 0^m.053; to anal, 0^m.038; to ventral, 0^m.0288; length of head, 0^m.014; length to orbit, 0^m.003; width at middle pterotics, 0^m.0064.

Numerous specimens were obtained by Dr. H. C. Yarrow and H. W. Henshaw from Beaver River, in Southwestern Utah. This stream flows into the Sevier Lake, a very alkaline body of water, in which no fishes were found by the naturalists of the survey.

The two species indicated are thus far the only ones of the genus known.

No.	Locality.	Date.	Collector.
90	Beaver River, Utah	Sept., 1872	Dr. H. C. Yarrow and H. W. Henshaw.
666 O	.....do.....	.....do.....	Do.

HYBORHYNCHUS, Agass.

HYBORHYNCHUS SIDERIUS, Cope, *sp. nov.*

PLATE XXXI, FIGS. 6, 6a.

A fusiform species with a rather small acuminate head and with small scales. The physiognomy is quite distinct from that of the known species of this genus, resembling rather an *Apocope*. The teeth are of typical character, and the intestines are very elongate, and the peritoneum black.

Greatest depth equal to length of head and one-fourth of total length without the caudal fin. Mouth terminal; upper jaw overlapping; maxillary bone reaching line of orbit. Profile gently descending from nares. Mouth more than a semicircle; lower jaw hard, but not so attenuated as in the species of *Hybognathus*. Eye not large, 4.1 times in length of head, 1.3 times in muzzle and interorbital width. First dorsal ray above first ventral. Radii: D. I. 8; A. I. 7; V. 8, reaching anal; pectorals extending 0.66, the distance to the ventrals. Dorsal and anal fin long. Dorsal nearer the end of the muzzle than the caudal fin; caudal fin short. Scales, $\frac{17}{88}$, $\frac{15}{15}$, present on median lines above and below.

Color dark iron-gray above (whence the name); a darker band of the same along the side above the lateral line, extending to the end of the muzzle, and through the caudal radii to the notch of that fin. Total length, 0.84; length to basis of caudal fin; 0.70; length to first dorsal ray, 0.33.

The plate affords a view in profile of the species and of the ventral aspect.

No.	Locality.	Date.	Collector.
625	Camp Lowell, Ariz.....	Sept., 1874	Jas. M. Rutter.

HYBORHYNCHUS NIGELLUS, Cope, *sp. nov.*

This Cyprinoid resembles a *Pimephales*, but possesses a complete lateral line. Teeth, 4-4. Alimentary canal elongate, less so than in the *H. siderius*.

Scales narrowly exposed, $\frac{8-9}{43}$, $\frac{5-6}{5-6}$. Form stout with moderately convex dorsal outline; head wide, the muzzle abruptly truncate. Mouth terminal, very small, oblique; the end of the maxillary not reaching the line of the orbital border. Diameter of eye one-fourth length of head, one-half interorbital width, and a little less than length of muzzle. Two osseous ridges on front, each extending backward from inner posterior border of nares; another short one above each postorbital region. Length of head entering total without caudal fin 3.8 times, and equal to greatest depth of body. Isthmus moderately wide. Radii: D. I. 8; osseous ray very distinct, as in other species; A. I. 7; V. 8. The fins are small; but while the pectoral does not reach the ventral, the latter reach the anal.

Total length, 0.060; length to basis of caudal, 0.048; length to first dorsal ray, 0.025. Color dark-olive; a blackish lateral band; scales above it edged with dusky; a black vertebral band; head, except lower aspect, black; anterior border of pectoral, both borders of anal, and a strong median band through the dorsal fin, black.

Several specimens from the Arkansas River at Pueblo, Colo., from C. E. Aiken.

Numerous individuals from the same locality differ in having a less truncate muzzle and a much smaller anal fin; the radial and scale formulæ are the same. I suppose these to be females of the present species.

HYBOGNATHUS, Agass.

HYBOGNATHUS NUCHALIS, Agass.

Hybognathus nuchalis, COPE, Proc. Am. Phil. Soc. Phila., 1870, 466.

Abundant in the Rio Grande; one of the few eastern species occurring west of the Rocky Mountain range.

No.	Locality.	Date.	Collector.
164	San Ildefonso, N. Mex	Aug., 1874	Dr. H. C. Yarrow and Prof. E. D. Cope.

CAMPOSTOMA, Agass.

CAMPOSTOMA AIKENII, Cope, *sp. nov.*

A true species of this genus, exhibiting the characteristic convolution of the alimentary canal around the natatory bladder, from the Upper Arkansas River, is represented by a small specimen. Form attenuated; muzzle conic; mouth terminal, small. Head 3.75 times in length without caudal fin; depth 4.75 times in the same. Eye 4.25 times in head, 1.5 times in both interorbital width and length of muzzle. The fissure of the mouth only reaches to the anterior nareal opening. The fins are small, the dorsal standing immediately over the ventral. Radii: D. I. 8; A. I. 7. Total length, 0.052; length to origin of caudal fin, 0.042; to basis of dorsal fin, 0.022. Color above dusky-olive; a dark lateral band from end of muzzle to base of caudal fin; below silvery.

The species is dedicated to Chas. E. Aiken, of Colorado Springs, an industrious naturalist, who has made a number of interesting discoveries in various departments of zoölogy.

One specimen; Pueblo, Colo.; Chas. E. Aiken.

CATOSTOMIDAE.

PANTOSTEUS, Cope.

Professor Cope, in 1870, purposed to adopt as valid seven genera of this family; but, in 1872, he stated his belief that an eighth should be added, which should embrace species combining the characters of *Catostomus* proper, a complete union of the parietal bones, which obliterates the fontanelle so universal among the suckers; the only other exception being seen in *Cycleptus*, Raf., as he has already observed. In all the members of the family that he has examined in this regard, the fontanelle has been found quite open and of no doubtful proportions, and is nowhere reduced to the slit often seen in the *Siluridae*, unless it be in the *Catostomus discobolus*. In searching for the characters of Girard's supposed genera *Minomus* and *Acomus*, he expressed the view that the type of the former, *M. insignis*, Baird and Girard, presents the character in question. This conclusion was based on a specimen sent to the Academy of Natural Sciences from Washington bearing this name. Having since then examined five specimens of the *M. insignis*, obtained by the zoölogists of this survey, he finds them to be true *Catostomi*, as determined by the presence of the fontanelle. It therefore appears that this genus requires a name, and he proposes for it that of *Pantosteus*. It embraces the following species: *P. platyrhynchus*, *P. jarrovi*, and *P. virescens*, Cope, of the present essay; *P. delphinus* and *P. bardus*, Cope, Hayden's report, *l. c.*

PANTOSTEUS PLATYRHYNCHUS, Cope.

PLATE XXIX, FIGS. 3, 3a.

Minomus platyrhynchus, COPE, Proc. Am. Phil. Soc. Phila., 1874, 134.—*Id.*, Plagop. & Ichthy. Utah, 1874, 8.

This Catostomoid is of very elongate form; the depth of the body at the dorsal fin entering the total length seven and two-fifths times. The head is short and wide, with expanded and depressed muzzle; its length enters

the total five and three-fourths times. The scales are materially larger on the caudal peduncle than on the post-scapular region, and the dorsal fin originates considerably nearer the end of the muzzle than the basis of the caudal fin. Radial formula: D. I. 11; C. 18, openly emarginate; A. I. 7; V. 9, not reaching vent; pectoral reaching half way to ventral. Scales, $\frac{15}{86}$.

The orbits are excavated at their superciliary border, and their diameter enters their frontal interspace 1.66 times, and the length of the head 4.6 times, twice in the length of the muzzle in front of its border. The muzzle considerably overhangs the mouth. The lip folds are tubercular and largely developed, forming a discoidal funnel. The posterior is deeply incised behind; and there is a notch where it joins the anterior lip. The commissure is transverse and abruptly angulate to the canthus, and covered with a cartilaginous sheath as in *Chondrostoma*. Isthmus very wide.

Total length, 0^m.168; length to basis of caudal, 0^m.149; length to basis of ventral, 0^m.082; length to basis of dorsal, 0^m.070; length of head, 0^m.029; width of muzzle at mouth, 0^m.015; width of head at pterotics, 0^m.0156. Color blackish; belly and ventral fins yellowish (? pink). This species resembles the *Catostomus discobolus*, Cope, but has larger scales, besides presenting generic differences. Several specimens from near Provo. Collected by Dr. H. C. Yarrow and H. W. Henshaw.

No.	Locality.	Date.	Collector.
48	Provo River, Utah	Nov., 1872	Dr. H. C. Yarrow and H. W. Henshaw.

PANTOSTEUS JARROVII, Cope.

PLATE XXIX, FIGS. 2, 2a.

Minomus jarrovi, COPE, Proc. Am. Phil. Soc. Phila., 1874, 135.—*Id.*, Rep. Plagop. & Ichthy. Utah, 1874, 9.

A less elongate species than the last, with a much less enlarged muzzle. The anterior scales are smaller than the posterior, and the first dorsal ray is nearly intermediate between the end of the muzzle and the basis of the caudal fin. Radii: D. 9; C. 18; A. I. 7; V. 9, well removed from both vent and pectoral fin. Depth at dorsal fin 5.75 times in total length, into

which the length of the head enters 5.3 times; orbit small, 4.6 times in length of head, twice in interorbital width, and 1.75 times in muzzle; the latter projecting a little beyond mouth, not depressed, but narrowed viewed from above. Labial folds well developed, tubercular, the anterior rather narrow, the posterior deeply incised. Commissure with acute cartilaginous edge, regularly convex forward. Scales, $\frac{14}{85}$.

Total length, 0^m.107; length to basis of caudal, 0^m.0933; length to basis of ventral, 0^m.052; length to basis of dorsal, 0^m.047; length of head, 0^m.0205; width of muzzle at mouth, 0^m.075; width of head at pterotics, 0^m.011.

Color light-brown, with numerous dusky spots and clouds; a narrow abdominal band light; fins and chin (?) red.

Two specimens of this species were obtained by the expedition of 1873 in the Zuñi River, a tributary of the Colorado. In 1874, we found it very abundant in the tributaries of the Rio Grande as far as we explored it, *i. e.*, from Fort Garland, Colo., to Santa Fé. It is the prevalent Catostomoid of that river basin, and is everywhere associated with the *Salmo pleuriticus* and *Gila pandora*, &c. It imitates the coloration of the former in having a broad crimson band along the middle of each side in spring and summer. Below this there is frequently a broad blackish band. The scales below the lateral line vary from 11 to 14, and those on the line from 80 to 87. The dorsal fin rarely has 10 rays.

The species was dedicated to Dr. H. C. Yarrow in recognition of his important services to zoölogical science.

No.	Locality.	Date.	Collector.
504	Zuñi River, N. Mex.....	June 12, 1873	H. W. Henshaw.
126 A	Costilla, N. Mex	Aug., 1874	Prof. E. D. Cope.
111	Taos, N. Mex .....	..... do	Dr. H. C. Yarrow.
240	San Ildefonso, N. Mex .....	..... do	Dr. H. C. Yarrow and Prof. E. D. Cope.
227	Tierra Amarilla, N. Mex.....	Sept., 1874	Dr. H. C. Yarrow and W. G. Shedd.

PANTOSTEUS VIRESCENS, Cope, *sp. nov.*

An elongate fish, with short, wide head and compressed body; the caudal peduncle rather contracted. Muzzle obtuse, projecting but little

beyond the upper lip. Upper lip moderately wide, pendent, furnished with three rows of small tubercles. Posterior lip full, with a strong median emargination, and entering angle at junction with anterior lip; tubercles numerous, small. Orifice of mouth large, slightly curved; tomia with smooth borders. As the specimen is adult, the eye is relatively small, entering the length of the head seven times and the interorbital width 3.5 times. The length of the head enters the total (with caudal fin) six times.

The scales are much larger on the caudal peduncle than on the anterior parts of the body, and number $\frac{18}{103}$. Fin radii: D. I. 10; A. 7; V. 9; pectorals not reaching half way to ventrals; the latter 0.75 the distance to the anal fin. Emargination of caudal fin distinct, shallow. Dorsal a little nearer basis of caudal than end of muzzle. Eleven longitudinal rows of scales on caudal peduncle.

Color in spirits olivaceous; decidedly green on the head; lower surfaces and fins (narrowly on belly) yellow. Total length, 0^m.365; length to dorsal fin, 0^m.150; length to caudal fin, 0^m.307.

One species accompanying an *Amiurus*, which is marked Arkansas River, at Pueblo, Mr. C. E. Aiken.

CATOSTOMUS, Les.

CATOSTOMUS INSIGNE, Bd. & Gir.

Catostomus insigne, BD. & GIR., Proc. Acad. Nat. Sci. Phila., 1854, 28.

Minomus insignis, GIR., U. S. & Mex. Bound. Surv., ii, Ichthyology, 37, 37, pl. xxi, figs. 1-4.

This species is a true *Catostomus*, and the fine adult specimens all exhibit the characteristic fronto-parietal fontanelle. Scales, $\frac{11}{62}$; radii, D. I. 11; A. 7; V. 9.

No.	Locality.	Date.	Collector.
1270	Ash Creek, Ariz	July, 1874	Dr. J. T. Rothrock.
L 400	"New Mexico"	Aug., 1874	Dr. O. Loew.

CATOSTOMUS ALTICOLUS, Cope.

Catostomus alticolus, COPE, Proc. Am. Phil. Soc. Phila., 1874, 138.—*Id.*, Rep. Plagop. & Ichthy. Utah, 1874, 12.

A stout, rather short species of sucker, with elongate head and narrowed muzzle. The scales are larger behind than anteriorly, and number sixty transverse and nineteen longitudinal rows. The radial formula is: D. 10; C. 18; A. 7; V. 10, originating below the middle of the dorsal fin, and neither extending to the vent nor reached by the pectoral fin; caudal with shallow emargination. The depth enters the length with caudal five times, which is three and two-thirds the length of the head. Orbit 4.33 times in head, 1.66 times in interorbital width. The muzzle is long (1.66 times orbit), but is not produced much beyond the mouth, but is truncate and narrowed viewed from above. Lip folds well developed; the superior pendant; the inferior full but incised to the symphysis; the surfaces tubercular. Vertex flat.

Total length, 0^m.0863; length to origin of caudal fin, 0^m.070; to origin of anal, 0^m.0546; to origin of dorsal, 0^m.0365; width of head at posterior nares, 0^m.008; at middle of pterotics, 0^m.010. Color silvery; upper part of sides and back dusky. In specimens of this size, the lateral line is invisible; but in adults of eight inches obtained by Mr. J. S. Lippincott, it extends to the basis of the caudal fin.

Numerous specimens from Twin Lake, Colorado, obtained by Dr. J. T. Rothrock, botanist of the survey. This lake is situated in the South Park, at an elevation of 9,500 feet above the sea.

No.	Locality.	Date.	Collector.
160	Twin Lakes, Colo.....	July, 1873	Dr. J. T. Rothrock.

CATOSTOMUS DISCOBOLUS, Cope.

Catostomus discobolus, COPE, U. S. Geol. Surv. Wyoming & Contiguous Territories, 1870, 435.—*Id.*, Proc. Am. Phil. Soc. Phila., 1874, 138.—*Id.*, Rep. Plagop. & Ichthy. Utah, 1874, 12.

Numerous specimens from the Zuni River, New Mexico, and from another locality in Arizona, obtained by H. W. Henshaw and Dr. C. G. Newberry.

No.	Locality.	Date.	Collector.
C C C	Arizona.....	—, 1873	Dr. C. G. Newberry.
504 X	Zuñi River, N. Mex.....	June, 1873	H. W. Henshaw.
504	..... do	July, 1873	Do.

CATOSTOMUS FECUNDUS, Cope & Yarrow, *sp. nov.*

PLATE XXXII, FIGS. 1, 1a.

At the first examination of this species, it was supposed to be identical with Girard's *Acomus generosus*; but a comparison with his type in the National Museum at the Smithsonian Institution proves it to be a new species. It is a true *Catostomus*, having the parietal fontanelle well marked and widely open. The head enters in entire length 5 times, the diameter of orbit 6 times in greatest length of side of head. The insertion of the dorsal fin anteriorly is nearer the end of the muzzle than insertion of caudal; the ventrals originating below middle of dorsal. The width of the dorsal to ventral enters the entire length to insertion of caudal 6 times.

Radii: D. 12–13; A. 1–8; P. 17; V. 11. Scales, are in 20 longitudinal rows from the insertion of the first dorsal to pectoral, and in 60 transverse rows from branchiæ to insertion of caudal; they are elongate and octagonal, smaller on dorsal region, and larger on ventral. Body elongated, sub-fusi form. It differs from *C. (Acomus) generosus*, Gir., in many particulars, as may be seen from the following comparisons:

Girard's species has no fontanelle; is shorter and narrower; the diameter of orbit enters greatest length of side of head 5 times instead of 6. The anterior insertion of dorsal fin is equidistant between the end of the snout and the insertion of the caudal, while in *C. fecundus* it is nearer the end of snout than insertion of caudal. The ventrals in *C. generosus* originate under the posterior third of the dorsal; in *C. fecundus* under the middle third of the dorsal. The radii in *C. generosus* are: D. 10; A. 2–7; P. 16; V. 10; C. 27; in *C. fecundus*: D. 12–13; A. 1–8; P. 17; V. 11.

This species is abundant in Utah Lake, and is called "sucker" by the settlers. They run well up the rivers to spawn in June; feed on the bottom and eat spawn of better fish; spawning beds on gravel; bite at hook sometimes; are extremely numerous, and are considered a nuisance by the

fishermen, but they meet with a ready sale in winter at an average price of $2\frac{1}{2}$ cents per pound.

No.	Locality.	Date.	Collector.
508	Utah Lake, Utah	July, 1872	Dr. H. C. Yarrow and H. W. Henshaw.
509	..... do .....	..... do	Do.
800	..... do	Nov., 1872	Do.
801	..... do .....	..... do	Do.

CATOSTOMUS GUZMANIENSE, Girard.

Catostomus (Acomus) guzmaniensis, GIR., Proc. Acad. Nat. Sci. Phila., viii, 1856, 173.

Acomus guzmaniensis, GIR., U. S. & Mex. Bound. Surv., ii, pt. ii, 1859, Ichthyology, 39.

We find in the collection a specimen which corresponds with Girard's species known as *Acomus guzmaniensis*, the type of which was procured in the Janos River, a tributary of Lake Guzman, Chihuahua. The specimen under consideration was procured at Lake Utah, Utah, in 1872, and has been overlooked until lately. This species has a fontanelle, and is consequently a true *Catostomus*. It resembles *C. latipinnis*, Gir., but has larger scales, especially on the dorsal region.

No.	Locality.	Date.	Collector.
(?)	Lake Utah, Utah	July, 1872	Dr. H. C. Yarrow and H. W. Henshaw.

MOXOSTOMA, Raf.

MOXOSTOMA TRISIGNATUM, Cope, *sp. nov.*

Represented by numerous specimens from the Upper Arkansas River, none of which are mature. It is therefore possible that in adults the lateral line of tubes may be developed, in which case this species will be referred to the genus *Catostomus*.

The head is rather large, as in other *Moxostomæ*, and is wide above and square. The dorsal outline is very little arched, although the body is not slender. Head 3.4, depth 4 times in length without caudal fin; muzzle not produced; mouth small; lips full, tubercular; scales a little smaller

anteriorly in 19 longitudinal and 64-5 transverse series. Fin radii: D. I. 11-12; A. 7; V. 10; dorsal exactly half way between end of muzzle and basis of caudal fin. Orbit 4.2 times in head; twice in interorbital width.

Color silvery, with steel reflections; upper surface pale-brown with dark-brown scales arranged so as to make imperfect shades across the back. Three black spots on each side, one above the middle of the pectoral fin, one above the origin of the ventral, and one near the base of the caudal. Length, 0^m.07.

The large lateral spots of this species are not seen in any other of the order.

No.	Locality.	Date.	Collector.
1 A	Pueblo, Colo .....	.....	C. E. Aiken.

PTYCHOSTOMUS, Agass.

PTYCHOSTOMUS CONGESTUS, Gir. (?).

Ptychostomus congestum, GIR. (?), U. S. & Mex. Bound. Surv., ii, 1859, 36, pl. xx, figs. 5-8.

Three fine specimens, referred provisionally to this species, exhibit the following characters: Scales, $\frac{6}{42}$. Radii: D. I. 13; A. 7; V. 9. The head enters the length without caudal fin 4.5 times, or 5.5 times into the total. Eye 4.5 times in length, and twice in interorbital width of head. Vertex with low lateral ridges; front perfectly flat. This is one of the short-headed species, intermediate in this and other respects between the *P. erythrurus*, Raf., and *P. aureolus*, Les., of the eastern and Mississippi waters. *P. congestus* is a Texan species, with two more rows of scales than the present individuals, a point of some note in this genus.

No.	Locality.	Date.	Collector.
1270 A	Ash Creek, Ariz	July, 1874	Dr. J. T. Rothrock.

CARPIODES, Raf.

CARPIODES GRAYI, Cope.

Carpiodes grayi, COPE, Proc. Am. Phil. Soc. Phila., 1870, 482.

Scales, $\frac{6}{33}$. Radii: D. I. 23; A. 7; V. 9. Head entering length, exclusive of caudal fin, 3.75 times; depth entering the same 2.83 times.

Several specimens; San Ildefonso, N. Mex.; Prof. E. D. Cope.

ORTHODON, Gir.

The species of this genus bear a general resemblance to *Gila*, but the insertion of the fins, particularly the ventrals, is different. In dental peculiarities, it has some affinity with *Hybognathus*.

ORTHODON MICROLEPIDOTUS, Gir.

Gila microlepidota, AYRES, Proc. Cal. Acad. Nat. Sci., i, 1855, 21.

Orthodon microlepidotus, GIR., Proc. Acad. Nat. Sci. Phila., viii, 1856, 182.—BD. & GIR., P. R. R. Rep., x, Ichthyology, 1859, 237.

This species, called "Chub" by the Mormon settlers, is extremely abundant in Utah Lake, and also in the Provo River, running into this beautiful sheet of water. Spawn in May and June, and are terribly destructive to small fish and spawn, eating their own as well as others'. Run up the stream to spawn, depositing their eggs in *muddy* places. Average price five cents per pound. Are considered a fair table fish. Will bite any time at anything, and almost anywhere in Provo River.

No.	Locality.	Date.	Collector.
1872	? Utah Lake, Utah	July, 1872	Dr. H. C. Yarrow and H. W. Henshaw.

NOTE.—Professor Cope declines to be answerable for the locality named, as he considers this fish an exclusively Pacific slope form; we have consequently marked its locality doubtful.

ISOPONDYLI.

COREGONUS, Cuv.

COREGONUS VILLIAMSONII, Gir.

Coregonus williamsonii, GIR., P. R. R. Rep., x, 1859, 326.—*Id.*, Proc. Acad. Nat. Sci. Phila., viii, 1856, 136.

Coregonus williamsoni, COPE, U. S. Geol. Surv. Wyoming, 1870, 433.—*Id.*, U. S. Geol. Surv. Montana, 1871, p. 469.—*Id.*, Proc. Am. Phil. Soc. Phila., 1874, 132.—*Id.*, Rep. Plagop. & Ichthy. Utah, 1874, 6

SPECIFIC CHARACTERS.—Head contained five times and a half in the total length. Mouth small; posterior extremity of maxillar bone not extending quite as far as the anterior rim of the orbit. Eye moderate, subcircular; its diameter entering about five times in the length of the side of the head. Anterior margin of dorsal fin nearer the posterior edge of the base of the adipose than the extremity of the snout. Scales well developed, disposed upon eighteen longitudinal series across the line of the greatest depth; nine between the lateral line and the base of the dorsal; and eight between the lateral line and the insertion of the ventrals. Color bluish-lead above, whitish beneath, with a silvery reflect.

Br. VII: VII; D. 2, 12 + 1; A. 2, 12 + 1; C. 5, 1, 9, 8, 1, 6; V. 12; P. 16.

Upon comparison of specimen No. L with Girard's description and type, we find some marked differences, which are here noted. Total length of specimen examined, 17 inches; but we have seen others even longer. Girard mentions 11 inches as the length of his specimen. Head contained nearly $5\frac{1}{2}$ times in the total length. Mouth small; posterior extremity of maxillar bone extending as far as anterior rim of orbit. Eye moderate, subcircular; diameter in alcoholic specimen thirteen twenty-fifths of an inch, entering about six times in the length of the side of the head. Anterior margin of dorsal fin nearer the posterior edge of the base of the adipose than the extremity of the snout. Scales well developed, somewhat larger in dorsal than ventral region, disposed upon 20 longitudinal series across the line of the greatest depth just in front of anterior base of dorsal fin, 10 between the lateral line and insertion of the ventrals, 10 between the lateral line and base

of the dorsal. Colors in life, bluish neutral tint above, silvery-white beneath.

Radii: Br. 8-8; D. 1-12; A. 1-12; C. 5, 1, 9, 8, 16; V. 2-12-12; P. 2-16-16.

The specimens from the Provo River correspond generally with Girard's specimens, but there appears to be an exaggeration in the size of certain parts, notably the adipose fin, and maxillary bone; in short, the whole physiognomy of our specimens differs in being much larger. This appearance may, perhaps, be due to the fact that Girard's specimens were very old, and have contracted greatly during their twenty years' preservation in alcohol; ours are comparatively fresh.

This fish, belonging to the Puget's Sound fauna, we in vain endeavored to find at Provo, in July, 1872, and it was not until November that we succeeded in procuring specimens. At this time, many were being taken with *hook* and *line*, and we were informed it is seldom taken in any other way. Occasional stragglers find their way to the lake, and are then taken with trout, but this seldom occurs. They go far up the mountain streams to spawn, but the time could not be ascertained. It is probably early in summer, as no fish were heard of below Provo Cañon in July. They are frequently taken eighteen inches in length. The average price is twenty cents per pound, and they are highly esteemed for the table. This fish is also found high upon the Sevier to the southward, but is by no means so numerous as in the Provo River.

No.	Locality.	Date.	Collector.
L	Provo River, Utah	Nov., 1872	Dr. H. C. Yarrow.
L 1	..... do.....	..... do.....	Do.
D 13	Sevier River, Utah.....	Aug, 1872	Do.

SALMO, Linn.

Of this genus, quite a number of species are found in the lakes and streams of the Rocky Mountains, and are very nearly allied: *Salmo virginalis* being the characteristic fish of the lakes of Utah; *S. pleuriticus* of Ne-

vada, Montana, and Colorado; and *S. spilurus* of Western Colorado and New Mexico. These all belong to the group *Salar*.

The following brief synopsis of the *Salmonidæ* of the regions under discussion may prove useful for purposes of identification:

- Depth 5.75 in length; eye 4.5 times in head; snout obtuse; caudal fin scarcely emarginate; Br. IX *S. virginalis*.
- Depth 4.75 in total (to point of caudal); eye 5 times in head; muzzle acute; scales larger, 26 below dorsal fin; cranium not keeled above; head one-fourth length; dorsal fin nearer muzzle than end of caudal scales; caudal fin scarcely emarginate; Br. X *S. spilurus*.
- Head large, broad, flat, not keeled, 4.25 in total, equal depth of body; muzzle obtuse; eye nearly 5 times in head; scales 42 below first dorsal ray; dorsal fin equidistant; caudal fin not notched *S. stomias*.
- Head smaller, 4 times in length to notch of caudal (which is well emarginate); upper surface keeled; muzzle obtuse; eye 4 times in length; depth 4.5 in length to end of caudal scales; dorsal midway between latter and end of muzzle; scales small, 40-43 below dorsal first ray; Br. XI *S. pleuriticus*.
- Head acuminate, keeled above 4.66 times in length to notch of caudal fin, which is well marked; eye 0.2 of head; depth 5.25 to caudal notch; dorsal nearer muzzle than end of caudal scales; scales large, 33 below dorsal first ray; spots large, distinct; Br. XII *S. carinatus*.
- Head $\frac{1}{4}$ total length; eye 5 times in head; dorsal fin equidistant between insertion of caudal and end of muzzle; muzzle rather pointed; Br. X-XI *S. irideus*.

S. spilurus and *S. carinatus*, of those above enumerated, are readily distinguishable by their smaller orbits and large scales; as in *S. stomias* and *S. pleuriticus* the scales are quite small in comparison. But it should be mentioned that *S. carinatus* and *S. pleuriticus* resemble each other in the presence of the strong median carina on the superior aspect of the cranium. *S. stomias* may be readily known by the large mouth and head. Its habitat, as far as known, is the Kansas River, far to the eastward of the Rocky Mountains.

SALMO VIRGINALIS, Gir.

Salar virginalis, GIR., P. R. R. Rep., 1859, Ichthyology, x, 320, pl. lxiii, figs. 1-4.—*Id.*, Proc. Acad. Nat. Sci. Phila., viii, 1856, 220.

Salmo virginalis, COPE, U. S. Geol. Surv. Wyoming, 1870, 433.—*Id.*, U. S. Geol. Surv. Montana, 1871, p. 469.—*Id.*, Proc. Am. Phil. Soc. Phila., 1874, p. 130.—*Id.*, Rep. Plagop. & Ichthy. Utah, 1874, 6.

Description according to Girard.

SPECIFIC CHARACTERS.—Body subfusiform in profile, otherwise compressed; head comprised about four times in the total length; the caudal fin excluded; jaws subequal; posterior extremity of maxillary extending to a vertical line, intersecting the posterior rim of the orbit. Anterior margin of dorsal nearer the extremity of the snout than the insertion of the caudal fin. Grayish-brown, with a purplish reflection and subcircular black spots; beneath olivaceous, unicolor.

Br. 9:9; D. 12:0; A. 11; C. 7, 1, 9, 8, 1, 8; V. 8; P. 14.

A comparison of specimens in the collection of the survey gives the following result:

Length of two specimens $14\frac{1}{2}$ and 15.2 inches. Head enters total length, caudal fin included, about four and one-third times. Posterior extremity of maxillary extends to and intersects a vertical line drawn one-fifth of an inch in rear of posterior rim of orbit; anterior margin of dorsal nearer insertion of caudal than snout. Eye large, subcircular, entering 8-7 times in greatest length of side of head, and over twice in advance of anterior rim of orbit. Caudal five and two-thirds in total length. Line vertical drawn from insertion of ventral reaches the sixth spine of dorsal; 36-36 rows of scales above lateral line, 40-41 below. Br. 11-11; D. 12; A. 12; C. 7-1-9-8-1-8; V. 9-9; P. 14-14. The characters here given we find are constant in a number of specimens, and it may be noticed some grave differences exist between our own and Girard's specific characters. His general description of the species is good, however, and leaves little to be desired. It may be mentioned that the dark spots which are found on the dorsal aspect of this species frequently run into the conjunctiva of the eye; this fact as far as known has not been observed in other species.

By an extended examination of specimens, we are ready to state that this species certainly maintains its distinctness from *S. pleuriticus*, Cope, from the streams which flow from the mountains on both sides, in its more slender form of head and body. The depth enters the length 5.75 and 6 times, and equals the length of the head to the preoperculum. In *S. pleuriticus* of equal size, it enters the length 4.66 times, and nearly equals the length of the head

As this fish possesses interest from an economic point of view, the following account, compiled from Dr. H. C. Yarrow's field notes, may be found of interest:

The Lake Trout, or, as it is sometimes called, the Brook and Speckled Trout, by the inhabitants of Utah, is one of the most characteristic and numerous fish of the Territory, affording a valuable, healthy, and cheap article of diet. This fish has existed for years in immense numbers, and for this reason it is rather singular that its occurrence was not noticed until the party of this survey visited Lake Utah in 1872. This fish is found in Utah and Panquitch Lakes (the latter in Southern Utah) throughout the year, being most abundant during July and August, at which time these notes were hastily taken.

In comparison with the other fishes of Utah, the Lake Trout is undoubtedly the most numerous and the most easily captured; how long, however, this condition of affairs will last it is impossible to say, the supply having greatly diminished during the past few years, owing to the reckless methods of fishing and increase in the number of fishermen; moreover, a larger demand is now made for this fish, owing to increase in the number of settlers. The decrease in the yield may be roughly estimated at about one-third, but this percentage is slowly but surely increasing. The greatest size this fish attains, as far as could be learned on inquiry and from personal observation, is three feet; weight about fifteen and a half pounds. The average length, however, is about fourteen inches, and average weight one and a half pounds. The rate of growth is not known, although it is stated by the fishermen to be perhaps an inch per annum, but according to my belief the rate is greater. The fish is supposed to attain its full size in about five years. In shape there is very little difference between the male and female; though near the breeding season the female is the larger and more brilliant in color.

This increased brilliancy of color affects both sexes, but is noticeable in a more marked degree in the female. About breeding time, the eyes are brighter, scales more brilliant, and the superficial blood vessels more fully engorged than ordinarily; the movements are more rapid, a celerity being displayed quite at variance with its usual somewhat sluggish habits. This fish winters in the deepest waters of the lakes, as most of the mountain streams to which it resorts in spring and summer are shallow and very cold. The male and female, large and small, run indiscriminately together; the presence of this fish in any particular locality being indicated by the presence of flocks of birds hovering over the water. Except in the month of July, when unusually sluggish, the Lake Trout may be taken at any time with the hook and line, and, being high spirited and particularly gamy, affords excellent sport for the angler. In summer, it swims low in the water, in order, it is thought, to avoid the extreme heat of the sun. In winter, it prefers the deepest water.

As far as could be ascertained, the spawn has not been observed to run from this fish when captured, either by the line or net, for the reason, most likely, that the gravid female is seldom taken just prior to or during the time of spawning. It first enters the mouths of mountain streams and rivers to spawn about the middle of March, remaining until the middle of May, by which time the majority have fulfilled their reproductive functions. It is at such times that the fishermen, lying in wait at the mouths of the rivers, are able to capture such enormous quantities. In coming on to the breeding grounds, all sizes are found together, young and old, little and big. The favorite localities for feeding in summer are close to the mouths of rivers, the water of which from the mountains is ice cold, from ten to twelve feet deep, and the current very swift. As already stated, the cold water is preferred in summer and warm in winter.

After spawning, the trout invariably swim in schools, from one part of the lake to the other, in search of food; a solitary fish at such time being seldom seen. In traveling, the trout is nearly always accompanied by its friendly companions, the mullet, sucker, &c., which share with it the danger of attack by man and birds.

Notwithstanding the apparent affection existing between the different

species of fish in Lake Utah, the trout does not hesitate to prey to a large extent upon the young of other kinds, suffering itself, in return, in the same way, but in a much less degree. The trout is very voracious, devouring other fish smaller than itself, particularly a species locally known as "Silver-sides" or "Leather-sided Minnows" (*Gila (Clinostomus) tania*, Cope, *sp. nov.*), of from two to six inches in length; on dissection, I found the stomach of the trout crammed with these little fish. Grasshoppers, too, are a source of diet to the trout, with flies and other insects, while they do not disdain even snakes and frogs of tolerably large size. With regard to the methods of feeding, I have not been able to perceive or otherwise learn of any peculiarities of the trout unless it be the great eagerness with which they seek their food and the rapidity of devouring the same, especially with reference to bait on the hook. The quantity of food it consumes, judging from personal observations and accounts of experienced fishermen, must be enormous. During the spawning season, no very observable changes take place in the trout except those mentioned above, and also that the under part of the cheek of the female becomes very bright. As a rule, it may be stated that in general appearance the male is much less bright than the female at this season, and smaller.

Before spawning, the nests are made in the sand or gravel by a rotary motion of the tail of the male. Into this cavity, the eggs are exuded by the female, which is sedulously guarded by the male until the process is completed, when the latter deposits the milt which is to impregnate the eggs. No further care is taken by either after the deposition of the impregnating substance. Most of the spawning is done in the rivers, but the process takes place in the lake also to some extent. Spawning is greatly interfered with by the nets used by fishermen; knowing the time when fish begin to run up the rivers, the nets are drawn near the mouth of the streams, and large numbers of fish taken. It is not known at what age this fish begins to breed, nor what period of time the process continues, although both these points might be definitely ascertained by careful observation of captives under favorable circumstances. The act of spawning exerts an injurious effect on the flesh of the fish, rendering it poor and insipid. In addition, many of the fish seeking the upper parts of the rivers, to fulfill their repro-

ductive duties, do not survive the severe bruises and other injuries they meet with in their journey past the rocks and through the rapid currents of the mountain streams.

The water in the locality in which the trout spawns has never been noticed to be whitened by the milt, but it does present a translucent pinkish appearance after the event.

The temperature of water most favorable for hatching appears to be the coldest obtainable; the eggs, in many cases, being laid directly on the bottom of ice-cold mountain springs. The color of the spawn is whitish pink; each egg, just previous to spawning, being the size of No. 4 shot. In July, the eggs are not larger than No. 12, or dust shot. The eggs, when spawned, always sink to the bottom, where they remain unless eaten or carried away by the swift current. As already stated, the nest is made from gravel and stones entirely; no other materials being used as far as has been observed. The eggs are hatched in March, April, and May, but the number of days required by the process is not known. The spawn and young fish suffer greatly from the attacks of other fish, aquatic reptiles, and even from the large fish of their own species; these seeming to have no affection for their young. It is rather a singular fact that the very young trout is seldom seen or taken either by hook or net, and I am unable to account for the same unless it is that it resorts to unknown localities until a larger growth is obtained. Its food, so far as known, consists principally of small insects.

No steps have as yet been taken to increase the supply of this valuable fish by artificial means, the yield still being large enough to meet the wants of the settlers and miners; but, in the course of a few years, artificial propagation must be resorted to, for although certain laws have been passed regulating the size of the meshes of nets, no attention is paid to them by some greedy individuals, who think only of filling their own pockets at the expense of future generations. It may be mentioned in this connection that a letter, prepared at the request of the Hon. G. Q. Cannon, and bearing on this subject, has been presented to the legislature of Utah. It suggests the enacting of certain laws with reference to the preservation of fish, &c., and that the same be rigidly enforced when passed.

No epidemic causing sickness or destruction of life among the trout of Utah and Panquitch Lakes has ever been known, nor is this fish ever affected with parasites, as are many of the marine species. I must state, however, that I have been informed by a trustworthy friend that the same fish of the lakes in the Yellowstone region is uneatable in the summer; its flesh being riddled and filled with parasitic tape worms of considerable size, many, according to Dr. Leidy, being *five inches* in length. Mr. Carrington, whose notes accompanied the specimens examined by Dr. Leidy, states that the smaller worms were contained in cysts adherent to the exterior of the intestines, while the larger ones, up to six inches in length, were found imbedded in the flesh. From five to fifty of the parasites were found in a single fish. When numerous, they appeared to affect the health of their host, and the fishes most infested could generally be told by their duller color, meagerness, and less activity. Dr. Leidy states that this worm belongs to the genus *Bothriocephalus*, or rather to that section of it now named *Dibothrium*. Two species have long been known as parasites of the salmon and other members of the same genus of fishes in Europe; but the tape worm of the Yellowstone trout appears to be a different one, and may, from the shape of its head, be named with propriety *Dibothrium cordiceps*.

The trout of Utah Lake may be taken at nearly all seasons by both hook and net at all times, but in Panquitch Lake by hook only, since fishing in any other way is prohibited by common consent. This, however, is no hardship, since large captures are easily made with the hook, I myself having taken from thirty to forty pounds' weight in a single hour's fishing. The hooks used are simply large steel ones, with a snood, or snell, of piano wire, which is strong and flexible. The best bait is minnow and grasshopper, although this trout will bite at almost anything. In Panquitch Lake, a fish's eye is considered a very tempting bait. The nets used in Utah Lake are made of Nos. 9, 12, and 18 cotton twine, are generally four hundred yards long, 8 to 10 feet deep, and are furnished with brails at each end; when employed, they are reeled into the boats by means of a wooden windlass in the stern. The average daily catch of one person with hook and line would perhaps be twenty pounds, or about thirty-six hundred pounds

the entire season ; for a net of the dimensions above specified, one hundred and fifty pounds daily in summer and thirty or forty in winter.

This trout is highly prized by the settlers and miners of Utah, and quite a large proportion of those taken are consumed in the immediate neighborhood; the remainder being sent to the different mining camps, settlements, and the Salt Lake City market. As an article of food, its excellence is not surpassed by any fish, either fresh or salted, the delicacy and firmness of its flesh commending it to all who have a preference for fish diet. Furthermore, it retains for a longer period than most fish its unequaled and unique flavor. All that are captured are readily disposed of, mostly in a fresh state, though a few are salted and smoked. In no case is it used for manure, nor is it ever exported. The retail price of the fish in its fresh state varies from twenty to thirty cents per pound ; wholesale from ten to fifteen cents ; salted ones bring from ten to fifteen cents. These prices are about those formerly obtained and are now current in the Salt Lake market.

In September and October, the trout are somewhat scattering, and do not approach the shore ; consequently large hauls are seldom made at this period.

Mr. Madsen states it as his opinion that the female in spawning ejects only a portion of her eggs, as he has found on dissecting the trout after the spawning season eggs of various sizes, some very small and others full grown. The manner of seine fishing in the locality mentioned is quite similar to that pursued in the East, excepting that two boats are used instead of one ; the seine being paid out from one of the boats, which generally takes position to the southward of Provo River, while the other, with a line attached, makes a semicircle. As there is a perceptible current setting from the southern arm of the lake, increased by the southwest wind, the net is gradually drifted to near the mouth of the river ; the boats then approach each other, the brails are seized, and the lead line is held down by the feet of the fishermen, who jump into the shallow water into which the net is drawn ; the fish being secured as the net is gradually hauled in. In winter, fishing is carried on under the ice, holes being cut at certain distances, and the net introduced by means of spars ; it is then dragged to a favorable open space and the fish collected. The hauls in winter, however, scarcely

repay the labor bestowed; the net is sometimes seriously damaged, and the trout are shy and run into deep water; but the so-called suckers are very numerous, and meet with a ready sale.

The foregoing observations, as already stated, are the result of notes taken in Utah in July, 1872, by myself and assistant, Mr. Henshaw, though in some instances valuable aid and information were obtained from Mr. Peter Madsen, an intelligent Danish fisherman of Utah Lake, who kindly placed at our disposal data obtained during many years' experience acquired in this locality.

In conclusion, it may be stated that the Utah Lake trout is of vast economic importance to the settlers of the Great Salt Lake Valley, supplying as it does a comparatively cheap and most excellent article of sustenance, and one to the preservation of which special attention should be speedily given, since, if means are not shortly taken to prevent the destructive methods of fishing now employed, the species must become extinct after a few years. A number of fishermen, having no fear of the law, which is virtually a dead letter, are in the habit of visiting Utah Lake from Salt Lake City and other localities, and make use of nets of very small mesh for the express purpose of taking in small fish, which readily sell for ten cents per pound in the Salt Lake market. As already mentioned, this reckless and destructive mode of fishing is in no wise tolerated by the people of Panquitch, nor should it be by the residents of Provo City, near Utah Lake. Mr. Madsen, who lives on the lake, and who has been engaged in fishing for the past eighteen years, complains bitterly of these interlopers and law breakers, as he finds his profits are gradually decreasing with the number of fish from year to year. He mentions that, in 1864, such was the abundance of this fish, that in one haul of the seine, discarding all other kinds, he secured between thirty-five and thirty-seven hundred weight of trout, while at the present time five hundred pounds is considered an enormous haul.

No.	Locality.	Date.	Collector.
80 X	Provo, Utah.....	Aug., 1872	Dr. H. C. Yarrow.
88 X 8	Panquitch Lake, Utah.....	Sept., 1872	Do.

Of these specimens eight or ten individuals are from Provo; six or eight from Panquitch.

SALMO SPILURUS, Cope.

Salmo spilurus, COPE, U. S. Geol. Surv. Montana, &c., 1871, 470.

This fish was only observed in the Brazos River, one of the principal head tributaries of the Chama. Twenty-three specimens were examined, which all agree in possessing larger scales, a lighter color, and a larger size than the *S. pleuriticus*, which lives in the same region. This trout is the finest game and food fish of New Mexico, as the members of our party had good opportunity of ascertaining. It has so far only been found in the headwaters of the Rio Grande, near the mountain ranges, and perhaps may prove to be a large and well marked race of the more widely distributed *S. pleuriticus*. On six specimens, the following numbers of scales were counted above and below the lateral line: (1) $\frac{33}{35}$; (2) $\frac{33}{37}$; (3) $\frac{34}{37}$; (4) $\frac{37}{39}$; (5) $\frac{34}{37}$; (6)

$\frac{34}{38}$ The cranium is not keeled on the middle line. The color is a very light yellowish-brown, marked with small spots, which are composed of decussating lines. There are but few of them in advance of the anal fins, and none (except in one) in front of the ventrals. A red band on each side of the chin.

SALMO PLEURITICUS, Cope.

Salmo pleuriticus, COPE, U. S. Geol. Surv. Wyoming, 1870, 433.—*Id.*, U. S. Geol. Surv. Montana, 1871, 471.—*Id.*, Proc. Am. Phil. Soc. Phila., 1874, 132.—*Id.*, Rep. Plagop. & Ichthy. Utah, 1874, 6.

DESCRIPTION.—A stout species with obtusely descending muzzle; large subcircular eye, which enters head four times. Cranial keel well marked, its elevation being greater between orbits than on posterior part of frontal bones. Interorbital width 1.33 times long diameter of the interpalpebral opening of the eye. Dorsal fin nearer the origin of the marginal rays of the caudal than to the end of the muzzle, but is midway between the latter and the termination of the scales on the sides of the fins.

Radii: Br. XI; D. 2, 11–12 and 13; A. II. 11. Scales from 40 to 45 below first dorsal ray to lateral line. Maxillary bone extends a little beyond posterior rim of orbit; is not expanded. This species is well spotted,

the typical specimen especially, and the spots are found mostly above the lateral line on the entire caudal peduncle, dorsal and caudal fins, are rather scattered, less numerous on peduncle than *S. spilurus*. Sides with short, broad, longitudinal bars of crimson, and a band of the same color occupies the fissure within each ramus of the mandible and skin on the median side of it. The fins are all more or less crimsoned; none black-bordered. Color bluish silvery-lead color on back, yellowish-white beneath. Largest specimen $21\frac{1}{2}$ inches. We have in our collection a fine series of this species and of its varieties. The typical is represented by a number, and after a careful examination of the remaining ones we are obliged to note some differences which may entitle them to be considered subspecies or varieties.

Of the lot marked 204 B, from the Rio Grande, we have examined nine specimens, and find them typical in all respects.

Lot No. A, from Rio Grande, Colorado, which may be called var. *a*, or large spotted variety, contains two specimens. In these we find that the spots are quite large, round, but somewhat isolated and infrequent; greatest number on tail; none on the head. The posterior extremity of maxillary bone is on a line with the posterior rim of the orbit.

Lot No. 596 from White River, Arizona, containing three specimens, may be called var. *b*, or large and small spotted variety. Spots large and small, larger and more frequent on dorsal region and head; maxillary extending beyond rim of orbit.

Lot No. 205 A, two specimens, from Rio Grande, Colorado, have very small and partially semicircular spots, the concentration of which is near the caudal region; few on cheeks; none on top of head. Eye $5\frac{1}{2}$ times in greatest length of side of head. Head 4.50 of total length, including caudal. Dorsal midway between insertion of caudal and end of snout. Scales, 37–40, below dorsal first ray to lateral stripe, 43–45 below. Maxillary extends seven twenty-fifths of an inch behind posterior rim of orbit.

Radii: Br. XI:XI; D. 12–12; A. 11–11. The scales in these specimens are as large nearly as *S. spilurus*.

No.	Locality.	Date.	Collector.
370	Fort Garland, Colo.....	June, 1873	H. W. Henshaw.
61	White Mountains, Ariz.....	Aug., 1873	Do.
596	.....do.....	.....do.....	Do.
A	Rio Grande, Colo.....	Oct., 1873	Dr. J. T. Rothrock.
205	.....do.....	.....do.....	Do.
205 A	.....do.....	.....do.....	Lieut. W. L. Marshall.
204 B	.....do.....	.....do.....	Dr. J. T. Rothrock.
4 B	?	—, 1873	?
81	Fort Garland, Colo.....	July, 1874	W. G. Shedd and C. E. Aiken.
140	.....do.....	Aug., 1874	Do.
126 B	Costilla, N. Mex.....	.....do.....	Prof. E. D. Cope.
128	Rio Taos, N. Mex.....	.....do.....	W. G. Shedd.
227 A	Chama River, N. Mex.....	.....do.....	Do.
?	Near San Ildefonso, N. Mex.....	.....do.....	Dr. H. C. Yarrow.
268	Pagosa, Colo.....	Sept., 1874	C. E. Aiken.
354	.....do.....	.....do.....	Do.
355	.....do.....	.....do.....	Do.
357	.....do.....	.....do.....	Do.
358	.....do.....	.....do.....	Do.

HAPLOMI.

GIRARDINUS, Poey.

GIRARDINUS SONORIENSIS, Gir.

Girardinus sonoriensis, GIR., Proc. Acad. Nat. Sci. Phila., 1859, 120.

Numerous specimens; Camp Lowell, Ariz.; H. W. Henshaw.

FUNDULUS, (Cuv.) Val.

FUNDULUS ?MULTIFASCIATUS, (Cuv.) Val.

One specimen; Arkansas River, at Pueblo, Colo.; Mr. C. C. Aiken.

HAPLOCHILUS, Günther.

HAPLOCHILUS FLORIPINNIS, Cope.

PLATE XXVIII, FIGS. 4, 4a, 4b.

Haplochilus floripinnis, COPE, Proc. Am. Phil. Soc. Phila., 1874, 138.—*Id.*, Rep. Plagop. & Ichthy. Utah, 1874, 12.

First dorsal ray standing above the second or third anal. Formula: D. 10–11; A. 13–14; V. 7. Scales large, in 10 longitudinal and 29 trans-

verse series. First dorsal ray half as far from base of caudal as from end of muzzle. Length of head 4.66 times in total, a little less than four times to basis of caudal fin. Orbit large, 3.2 times in length of head and 1.6 times in interorbital width. Mandible projecting a little beyond premaxillary; one external series of teeth in both jaws larger than the others.

Total length, 0^m.0595; length to anal fin, 0^m.0335; length to basis of ventral fin, 0^m.027; length of head, 0^m.0138; width of head at pterotics, 0^m.008. Color olive-gray; the scales with ocher borders; fins yellow, broadly edged with crimson.

Numerous specimens from the Platte River, near Denver, Colo. No. 65 a species with large scales.

The plate affords views of this fish from the side, and the upper and lower aspects of the head.

No.	Locality.	Date.	Collector.
66 C	Cherry Creek, Arkansas River, Colo	May 11, 1873	H. W. Henshaw.
65	Denver, Colo.	May 12, 1873	J. M. Keasbey.
65 A B	..... do . . . . .	..... do	Do.

PERCOMORPHI.

URANIDEA, De Kay.

URANIDEA WHEELERI, Cope.

PLATE XXXII, FIGS. 3, 3a, 3b.

Uranidea wheeleri, COPE, Proc. Am. Phil. Soc. Phila., 1874, 138.—*Id.*, Rep. Plagop. & Ichthy. Utah, 1874, 12.

The only Physoclystous or spinous-rayed fish as yet found in the Great Basin of Utah.

Radial formula: Br. VI; D. VII. 17; A. 12; P. 15, all simple. The head is depressed and enters the length minus the caudal fin three times. Orbit large, one-fifth length of head and twice the width of the frontal interspace. Greatest depth (at first anal ray) 6.75 times in length, less caudal fin. Anal commencing opposite the third ray of the second dorsal. Lateral line deflexed opposite last ray of second dorsal. The recurved pre-

opercular spine strong; the decurved small and obtuse. Palatine teeth present; end of maxillary reaching line of pupil. Isthmus as wide as length of muzzle and orbit to front line of pupil. Skin everywhere smooth.

Total length, 0^m.084; length less caudal fin, 0^m.069; length to anal, 0^m.042; length to first dorsal, 0^m.031; length of head, 0^m.022; width at maxillaries distally, 0^m.0125; at preopercular spines, 0^m.0185.

From Beaver River, Southwestern Utah, and from Rio San Juan Pagosa, Colo. The other species of the Rocky Mountains (*U. punctulata*, Gill) has, according to that zoölogist, a much wider head, especially in the frontal region. This character is well exhibited by specimens in other collections.

Found tolerably abundant in pools left near the river after the spring floods had ceased; living under stones; movements very sluggish.

Dedicated to Lieut. G. M. Wheeler, in charge of explorations west of the one hundredth meridian.

No.	Locality.	Date.	Collector.
282	Pool, near Beaver River, Utah	Sept., 1872	Dr. H. C. Yarrow and H. W. Henshaw.
283	..... do .....	..... do	Do.
272	Pagosa, Colo	Sept., 1874	Dr. H. C. Yarrow and C. E. Aiken.

It may be mentioned, in addition to the species enumerated from Provo River and Utah Lake, we were informed of the occasional taking of a small fish called "Mountain Mullet", the description of which does not appear to apply to any of those already known from this locality. We were also informed that a small species called "Bullhead" is found under stones in the river bed, the colors of which are gray, spotted with black, having a very large head, with green eyes and very spiny fins; no scales. This is doubtless a cottoid, and it is much to be regretted no specimens were procured.

RECAPITULATION OF THE SPECIES.

The preceding investigation of the Ichthyology of the Southwestern Territories is sufficiently complete to throw much light on questions of geographical distribution. We therefore append lists of the ichthyic faunæ of the distinct water sheds and basins embraced within its scope. These are

(1) the drainage of the Arkansas; (2) that of the Rio Grande; (3) that of the Colorado; and (4) that of the basin Salt Lake.

The species of the Arkansas basin are as follows:—

Amiurus nebulosus, Lesueur.
Rhinichthys maxillosus, Cope.
Ceratichthys physignathus, Cope.
Pogonichthys communis, Gir.
Hypsilepis jugalis, Cope.
Hybopsis scylla, var., Cope.
Hybognathus nigellus, Cope.
Campostoma aikenii, Cope.
Pantosteus virescens, Cope.
Moxostoma trisignatum, Cope.
Salmo pleuriticus, Cope.
Fundulus multifasciatus, Cuv. Val.

The species of the Rio Grande are the following:—

Scaphirhynchops platyrhynchus, Raf.
Lepidosteus, sp.
Anguilla tyrannus, Gir.
Rhinichthys maxillosus, Cope.
Apocope vulnerata, Cope.
Apocope ventricosa, Cope.
Ceratichthys sterletus, Cope.
Gila egregia, Gir.
Gila pandora, Cope.
Gila gula, Cope.
Alburnellus simus, Cope.
Alburnellus jemezianus, Cope.
Hypsilepis iris, Cope.
Hyborhynchus nuchalis, Agass.
Pantosteus jarrovi, Cope.
Carpiodes grayi, Cope.
Salmo spilurus, Cope.
Salmo pleuriticus, Cope.

The most extended list is that of the Colorado basin:—

Plagopterus argentissimus, Cope.

Meda fulgida, Gir.

Lepidomeda vittata, Cope.

Lepidomeda jarrovi, Cope.

Ceratichthys squamilentus, Cope.

Apocope ventricosa, Cope.

Apocope couesii, Yarrow.

Apocope oscula, Gir.

Gila egregia, Gir.

Gila nigra, Cope.

Gila nacreata, Cope.

Gila elegans, Bd. & Gir.

Gila grahamii, Bd. & Gir.

Gila emorii, Bd. & Gir.

Gila seminuda, Cope & Yarrow.

Gila gracilis, Bd. & Gir.

Gila robusta, Bd. & Gir.

Hyborhynchus siderius, Cope.

Pantosteus bardus, Cope.

Pantosteus delphinus, Cope.

Catostomus discobolus, Cope.

Catostomus insigne, Gir.

Ptychostomus congestus, Gir.

Salmo pleuriticus, Cope.

Coregonus villiamsonii, Gir.

Girardinus sonoriensis, Gir.

Uranidea wheeleri, Cope.

The following species are those of the basin of Utah, whether from tributaries of the Great Salt Lake or not:—

- Apocope henshavi*, Cope.
- Apocope vulnerata*, Cope.
- Apocope carringtonii*, Cope.
- Ceratichthys biguttatus*, Kirt.
- Gila egregia*, Gir.
- Gila hydrophlox*, Cope.
- Gila montana*, Cope.
- Gila tænia*, Cope.
- Gila phlegethontis*, Cope.
- Siboma atraria*, Gir.
- Myloleucus pulverulentus*, Cope.
- Myloleucus parovanus*, Cope.
- Hybopsis timpanogensis*, Cope.
- Hybopsis bivittatus*, Cope.
- Pantosteus platyrhynchus*, Cope.
- Pantosteus jarrovi*, Cope.
- Catostomus fecundus*, Cope & Yarrow.
- Coregonus villiamsonii*, Gir.
- Salmo pleuriticus*, Cope.
- Salmo virginalis*, Gir.
- Uranidea wheelerii*, Cope.
- Uranidea punctulata*, Gill.

APPENDIX.

DESCRIPTION OF A MUGILOID FISH FROM THE MESOZOIC STRATA OF COLORADO.

SYLLAEMUS, Cope.

Allied to the *Mugilidae*.—A short, spinous, dorsal fin; ventral fins abdominal, posterior to the spinous dorsal. Pectoral fins subinferior in position. Coracoid bones forming a compressed, keeled body. Scales large, cycloid; lateral line present, extending along the middle of the sides. Parietal bones less than epiotics, entirely separated by the supraoccipital. Frontal bones large, wide; their common suture distinct.

The opercular apparatus extends obliquely backward, while the mandible is produced forward; hence the inferior part of the hyomandibular and the symplectic are directed obliquely forward. The end of the muzzle is broken off, but the posterior part of the dentary bone does not exhibit any teeth. The opercular bones are thin, and their inferior borders reach the median line of the inferior side of the head.

The only species of this genus which has fallen under my observation is represented by a specimen in which the body posterior to the femoral bones is wanting. The surface is covered with scales, so that only the outlines of the femoral bones can be distinctly seen. These are thickened and curved outward; those of opposite sides are well separated from each other. The scales exhibit a very delicate concentric line sculpture.

The very posterior position of the ventral fins distinguishes this genus from *Mugil*, while the inferior position of the pectoral fins is not seen in *Atherina*. The lateral line does not occupy the inferior position seen in the

Scombresocidæ. As compared with *Apsopelix*, Cope, from the Benton group of Kansas, *Syllæmus* differs in the absence of dorsal radii or interneural spines anterior to the line the ventral fins. There is doubtless some affinity between the two genera, as the other characters are quite similar. I was unable to detect a lateral line in *Apsopelix*. It is possible that a catalogue name of Agassiz, viz, *Calamopleurus* (Poiss. Foss., v, 122), refers to this or some allied genus, but I am unable to discover that it has ever been described.

SYLLAEMUS LATIFRONS, Cope.

Represented by the entire head and body of a fish as far as the basis of the ventral fins, excepting the end of the muzzle. The scales are completely preserved, while only the bases of the fins remain.

The body is subcylindric, while the head is broad and flat above. The inferior side of the head is contracted, the coracoids forming a keel, and the lower borders of the dentary bones being in contact. The angular portion of the dentary is strongly grooved on its inferior surface, and the proximal or anterior parts of the operculum display a radiate sculpture. The top of the head is smooth, excepting a slight radiate sculpture of the parietals. The outline of the parietals is subround and a little more extended than that of the supraoccipital, which is a short longitudinal oval.

There are twenty-six or twenty-seven longitudinal rows of scales, those of the abdomen not differing from those of the sides. The lateral line runs along the eighth below the dorsal fin, originating just above the base of the pectoral fin. There are nine rows of scales between the occiput and the first dorsal ray. I count the bases of fifteen dorsal radii, which are all fissured anteriorly, excepting the first, which is rudimentary. The anterior rays are stouter than the posterior, and they embrace the posterior part of the ray in front of them by the basal fissure. The posterior rays are much narrowed and embrace but little. The pectoral rays are numerous. The physiognomy of this fish is rendered peculiar by the depressed form of the snout, with the narrow under jaw. It is impossible to be sure whether the muzzle was elongate or not.

Measurements.

	M.
Length of specimen to base of ventral fin.....	0.205
Length of specimen to base of dorsal fin.....	0.090
Length of specimen to base of pectoral fin.....	0.075
Length of specimen to edge of operculum.....	0.071
Length of specimen to edge of preoperculum.....	0.055
Length of specimen to condyle of quadrate.....	0.029
Length of specimen to orbit.....	0.017
Diameter of front between orbits.....	0.020
Diameter of body at middle of dorsal fin.....	0.045
Depth of body at middle of dorsal fin.....	0.050

The specimen which represents this fish in the collections of the survey west of the one hundredth meridian was secured by Lieut. W. L. Marshall, of the expedition, and is said to be from near the summit of Pike's Peak, as he informs us. This locality is not its proper horizon, but the matrix which includes it is that of the Cretaceous or Jurassic beds exposed at the eastern base of that mountain. From these it was doubtless procured and carried to the locality where it was discovered.

CHAPTER VII.

REPORT
UPON
THE COLLECTIONS OF HYMENOPTERA
MADE IN PORTIONS OF
NEVADA, UTAH, COLORADO, NEW MEXICO, AND ARIZONA,
DURING
THE YEARS 1872, 1873, AND 1874.
BY
E. T. CRESSON.
WITH
LIST OF FORMICIDAE.
BY
EDWARD NORTON.

CHAPTER VII.

1. TENTHREDO SEMIRUFUS.

Tenthredo semirufus, NORTON, Proc. Ent. Soc. Phila., iii, 12.

1 ♀ specimen; Eastern Nevada; 1872; Dr. H. C. Yarrow.

2. TENTHREDO VARIEGATUS.

Tenthredo variegatus, NORTON, Proc. Ent. Soc. Phila., iii, 12.

1 ♂ specimen; Eastern Nevada; 1872; Dr. H. C. Yarrow.

3. UROCERUS AREOLATUS.

Urocerus areolatus, CRESS., Trans. Am. Ent. Soc., i, 375.

1 ♀ specimen; Colorado; Dr. H. C. Yarrow.

4. UROCERUS EDWARDSII.

Urocerus Edwardsii, BRULLÉ, Hym., iv, 645, pl. 45, f. 1.

1 ♀ specimen; Arizona; Jas. M. Rutter.

5. UROCERUS CYANEUS.

Sirex cyaneus, FAB., Ent. Syst., ii, 127.

1 ♀ specimen; New Mexico; J. Alborn.

6. UROCERUS ALBICORNIS.

Sirex albicornis, FAB., Ent. Syst., ii, 127.

1 ♀ specimen, with bright orange-yellow wings; New Mexico; J. Alborn.

7. UROCERUS FLAVICORNIS.

Sirex flavicornis, FAB., Ent. Syst., ii, 126.

Sirex bizonatus, STEPH., Kirby, Fn. Bor.-Am., iv, 256.

3 ♀ specimens; Eastern Colorado; 1873; Dr. J. T. Rothrock; New Mexico; Dr. H. C. Yarrow.

8. TREMEX COLUMBA.

Sirex columba, LINN., Syst. Nat., ii, 929.

1 ♀ specimen, with abdomen pale yellow, with five narrow black fasciæ; South Arizona; H. W. Henshaw; 1874.

9. ICHNEUMON SUTURALIS.

Ichneumon suturalis, SAY, Bost. Jour. Nat. Hist., i, 226.

2 ♂ ♀ specimens; New Mexico, Colorado; Dr. H. C. Yarrow.

10. TROGUS MELLOSUM, *sp. nov.*

♂.—Large, honey-yellow, opaque; head and antennæ lemon-yellow, tips of the latter and of mandibles black; mesothorax with a brownish longitudinal stripe on each side over tegulæ; scutellum and tegulæ pale honey-yellow, the former convex, shining, finely punctured; metathorax with sharply defined carinæ, the disk elevated, central area lunate, shining; wings yellow, apical margin fuscous, nervures and stigma honey-yellow; legs yellow, femora honey-yellow; abdomen velvety, paler on apical middle of segments; basal incisure of third segment narrowly black; apex of first segment with a prominent shining tubercle on summit. Length, 12 lines.

1 specimen; New Mexico; collected by T. V. Brown?, 388.

11. OPHION MACRURUM.

Ichneumon macrurus, LINN., Mant., 540.

1 ♀ specimen; Eastern Nevada; 1872; Dr. H. C. Yarrow.

12. OPHION BILINEATUS.

Ophion bilineatus, SAY, Contrib. Macl. Lyc., i, 75.

11 ♂ ♀ specimens; Eastern Nevada; 1872; Dr. H. C. Yarrow.

13. OPHION PURGATUS.

Ophion purgatus, SAY, Bost. Jour. Nat. Hist., i, 238.

1 ♀ specimen; Eastern Nevada; 1872; Dr. H. C. Yarrow.

14. CRYPTUS CALIPTERUS.

Cryptus calipterus, SAY, Bost. Jour. Nat. Hist., i, 234.

1 ♀ specimen; Arizona; 1873; H. W. Henshaw.

15. FORMICA PENNSYLVANICA.

Formica pennsylvanica, DE GEER, Ins., iii, 603.

2 ♀ specimens; Colorado, Arizona; 1873; H. W. Henshaw.

16. FORMICA RUFA.

Formica rufa, LINN., Syst. Nat., ii, 962.

2 ♂ specimens; Colorado; 1873; H. W. Henshaw.

17. MUTILLA OAJACA.

Mutilla oajaca, BLAKE, Trans. Am. Ent. Soc., iii, 228.

2 ♂ specimens; Colorado; Dr. H. C. Yarrow.

18. MUTILLA ORCUS.

Mutilla orcus, CRESS., Proc. Ent. Soc. Phila., iv, 428.

4 ♀ specimens; Eastern Nevada; 1872; Dr. H. C. Yarrow: Arizona (1294); Dr. J. Rothrock.

19. MUTILLA MAGNA.

Mutilla magna, CRESS., Proc. Ent. Soc. Phila., iv, 385.

1 ♀ specimen; Arizona; Jas. M. Rutter.

20. MUTILLA AUREOLA.

Mutilla aureola, CRESS., Proc. Ent. Soc. Phila., iv., 385.

2 ♀ specimens; New Mexico; Dr. Oscar Loew.

21. MUTILLA BIOCULATA.

Mutilla bioculata, CRESS., Proc. Ent. Soc. Phila., iv, 431, ♂.

♀.—Black; occiput, thorax above, and first large abdominal segment above clothed with a long, dense, yellowish-ferruginous pubescence; remainder of the body and legs clothed with black pubescence. Length, 7 lines.

4 ♂ ♀ specimens: Eastern Nevada; 1872: Colorado; Dr. H. C. Yarrow.

22. MUTILLA FULVOHIRTA.

Mutilla fulvohirta, CRESS., Proc. Ent. Soc. Phila., iv, 433.

1 ♂ specimen; New Mexico; Dr. H. C. Yarrow.

23. MUTILLA URSULA.

Mutilla ursula, CRESS., Trans. Am. Ent. Soc., v, 120.

1 ♂ specimen; New Mexico; Dr. H. C. Yarrow.

24. MUTILLA CALIFORNICA.

Mutilla californica, RAD., Blake, Trans. Am. Ent. Soc., iii, 235.

12 ♀ specimens; Eastern Nevada; 1872: New Mexico, Colorado; Dr. H. C. Yarrow: Arizona; 1873; Dr. J. T. Rothrock: New Mexico; H. W. Henshaw.

25. MUTILLA COCCINEOHIRTA.

Mutilla coccineohirta, BLAKE, Trans. Am. Ent. Soc., iii, 235.

1 ♂ specimen; Arizona; 1873; Dr. J. T. Rothrock.

26. MUTILLA AEGINA.

Mutilla Aegina, CRESS., Proc. Ent. Soc. Phila., iv, 435.

11 ♀ specimens; Arizona; 1873; Dr. J. T. Rothrock: New Mexico; Dr. H. C. Yarrow.

27. MUTILLA GORGON.

Mutilla gorgon, BLAKE, Trans. Am. Ent. Soc., iii, 233.

1 ♀ specimen; Eastern Nevada; 1872; Dr. H. C. Yarrow.

28. MUTILLA SACKENI.

Mutilla Sackeni, CRESS., Proc. Ent. Soc. Phila., iv, 385.

2 ♀ specimens; Eastern Nevada; 1872; Dr. H. C. Yarrow.

29. MUTILLA FENESTRATA.

Mutilla fenestrata, ST. FARG., Hym., iii, 627.

3 ♂ specimens; New Mexico; Dr. H. C. Yarrow, W. G. Shedd.

30. MUTILLA SIMILLIMA.

Mutilla simillima, SMITH, Brit. Mus. Cat. Hym., iii, 62.

6 ♀ specimens; New Mexico; Dr. H. C. Yarrow.

31. AGAMA TAPAJOS.

Agama Tapajos, BLAKE, Trans. Am. Ent. Soc., iii, 262.

1 ♂ specimen; Arizona; 1874; H. W. Henshaw.

32. AGAMA ALCANOR.

Agama alcanor, BLAKE, Trans. Am. Ent. Soc., iii, 264.

1 ♂ specimen; New Mexico; Dr. Oscar Loew.

33. AGAMA NITIDA, *sp. nov.*

♂.—Pale chestnut-brown, polished, very sparsely punctured, clothed with a long, scattered, pale pubescence; antennæ and tegulæ pale testaceous; postscutellum with a central pit; disk of metathorax with a shallow longitudinal depression, slightly striated at base; wings hyaline, faintly tinged with yellowish; nervures and stigma fuscous; marginal cell very short, appendiculated at tip; second submarginal cell triangular, petiolated; third submarginal cell large, subquadrate; abdomen very feebly punctured; basal segment petiolate, gradually dilated to tip; disk faintly sulcate; venter tinged with fuscous. Length, 5–6½ lines.

3 specimens; Colorado; Lieutenant C. W. Whipple. This is allied to *Alcanor*, Blake.

34. AGAMA GLABRELLA.

Mutilla glabrella, CRESS., Proc. Ent. Soc. Phila., iv, 414.

5 ♂ specimens; Eastern Nevada; 1872: Colorado, New Mexico; Dr. H. C. Yarrow.

35. AGAMA ALBIPES, *sp. nov.*

PLATE XXXIII, FIG. 2.

♂.—Uniform dark honey-yellow, clothed with a long, thin, pale pubescence, more dense on abdomen; sparsely punctured; metathorax closely and rather coarsely reticulated; mandibles pale, with black tips and long hairs; palpi pale; antennæ yellowish-white; scape with long hairs; wings pale yellowish-hyaline; marginal cell with a fuscous cloud, rather narrow, about equal in length with the stigma, truncate at tip; second submarginal cell subtriangular; the third subquadrate, slightly narrowed beneath; legs entirely yellowish-white, clothed with a long whitish pubescence; abdomen more or less tinged with fuscous, ovate, petiolate; the petiole long, much swollen beyond the middle, strongly and rather closely punctured; the apex strongly constricted. Length, 5–5½ lines. (Trans. Am. Ent. Soc., 1875.)

4 ♂ specimens; Eastern Nevada; 1872: Colorado; Dr. H. C. Yarrow.

36. MYZINE SEXCINCTA.

Scolia sexcincta, FABR., Syst. Ent., 356.

9 ♂ specimens; New Mexico; 1873; Dr. Oscar Loew: Colorado; Dr. H. C. Yarrow.

37. MYZINE HAMATA.

Myzine hamatus, SAY, Bost. Jour. Nat. Hist., i, 300.

3 ♂ ♀ specimens; Eastern Nevada; 1872: New Mexico; Dr. H. C. Yarrow.

38. MYZINE FRONTALIS, *sp. nov.*

♀.—Black; narrow anterior orbits confluent with a broader transverse line immediately above antennæ, line behind the eyes, a spot on disk of occiput, prothorax above, subquadrate spot on disk of mesothorax, a cuneiform spot on each side over tegulæ, scutellum except basal margin, post-scutellum, two spots on pleura, metathorax except two black approximate spots on posterior face, a black spot on each side at base, spot on all the

femora, spot on posterior coxæ, anterior tibiæ in front, broad band on five basal segments above with posterior margin more or less sinuate, and lateral spots on second, third, and fourth ventral segments, all bright lemon-yellow; wings hyaline, costal margin tinged with yellowish, nervures fulvous; abdomen smooth, polished, sparsely punctured, terminal segment opaque black, longitudinally aciculated, apical margin narrowly dark rufous, tip rounded and subcrenulated. Length, $6\frac{1}{2}$ lines.

1 ♀ specimen; New Mexico; collected by Dr. H. C. Yarrow.

39. MYZINE HYALINA.

Myzine hyalina, CRESS., Proc. Ent. Soc. Phila., iv, 442.

12 ♂ specimens; Colorado; Dr. H. C. Yarrow, Wm. H. Hance.

40. TIPHIA ALBILABRIS.

Tiphia albilabris, ST. FARG., Hym., iii, 556.

11 specimens; Eastern Nevada; 1872: New Mexico; Dr. H. C. Yarrow.

41. SCOLIA HAEMATODES.

Scolia hæmatodes, BURM., Abh. Nat. Ges. Halle, i, 33.

15 ♂ ♀ specimens; Eastern Nevada; 1872: New Mexico; Dr. H. C. Yarrow: Arizona; H. W. Henshaw.

42. SCOLIA LECONTEI.

Scolia Lecontei, CRESS., Trans. Am. Ent. Soc., i, 376.

13 ♂ specimens; New Mexico, Colorado; Dr. H. C. Yarrow.

43. ELIS XANTIANA.

Elis Xantiana, SAUSS., Ann. Soc. Ent. Fr., 4e sér., iii, 18.

2 ♀ specimens; New Mexico, Colorado; Dr. H. C. Yarrow.

44. ELIS ZONARIA.

Elis zonaria, CRESS., Trans. Am. Ent. Soc., i, 378.

8 ♂ ♀ specimens; Eastern Nevada; 1872: Colorado; Dr. H. C. Yarrow.

45. POMPILUS ÆTHIOPS.

Pompilus æthiops, CRESS., Proc. Ent. Soc. Phila., iv, 451.

1 ♂ specimen; Colorado; Wm. H. Hance.

46. POMPILUS ATROX.

Pompilus atrox, DAHLB., CRESS., Trans. Am. Ent. Soc., i, 98.

1 ♀ specimen; Arizona; Henry Johnson.

47. POMPILUS MARGINATUS.

Pompilus marginatus, SAY, Long's 2d Exped., ii, 333.

1 ♀ specimen; New Mexico; Dr. H. C. Yarrow.

48. PRIOCNEMIS TEXANUS.

Priocnemis texanus, CRESS., Trans. Am. Ent. Soc., iv, 204.

1 ♀ specimen; New Mexico; Dr. H. C. Yarrow.

49. PRIOCNEMIS TERMINATUS.

Pompilus terminatus, SAY, Am. Ent., pl. 42.

1 ♀ specimen; Arizona; H. W. Henshaw.

50. PEPSIS CAERULEA.

Sphex caerulea, LINN., Syst. Nat., i, 497.

Pompilus formosus, SAY, Am. Ent., pl. 42.

Numerous ♂ ♀ specimens; Eastern Nevada; 1872; Dr. H. C. Yarrow: Arizona; Jas. M. Rutter.

51. PEPSIS ORNATA.

Pepsis ornata, ST. FARG., Hym., iii, 486.

10 ♂ ♀ specimens; Eastern Nevada; 1872: Colorado, New Mexico; Dr. H. C. Yarrow: Arizona; Jas. M. Rutter.

52. AMMOPHILA YARROWI, *sp. nov.*

♂.—Black; head and thorax covered with a rather long, dense, silvery-cinereous pubescence; metathorax with an elongate, black, transversely aciculated space on each side of disk; tegulae fulvous, black anteriorly; wings hyaline, slightly dusky at tip; legs black, covered with very fine sericeous cinereous scales; tibiae sometimes varied with ferruginous; abdomen: the petiole long and very slender, the second joint except upper edge, and the first, second, and sides of third segments, ferruginous. Length, 11 lines.

2 ♂ specimens; Pueblo, Colorado; collected by Dr. H. C. Yarrow.

53. AMMOPHILA PRUINOSA.

Ammophila pruinosa, CRESS., Proc. Ent. Soc. Phila., iv, 455.

15 ♂ ♀ specimens; Eastern Nevada; 1872: New Mexico, Colorado; Dr. H. C. Yarrow.

54. AMMOPHILA VARIPES.

Ammophila varipes, CRESS., Proc. Ent. Soc. Phila., iv, 457.

8 ♂ ♀ specimens; Colorado, New Mexico, Dr. H. C. Yarrow, Lieutenant C. W. Whipple.

55. AMMOPHILA VULGARIS.

Ammophila vulgaris, CRESS., Proc. Ent. Soc. Phila., iv, 458.

6 ♂ ♀ specimens; Eastern Nevada; 1872: New Mexico; Dr. H. C. Yarrow: Colorado; Lieut. C. W. Whipple.

56. AMMOPHILA ROBUSTA.

Ammophila robusta, CRESS., Proc. Ent. Soc. Phila., iv, 461.

6 ♂ ♀ specimens; Eastern Nevada; 1872; Dr. H. C. Yarrow: New Mexico; J. Alborn.

57. AMMOPHILA LUCTUOSA.

Ammophila luctuosa, SMITH, Brit. Mus. Cat., iv, 224.

8 ♂ ♀ specimens; Colorado; 1873; Dr. J. T. Rothrock: Eastern Nevada; 1872: New Mexico; Dr. H. C. Yarrow.

58. PELOPOEUS CEMENTARIUS.

Sphex cementaria, DRURY, Ins., i, 105.

7 ♂ ♀ specimens; Eastern Nevada; 1872: New Mexico, Colorado; Dr. H. C. Yarrow.

59. PELOPOEUS CAERULEUS.

Sphex caerulea, LINN., Syst. Nat., i, 941.

2 ♀ specimens; Eastern Nevada; 1872; Dr. H. C. Yarrow: Arizona; 1873; Dr. J. T. Rothrock.

60. PELOPOEUS TEXANUS.

Pelopæus texanus, CRESS., Trans. Am. Ent. Soc., iv, 210.

1 ♀ specimen; Arizona; 1873; H. W. Henshaw.

61. CHLORION CAERULEUM.

Sphex caerulea, DRURY, Ins., ii, 75.

1 ♀ specimen; Arizona; 1873; Dr. J. T. Rothrock and H. W. Henshaw.

62. SPHEX LAEVIVENTRIS.

Sphex laeviventris, CRESS., Proc. Ent. Soc. Phila., iv, 463.

1 ♀ specimen; Eastern Nevada; 1872; Dr. H. C. Yarrow.

63. SPHEX RUFIVENTRIS.

Sphex rufiventris, CRESS., Trans. Am. Ent. Soc., iv, 211.

1 ♀ specimen; New Mexico; Dr. Oscar Loew.

64. SPHEX ICHNEUMONEA.

Sphex ichneumonea, LINN., Syst. Nat., ii, 959.

5 ♂ ♀ specimens; Eastern Nevada; 1872: New Mexico; Dr. H. C. Yarrow.

65. PRIONONYX ATRATA.

Sphex atrata, ST. FARG., Hym., iii, 355.

9 ♂ ♀ specimens; Colorado, New Mexico; Dr. H. C. Yarrow, Wm. H. Hance.

66. PRIONONYX THOMAE.

Sphex Thomae, FABR., Ent. Syst., ii, 199.

8 ♂ ♀ specimens; Eastern Nevada; 1872: New Mexico; Dr. H. C. Yarrow: Arizona; H. W. Henshaw.

67. TACHYTES ABDOMINALIS.

Larra abdominalis, SAY, West. Quar. Rep., ii, 77.

5 ♀ specimens; Eastern Nevada; 1872: Colorado, New Mexico; Dr. H. C. Yarrow, Wm. H. Hance.

68. ASTATA UNICOLOR.

Astata unicolor, SAY, Long's 2d Exped., ii, 337.

1 ♂ specimen; New Mexico; Dr. H. C. Yarrow.

69. BEMBEX SAYI.

Bembex Sayi, CRESS., Proc. Ent. Soc. Phila., iv, 467.

2 ♂ specimens; New Mexico; Dr. H. C. Yarrow.

70. BEMBEX FASCIATA.

Bembex fasciata, FABR., Syst. Piez., 224.

9 ♂ ♀ specimens; Eastern Nevada; 1872: Colorado; Dr. H. C. Yarrow: New Mexico; H. W. Henshaw.

71. STIZUS GRANDIS.

Stizus grandis, SAY, Am. Ent., pl. 2.

1 ♀ specimen; Eastern Nevada; 1872; Dr. H. C. Yarrow.

72. STIZUS NEVADENSIS, *sp. nov.*

PLATE XXXIII, FIG. 1.

♂.—Black; middle of face, clypeus, labrum, mandibles except tips, anterior orbits ending in two dots within the ocelli, tubercles, narrow posterior margin of prothorax, sometimes narrow line over tegulæ, and a band or two spots on scutellum, both sometimes wanting, yellow; base of antennæ ferruginous; tegulæ dull honey-yellow, with a yellow spot anteriorly; thorax with a very short, dense, changeable pile; wings pale yellowish-fuscous; marginal cell darker; costa more deeply tinged with yellow; legs ferruginous, sometimes more or less black at the base; anterior femora beneath, four anterior tibiæ exteriorly, and base of posterior tibiæ, yellow; abdomen shining, pale yellow above; base of first segment and basal and apical margin of all the segments narrowly black; on each side of first segment anteriorly an oblique, generally bifurcate, black mark; anterior margin of second segment more or less undulate, and on each side anteriorly a rounded black spot; a short, oblique, black line on each side of second and third, and sometimes fourth, segments posteriorly; the yellow band on fifth, and sometimes fourth, segments deeply indented with black on each side anteriorly; sixth segment with a large, transverse, yellow mark; apical segment black, tipped with ferruginous; the anal spine rather long and acute; sometimes the base of second segment is ferruginous; venter black, sometimes varied with ferruginous; a yellow band on posterior margin of second segment deeply indented laterally; three following segments with a lateral yellow line or spot. Length, 10–12 lines. (Trans. Am. Ent. Soc., 1875.)

3 specimens; Eastern Nevada; 1872; Dr. H. C. Yarrow. The prevailing color of the dorsal segments of abdomen is a pale yellow; the bands occupying nearly the entire width of the segments, leaving only a narrow, black margin at base and apex; the basal margin of the yellow on first segment is more or less sinuous.

73. LARRA UNICINCTA.

Stizus uncinata, SAY, West. Quar. Rep., ii, 77; Am. Ent., pl. 2.

8 ♂ ♀ specimens; Colorado; Dr. H. C. Yarrow, Wm. H. Hance: New Mexico; Dr. H. C. Yarrow, Dr. Oscar Loew.

74. PHILANTHUS VENTILABRIS.

Philanthus ventilabris, FABR., Ent. Syst., suppl., 268.

3 ♀ specimens; Colorado; Wm. H. Hance: New Mexico; Dr. H. C. Yarrow.

75. CERCERIS FRONTATA.

Cerceris frontata, SAY, West. Quar. Rep., ii, 80.

2 ♀ specimens; Colorado; Dr. H. C. Yarrow.

76. CERCERIS BICORNUTA.

Cerceris bicornuta, GUÉR., Icon. Règ. Anim., 443, ♀.

Cerceris Dufourii, GUÉR., Icon. Règ. Anim., iii, 444, ♂.

Cerceris venator, CRESS., Proc. Ent. Soc. Phila., v, 116, ♂.

11 ♂ ♀ specimens; Eastern Nevada; 1872: Colorado, New Mexico; Dr. H. C. Yarrow.

77. CERCERIS SEXTA.

Cerceris sexta, SAY, Bost. Jour. Nat. Hist., i, 382.

2 ♀ specimens; Colorado; Wm. H. Hance.

78. MASARIS VESPOIDES.

Masaris vespoides, CRESS., Proc. Ent. Soc. Phila., ii, 69.

1 ♂ specimen; Colorado; 1873; Dr. J. T. Rothrock.

79. ODYNERUS CAPRA.

Odynerus capra, SAUSS., Rev. Mag. Zoöl., 1857, 273.

2 ♂ ♀ specimens; Eastern Nevada; 1872: New Mexico; Dr. H. C. Yarrow.

80. EUMENES COLORADENSIS, *sp. nov.*

♀.—Black; rather densely clothed with a short, pale pubescence; apex of clypeus, two oblique spots on upper margin (sometimes nearly confluent with apical spot), clavate spot between antennæ, dot behind summit of each eye, scape beneath, anterior margin of prothorax, dot beneath wings, dot on each side of scutellum, postscutellum, a round spot on each side of metathorax at base, apex of femora, anterior pair beneath, all the tibiæ, dot on each side of first segment of abdomen above, its narrow and wavy apical margin, a transverse, rather oblique mark of variable size on each side of second segment, its broad, apical margin (narrowed laterally, sometimes deeply indented on anterior middle, sometimes entire, inclosing a black dot),

apical margin of remaining segments above and beneath (more or less indented laterally above), and a large quadrate mark on apex of second ventral segment, lemon-yellow; tarsi pale ferruginous; tegulæ yellowish, pupilled with fulvous; wings subhyaline, with costæ of anterior pair yellowish-fuscous; marginal cell fuscous. Clypeus elongate, convex at base, flattened at apex, which is deeply emarginate, the surface shining, with a few large, scattered punctures; thorax densely and deeply punctured; abdomen shaped much like that of *fraterna*, densely punctured, clothed with a dense, yellowish, sericeous pile, very conspicuous in certain lights; lateral tubercle on first segment distinct. Length, $5\frac{1}{2}$ lines.

♂.—Varies considerably in markings; clypeus entirely lemon-yellow; band on post scutellum sometimes interrupted medially; dot on each side of first abdominal segment generally wanting; lateral mark on second segment varies considerably both in length and breadth; the broad apical margin sometimes indented; hook at tip of antennæ ferruginous and very acute; the pubescence of the body is longer and more dense than in ♀, and the sericeous pile on abdomen more conspicuous. Length, 5–6 lines.

5 ♂ ♀ specimens; Colorado; Dr. H. C. Yarrow. This is allied to *verticalis*, Say, but is less robust and more densely pubescent; ♀ clypeus narrower, with apex more deeply emarginate.

81. ODYNERUS ANNULATUS.

Odynerus annulatus, SAY, Long's 2d Exped., ii, 348.

43 ♂ ♀ specimens; Colorado; Dr. H. C. Yarrow, Wm. H. Hance, Almont Barnes: New Mexico; Dr. H. C. Yarrow, Dr. Oscar Loew.

82. ODYNERUS DUCTUS.

Odynerus ductus, CRESS., Trans. Am. Ent. Soc., iv, 238.

5 ♂ specimens; New Mexico; Dr. H. C. Yarrow.

83. ODYNERUS ANORMIS.

Eumenes anormis, SAY, Long's 2d Exped., ii, 346.

2 ♂ specimens; Arizona; 1873; H. W. Henshaw: Colorado; Dr. H. C. Yarrow.

84. ODYNERUS TAOS.

Odynerus taos, CRESS., Trans. Am. Ent. Soc., i, 381.

15 ♂ ♀ specimens; Colorado; Dr. H. C. Yarrow, Almont Barnes: New Mexico; Dr. H. C. Yarrow, Dr. Oscar Loew.

85. PTEROCHILUS 5-FASCIATUS.

Pterochilus 5-fasciatus, SAY, Long's 2d Exped., ii, 347.

4 ♂ specimens; Colorado; Dr. H. C. Yarrow, Almont Barnes: New Mexico; Dr. Oscar Loew; H. W. Henshaw.

86. POLISTES CANADENSIS.

Vespa canadensis, LINN., Syst. Nat., i, 952.

1 ♀ specimen; New Mexico; Dr. H. C. Yarrow.

87. POLISTES NAVAJOE.

Polistes Navajoe, CRESS., Trans. Am. Ent. Soc., i, 383.

7 ♂ ♀ specimens; Arizona; Jas. M. Rutter, Henry Johnson.

88. POLISTES FLAVUS.

Polistes flavus, CRESS., Trans. Am. Ent. Soc., i, 383.

6 ♂ ♀ specimens; Arizona; Jas. M. Rutter: New Mexico; Dr. H. C. Yarrow, Wm. G. Shedd, Gilbert Thompson.

89. POLISTES AURIFER.

Polistes aurifer, SAUSS., Mon. Guêpes Soc., 78.

8 ♂ ♀ specimens; Eastern Nevada; 1872; Dr. H. C. Yarrow.

90. POLISTES VARIATUS.

Polistes variatus, CRESS., Trans. Am. Ent. Soc., iv, 247.

7 ♂ ♀ specimens; New Mexico; 1873; Dr. Oscar Loew, Dr. H. C. Yarrow: Colorado; Dr. H. C. Yarrow.

91. VESPA MACULATA.

Vespa maculata, LINN., Syst. Nat., ii, 948.

1 ♀ specimen; New Mexico; Dr. Oscar Loew.

92. VESPA OCCIDENTALIS, *sp. nov.*

PLATE XXXIV, FIGS. 1, 2.

♀.—Black; clypeus, mandibles except tips, large triangular mark on front, anterior orbits filling the sinus, broad posterior orbits, scape in front,

large elongate mark on each side of prothorax in front of tegulæ; a triangular spot beneath wings, two large transverse spots on scutellum, band on postscutellum interrupted medially, sometimes two spots on metathorax, and sometimes two small spots on mesothorax posteriorly, lemon-yellow; clypeus rather broader than long, with a black dot on middle; the apex broadly and rather deeply emarginate; the lateral angles prominent; eyes and base of mandibles contiguous; tegulæ yellow, pupiled with black or brown; wings pale fuscous; legs lemon-yellow; base of femora more or less black; abdomen lemon-yellow; first segment with a black spot on each side anteriorly, not inclosed, and a large triangular one on the middle; base of second, and the three following, segments, more or less broadly black, deeply indenting the yellow medially, and with a black spot on each side of the middle; apical segment black, with a large, triangular, black spot on each side; venter yellow, with a transverse, black spot on each side; second segment broadly black at base, confluent with the lateral black spot; the yellow band, occupying the apical half of this segment, divided by a black, median stripe. Length, $8\frac{1}{2}$ lines. (Trans. Am. Ent. Soc., 1875.)

♂.—Resembles the ♀ in markings, except that the apical yellow bands on second and three following segments are much narrower and acutely indented medially and squarely on each side of the middle; the black spots not inclosed. Length, 6 lines.

23 ♀ & ♂ specimens; Eastern Nevada; 1872; Dr. H. C. Yarrow: New Mexico; 1873; H. W. Henshaw, Dr. H. C. Yarrow, Dr. Oscar Loew: Colorado; Dr. H. C. Yarrow, Lieut. C. W. Whipple.

Distinguished at once from *germanica* by the scape of antennæ being yellow beneath, and by the different ornamentation of the first abdominal segment.

93. HALICTUS TRIZONATUS, *sp. nov.*

PLATE XXXIII, FIG. 3.

♀.—Black; finely, not densely punctured, clothed with a pale, griseous pubescence, more dense on face, cheeks, sides of thorax, postscutellum and sides of metathorax; scutellum shining; inclosed space at base of metathorax finely, longitudinally rugose; tegulæ brown; wings hyaline, tinged with yellow; veins honey-yellow; subcostal nerve black; legs black, with

short, dense, griseous pubescence; abdomen rather short, ovate, convex, smooth, and shining; base and sides with a long, thin, griseous pubescence; second, third, and fourth segments each with a broad band of short, dense, white pubescence; anal rima fulvous. Length, $4\frac{1}{2}$ lines. (Trans. Am. Ent. Soc., 1875.)

1 specimen; Eastern Nevada; 1872; Dr. H. C. Yarrow.

94. HALICTUS DISPARIILIS.

Halictus disparilis, CRESS., Trans. Am. Ent. Soc., iv, 253.

2 ♀ specimens; Eastern Nevada; 1872; Dr. H. C. Yarrow.

95. AGAPOSTEMON TEXANUS.

Agapostemon texanus, CRESS., Trans. Am. Ent. Soc., iv, 255.

6 ♀ specimens; Colorado, New Mexico; Dr. H. C. Yarrow, Dr. Oscar Loew.

96. AGAPOSTEMON TRICOLOR.

Agapostemon tricolor, ST. FARG., Hym., ii, 289.

14 ♂ specimens; Eastern Nevada; 1872: Colorado; Dr. H. C. Yarrow: New Mexico; Dr. H. C. Yarrow; H. W. Henshaw; Dr. Oscar Loew.

97. AGAPOSTEMON MELLIVENTRIS, *sp. nov.*

PLATE XXXIII, FIG. 4.

♀.—Golden-green, very densely punctured, clothed with a pale ochraceous pubescence; anterior margin of clypeus, and mandibles except tips, which are black, yellow; antennæ black; scape at base and beneath pale yellow; flagellum testaceous beneath; metathorax coarsely reticulated, sometimes tinged with blue, the truncate apex inclosed by a nearly semi-circular carina; tegulæ pale yellow; wings pale yellowish-hyaline; nervures pale; legs yellowish, with pale ochraceous pubescence; coxæ and base of femora black, more or less tinged with green; abdomen ovate, clothed above with a short, pale sericeous pile, very dense at base of the segments; the fourth segment has a narrow, black band across the middle, and the following segment more or less tinged with black; beneath, the apical segments are more or less blackish. Length, $4\frac{1}{2}$ lines. (Trans. Am. Ent. Soc., 1875.)

3 specimens. Easily recognized by the green head and thorax and the fulvous abdomen.

98. *NOMIA NORTONI*.

Nomia Nortoni, CRESS., Trans. Am. Ent. Soc., i, 385.

1 ♀ specimen; Colorado; Dr. H. C. Yarrow.

99. *NOMIA NEVADENSIS*, *sp. nov.*

PLATE XXXIV, FIGS. 3, 4.

♀.—Head and thorax black, rather densely clothed with a short ochraceous pubescence; three or four basal joints of antennæ, and sometimes the middle of face and clypeus, fulvous; scutellum and metathorax fulvo-feruginous; on sides of thorax, the pubescence is long and dense, and short and dense on anterior part of mesothorax, on posterior margin, and on post-scutellum; basal space of metathorax inclosed by a well-defined carina, and longitudinally rugose; tegulæ pale honey-yellow; wings yellowish, with apical margin broadly fuliginous; legs fulvous, with dense ochraceous pubescence; abdomen fulvous; apical margin of the segments depressed, pale, and fringed with ochraceous pubescence; venter fringed with long, ochraceous pubescence. Length, $5\frac{1}{2}$ lines. (Trans. Am. Ent. Soc., 1875.)

♂.—Less robust, and more densely pubescent, especially on the face; posterior femora much swollen and curved; their tibiæ dilated inwardly at tip, which has a stout, obtuse tooth; the margin above rather deeply emarginate; middle of first and second abdominal segments deeply and transversely excavated, the third less deeply so; fourth and fifth segments, except apical margins, black, the third sometimes tinged with black. Length, $5-5\frac{1}{2}$ lines. (Trans. Am. Ent. Soc., 1875.)

8 ♂ ♀ specimens; Eastern Nevada; 1872; Dr. H. C. Yarrow.

The pubescence is doubtless much faded from being long immersed in alcohol.

100. *EUNOMIA MARGINIPENNIS*, *sp. nov.*

♀.—Entirely black or brown-black; head and abdomen shining; thorax clothed with a short, dense, velvety-black or brown pubescence; legs generally brown, with sericeous pubescence on tibiæ; inclosed space behind postscutellum coarsely rugose; metathorax coarsely punctured; wings yellowish-hyaline, with apical margins broadly fuliginous; abdomen depressed above, with little or no pubescence, finely punctured; base deeply excavated. Length, 8 lines.

♂.—Very different from ♀, the body being clothed with a brownish-ochraceous pubescence, paler on the face; apical joint of antennæ enlarged and much flattened; legs shining; anterior tibiæ and tarsi fringed behind with long, ochraceous pubescence; intermediate femora much swollen, produced beneath into a sharp, bisinuate edge, their tibiæ short, simple, their tarsi long, slender; posterior femora clavate, being swollen at tip, their tibiæ short, triangular, flattened, undulate beneath, the apex beneath dilated and truncate or subbilobate, their tarsi slender, nearly as long as the femora and tibiæ together; first joint very long, longer than the remaining joints together; wings as in ♀; abdomen narrower than in ♀, more convex above, the depressed apical margin of the segments testaceous; all the segments above covered with a short, brownish-ochraceous, sericeous pubescence; venter flat, smooth, and shining. Length, $8\frac{1}{2}$ lines.

5 ♂ ♀ specimens; Colorado, New Mexico; Dr. H. C. Yarrow, Dr. Oscar Loew, W. G. Shedd. This is congeneric with *heteropoda*, Say; the males of both species having the apex of antennæ dilated and flattened, and the same formation of legs. I therefore separate them from our other species under the generic name given above. The *N. ? apache*, Cress., of which the ♀ only is known, and which resembles the ♂ of *marginipennis* very closely in color, also belongs to this genus.

101. MEGACILISSA YARROWI, *sp. nov.*

♀.—Black; head, thorax, legs, and basal segment of abdomen clothed with a rather long, dense, ochraceous pubescence; wings subhyaline, dusky beyond the cells; apical margin of second, third, and fourth segments of abdomen with a narrow continuous band of white pubescence; two apical segments entirely black; venter with ochraceous pubescence; four anterior tibiæ and all the tarsi black. Length, 9 lines.

2 ♀ specimens; New Mexico; Dr. H. C. Yarrow.

102. PANURGUS? ÆTHIOPS.

Panurgus æthiops, CRESS., Trans. Am. Ent. Soc., iv, 259.

1 ♂ specimen; New Mexico; Dr. H. C. Yarrow.

103. MACROTERA ALBIPENNIS.

Perdita ? albipennis, CRESS., Trans. Am. Ent. Soc., i, 386.

3 ♀ specimens; New Mexico; Dr. Oscar Loew.

104. MONUMETHA BOREALIS.

Monumetha borealis, CRESS., Proc. Ent. Soc. Phila., 1864, 388.

1 ♀ specimen; Eastern Nevada; 1872; Dr. H. C. Yarrow.

105. MONUMETHA ARGENTIFRONS.

Monumetha argentifrons, CRESS., Proc. Ent. Soc. Phila., 1864, 387.

1 ♂ specimen; Colorado; 1873; Dr. J. T. Rothrock. This is probably the ♂ of *borealis*.

106. OSMIA BUCEPHALA.

Osmia bucephala, CRESS., Proc. Ent. Soc. Phila., 1864, 17.

1 ♀ specimen; Colorado; 1873; Dr. J. T. Rothrock.

107. LITHURGUS APICALIS, *sp. nov.*

♀.—Black; the face with a transverse ridge, with the sides elevated into a prominent obtuse tubercle, and beneath a large, quadrate, flattened, smooth, shining space, having a few large scattered punctures; at base of antennæ, down the sides of the face, and on the margin of the clypeus covered with dense, whitish pubescence; that on the latter intermixed with fulvous; cheeks, sides of thorax and of metathorax, and postscutellum clothed with long, whitish pubescence; thorax convex, densely and rather coarsely rugose; wings subhyaline; legs clothed with a pale pubescence; that on tarsi beneath fulvous; abdomen depressed, much flattened and excavated at base, shining, finely and closely punctured on the sides, smooth on the disk of the segments, the apical margins of which have a narrow band of white pubescence, generally interrupted medially; apical segment above densely covered with a fulvo-fusca pubescence; ventral scopa dense and whitish. Length, 6–8 lines.

2 ♀ specimens; Colorado, New Mexico; Dr. H. C. Yarrow, C. E. Aiken. This is closely allied to *gibbosus*, Sm., also found in Colorado, but is readily distinguished by the fulvous apex of the abdomen; in *gibbosus*, the apical segment is black.

108. MEGACHILE PRUINA.

Megachile pruina, SMITH, Brit. Mus. Cat., i, 190.

10 ♂ ♀ specimens; Eastern Nevada; 1872; Dr. H. C. Yarrow: Colorado, New Mexico; Dr. H. C. Yarrow, Dr. Oscar Loew.

109. MEGACHILE DISPARILIS.

Megachile disparilis, CRESS., Trans. Am. Ent. Soc., iv, 264.

1 ♂ specimen; New Mexico; H. W. Henshaw.

110. ANTHIDIUM MACULIFRONS.

Anthidium maculifrons, SMITH, Brit. Mus. Cat. Hym., ii, 214.

1 ♂ specimen; Colorado; Almont Barnes.

111. ANTHIDIUM EMARGINATUM.

Megachile emarginata, SAY, Long's 2d Exped., ii, 352:

2 ♂ specimens; Eastern Nevada; 1872; Dr. H. C. Yarrow.

112. ANTHIDIUM ZEBRATUM.

Anthidium zebratum, CRESS., Trans. Am. Ent. Soc., iv, 270.

1 ♂ specimen; New Mexico; Dr. H. C. Yarrow.

113. NOMADA GRANDIS, *sp. nov.*

♀.—Head ferruginous, densely punctured; face clothed with yellowish pubescence; apical half of mandibles black; posterior orbits more or less yellowish; the ocelli are sometimes surrounded by a blackish stain; antennæ ferruginous, paler beneath and at extreme tip above. Thorax ferruginous, very densely and confluent punctured; collar yellow; mesothorax with a deeply impressed longitudinal line in front and a black central stripe; tubercles sometimes yellow, deeply notched anteriorly with blackish; scutellum subbilobate, entirely yellow, with a transverse line behind it; metathorax densely clothed with yellowish pubescence, black at base and down the middle, yellowish on the sides; tegulæ ferruginous. Wings subhyaline, the apical margins broadly and costal half of marginal cell fuliginous; nervures at base of wing, costal nervure and stigma ferruginous. Legs ferruginous, clothed with short, golden pubescence; coxæ pubescent, base of middle pair black. Abdomen broad, ovate, very finely and densely punctured, shining, bright yellow; basal half of first segment, as well as

the narrow apical margin of all the segments, ferruginous; apex densely clothed with fuscous pubescence, having a silvery reflection in certain lights; venter ferruginous, more or less varied with yellowish. Length, 6–7 lines.

3 ♀ specimens; Colorado; Dr. H. C. Yarrow.

114. CÆLIOXYS DUBITATA.

Cælioxys dubitata, SMITH, Brit. Mus. Cat. Hym., ii, 272.

1 ♀ specimen; New Mexico; W. G. Shedd.

115. MELECTA THORACICA, *sp. nov.*

PLATE XXXIII, FIG. 5.

♀.—Deep black; occiput, thorax above, and first abdominal segment above, clothed with a dense ochraceous pubescence; wings fuscous. Length, $6\frac{1}{4}$ lines.

1 specimen; Eastern Nevada; 1872; Dr. H. C. Yarrow.

116. EPEOLUS REMIGATUS.

Melecta remigata, FABR., Syst. Piez., 387.

7 ♂ ♀ specimens; Eastern Nevada; 1872: Colorado, New Mexico; Dr. H. C. Yarrow, Dr. Oscar Loew.

117. MELISSODES OBLIQUA.

Macrocera obliqua, SAY, Bost. Jour. Nat. Hist., i, 403.

14 ♂ ♀ specimens; Eastern Nevada; 1872: Colorado, New Mexico; Dr. H. C. Yarrow, Dr. Oscar Loew, Wm. H. Hance.

118. MELISSODES COMANCHE.

Melissodes Comanche, CRESS., Trans. Am. Ent. Soc., iv, 276.

2 ♀ specimens; Colorado, New Mexico; Dr. H. C. Yarrow.

119. MELISSODES NEVADENSIS, *sp. nov.*

PLATE XXXIV, FIG. 6.

♂.—Black; densely clothed with a long ochraceous pubescence; clypeus, labrum, and spot on base of mandibles white; mandibles with pale-fulvous stripe to tips; antennæ reaching beyond metathorax, black; scape densely pubescent; the pubescence on legs more yellowish, shading into

brown on the tarsi; abdomen clothed with short, black pubescence, that on first segment entirely ochraceous; a band on base of second segment, another near apex, and also near apex of third and fourth segments, of short, dense, pale, ochraceous pubescence; sometimes there are indications of a band near apex of fifth segment; venter fringed with pale pubescence. Length, $6\frac{1}{2}$ –8 lines. (Trans. Am. Ent. Soc., 1875.)

20 specimens; Eastern Nevada; 1872; Dr. H. C. Yarrow.

120. MELISSODES MENUACHUS.

Melissodes menuachus, CRESS., Trans. Am. Ent. Soc., i, 388.

10 ♂ ♀ specimens; Arizona; 1873; H. W. Henshaw: Colorado, New Mexico; Dr. H. C. Yarrow, Dr. Oscar Loew, W. G. Shedd.

121. MELISSODES DENSA.

Melissodes densa, CRESS., Trans. Am. Ent. Soc., iv, 282.

1 ♂ specimen; New Mexico; Dr. H. C. Yarrow.

122. ANTHOPHORA OCCIDENTALIS.

Anthophora occidentalis, CRESS., Trans. Am. Ent. Soc., ii, 292.

5 ♂ ♀ specimens; Colorado, New Mexico; Dr. H. C. Yarrow.

123. ANTHOPHORA BOMBOIDES.

Anthophora bomboides, KIRBY, Faun. Bor.-Am., iv, 271.

2 ♂ ♀ specimens; Colorado; C. E. Aiken.

124. ANTHOPHORA SMITHII.

Anthophora Smithii, CRESS., Trans. Am. Ent. Soc., ii, 289.

4 ♂ specimens; Colorado; 1873; H. W. Henshaw: New Mexico; Dr. H. C. Yarrow.

125. ANTHOPHORA CALIFORNICA.

Anthophora californica, CRESS., Trans. Am. Ent. Soc., ii, 290.

1 ♀ specimen; Colorado; 1873; Dr. J. T. Rothrock.

126. XYLOCOPA CALIFORNICA.

Xylocopa californica, CRESS., Proc. Ent. Soc. Phila., 1864, 40.

3 ♂ ♀ specimens; Eastern Nevada; 1872; Dr. H. C. Yarrow.

127. XYLOCOPA PURPUREA.

Xylocopa purpurea, CRESS., Trans. Am. Ent. Soc., iv, 284.

2 ♀ specimens; Eastern Nevada; 1872; Dr. H. C. Yarrow.

128. BOMBUS PENNSYLVANICUS.

Apis pennsylvanica, DE GEER, Ins., iii, 575.

1 ♀ specimen; Eastern Nevada; 1872; Dr. H. C. Yarrow.

129. BOMBUS CALIFORNICUS.

Bombus californicus, SMITH, Brit. Mus. Cat., ii, 400.

1 ♀ specimen; Eastern Nevada; 1872; Dr. H. C. Yarrow.

130. BOMBUS NEVADENSIS, *sp. nov.*

PLATE XXXIV, FIG. 5.

♀.—Black; thorax above, and three basal segments of abdomen above, clothed with a dense, yellowish pubescence; wings black or dark fuliginous; legs clothed with black pubescence. Length, 9 lines.

♂.—Like the ♀, except that the pubescence of the face and head above is yellowish; the face narrower, and the eyes much larger, antennæ longer, &c. Length, 8 lines. (Trans. Am. Ent. Soc., 1875.)

5 ♂ ♀ specimens; Eastern Nevada; 1872; Dr. H. C. Yarrow: Arizona; 1873; H. W. Henshaw: New Mexico; Dr. H. C. Yarrow.

131. BOMBUS FERVIDUS.

Bombus fervidus, FABR., Syst. Piez., 352.

1 ♂ specimen; Eastern Nevada; 1872; Dr. H. C. Yarrow.

132. BOMBUS TERNARIUS.

Bombus ternarius, SAY, Bost. Jour. Nat. Hist., i, 414.

2 ♂ specimens; Colorado; 1873; Dr. J. T. Rothrock: New Mexico; Dr. Oscar Loew.

133. APATHUS INSULARIS.

Apathus insularis, SMITH, Jour. Ent., i, 155.

2 ♂ ♀ specimens; Eastern Nevada; 1872; Dr. H. C. Yarrow: Colorado; 1873; Dr. J. T. Rothrock.

*Report upon the collections of Formicidæ, made during the years 1872, 1873,
and 1874, by*

EDWARD NORTON.

To make sure of the correct determination of this series of Ants, I forwarded a set of them to Dr. G. Mayr, Vienna, who kindly compared them with his large collection, and fixed them with greater precision than is possible in this country.

It is a matter of surprise to find so many species along certain parallels of latitude, apparently identical in this country and in Europe, and in some cases around the whole world.

So many new species have been found in Mexico that this result was hardly to be expected in New Mexico and Colorado.

I have before learned that great caution will be required in making up a list of the Formicidæ of the Northern United States.

FAM. FORMICIDAE.

1. Subfamily FORMICIDAE.

CAMPONOTUS, Mayr.

Camponotus, MAYR, Eur. Formiciden, 1861, 35.

1. CAMPONOTUS MARGINATUS, Latr.

Formica marginata, LATR., Hist. N. Formic., 103, ♀ nec ♂.—MAYR., Form. Austr., 42.

♂.—SMITH, Brit. Mus. Cat., 11.

Formica fallax, NYL., Ann. Sc. N. Fr., iv, ser. v, 57, ♂.

Camponotus fallax, MAYR, Eur. Form., 36.

Common in Southern and Middle Europe and North and South America.

No.	Locality.	Date.	Collector.
153 E	Plaza del Alcalde, N. Mex.	1874	Dr. H. C. Yarrow.

2. CAMPONOTUS PENNSYLVANICUS, De Geer.

Formica pensylvanica, DE GEER, Hist. Ins., i, 289; iii, 603, pl. 31, 9, 10, ♂, ♀, ♂.

Formica pubescens, var., LATR., Hist. Formic., 99.

Camponotus pensylvanicus, MAYR, Myr. Stud., 666.

Formica semipunctata, KIRBY, Zoöl. Brit. N. Am., T. 262.

Common in North America.

No.	Locality.	Date.	Collector.
L 43	"New Mexico"	—, 1874	Dr. O. Loew.
B 197	San Luis Valley, Colo.	—, 1872	Dr. J. T. Rothrock.

3. CAMPONOTUS PUBESCENS, Fabr., var.

Camponotus pubescens, MAYR, Eur. Form., 36.

Formica pubescens, FABR, Syst., Ent., 1775, 392; Ent. Syst., ii, 352.

Formica fuscoptera, OL., Encyc. Méth., vi, 491.

Formica vaga, SCHRANK, Ins. Aust., No. 835.—SCOP., Ins. Carn., 313.

Formica pensylvanica, ASA FITCH, Rept., i, 152.

Formica carya, ASA FITCH, Rep., i, 151.

Europe, Asia, Algeria, Madeira, and North America.

No.	Locality.	Date.	Collector.
L 97	New Mexico.	Sept. 1, 1874	Dr. O. Loew.
105 C	Taos, N. Mex.	Aug. 17, 1874	Dr. H. C. Yarrow.
1425	Cave Spring, Ariz.	Aug., 1874	Henry Johnson.

4. CAMPONOTUS SYLVATICUS, OL.

Camponotus sylvaticus, ROG., Berl. Ent. Z., 1862, 291.

Formica sylvatica, OL., Encyc. Méth., vi, 491.

Formica pallens, NYL., Add. alt., 36.

Formica marginata, LTR., Hist. Form., 103, ♂, not ♀

Formica castaneipes, LEACH, Zoöl. Jour., ii, 289.

Camponotus marginatus, MAYR, Eur. Form., 36.

Southern Europe, Northern Africa, and Madeira.

No.	Locality.	Date.	Collector.
284 E	Pagosa, Colo.	Sept. 1, 1874	C. E. Aiken.

5. CAMPONOTUS VICINUS?, Mayr.

Camponotus vicinus, MAYR, Neue Formic., 1870, 940.

Connecticut, Virginia, New Mexico, and California.

No.	Locality.	Date.	Collector.
247 C	New Mexico	Sept. 18, 1874	Dr. H. C. Yarrow.

Worker very like *C. ligniperda* and *C. herculanea*. Differs only in having the mandible 5–6 dentate and clypeus distinctly carinate and moderately protracted before.

LASIUS, Fabr.

Lasius, FABR., Syst. Piez., 1804, 415.

1. LASIUS ALIENUS, Foerst.

Formica aliena, FOERST., Hym. Stud., i, 1850, 41, ♂, ♀, ♂.*Lasius alienus*, MAYR, Eur. Form., 50.

Southern and Middle Europe.

No.	Locality.	Date.	Collector.
L 21	Abiquiu, N. Mex.	—, 1874	Dr. O. Loew.

2. LASIUS CLAVIGER, Rog.

Formica clavigera, ROG., Berl. Ent. Z., 1862, 241, ♀, Penn.*Acanthomyops claviger*, MAYR, Myr. Stud., 1862.*Lasius claviger*, MAYR, Neue Formic., 1870, 950, ♂, ♂, Ct., N. Y.

Connecticut, New York, and Pennsylvania.

No.	Locality.	Date.	Collector.
271 B	Pagosa, Colo.	—, 1874	Dr. H. C. Yarrow.

3. LASIUS NIGER, Linné.

Formica nigra, LINNÉ, Faun. Suec., 1723.*Lasius niger*, FABR., Syst. Piez., 415.*Formica fusca*, FÖRST., Hymen. Stud., i, 33, ♂, ♀, ♂.*Formica pallelescens*, SCHENK, Jahrb. Beschr. Nass., 1852, 55, ♂, ♀, ♂.

All of Europe, Madeira, and North America.

No.	Locality.	Date.	Collector.
B 197	San Luis Valley, Colo.	Sept., 1872	Dr. J. T. Rothrock.

FORMICA, Linné.

Formica, LINNÉ, Faun. Suec., 1761, 426.

1. FORMICA CINEREA, Mayr.

Formica cinerea, MAYR, Verh. z.-b. V., 1853, 281, ♂, ♀, ♂. — —, Neue Form., 1870, 951.

South and Middle Europe and California.

No.	Locality.	Date.	Collector.
L 37	New Mexico	—, 1874	Dr. O. Loew.

2. FORMICA FUSCA, Linné.

Formica fusca, LINNÉ, Faun. Suec., 1722, 226.—MAYR, Neue Form., 1870, 951

Formica glebaria, NYL., Act. Soc. Sc. Form., ii, F. iii, 917.

Formica flavipes, GEOFF., Encyc. Méth., vi, 493.

Europe, Africa, Madeira, Newfoundland, North America, and California.

No.	Locality.	Date.	Collector.
L 37	New Mexico	—, 1874	Dr. O. Loew.
137 E	Taos, N. Mex.	Aug., 1874	W. G. Shedd.
234	Tierra Amarilla, N. Mex.	Sept., 1874	Do.
1604	San Ildefonso	Aug., 1874	Dr. H. C. Yarrow.

3. FORMICA GAGATES, Latr., var.

Formica gagates, LATR., Hist. N. Formic., 1802, 138, pl. 5, 26, ♂, ♀.—MAYR, Neue Form., 1870, 951.

Formica picea, NYL., Act. Soc. Sc. Fenn., 917.

All of Europe, Northern Africa, Connecticut, and California.

No.	Locality.	Date.	Collector.
53 E	Fort Garland, Colo.	July, 1874	Dr. H. C. Yarrow.

4. FORMICA INTEGRA, Nyl.

Formica integra, NYL., Ann. Sc. Nat., F. iv, ser. v, §.—MAYR, Neue Form., 951.

Connecticut and New York.

No.	Locality.	Date.	Collector.
271 B	Pagosa, Colo.	Sept. 18, 1874	Dr. H. C. Yarrow.
A 184 C	Roaring Fork, Colo.	Aug. —, 1872	Dr. J. T. Rothrock.

5. FORMICA RUFIBARBIS, F., ♀.

Formica rufibarbis, FABR., Ent. Syst., ii, 1792, 355, ♀.

Formica cunicularia, LATR., Hist. N. Fourm., 1798, 151.—MAYR, Neue Form., 1870, 951.

Formica obsoleta, LATR., Ess. Hist. Fourm. Fr. 38.

Formica pratensis, OL., Encyc. Méth., vi, 504.

Formica nicæensis, LEACH, Vigor's Zoöl. Jour., 1825, ii, 289!

Formica stenoptera, FÖRST., Hym. Stud., i, 26, §, ♀.

Europe, Northern Asia, and Connecticut (Mayr).

No.	Locality.	Date.	Collector.
L 21	Abiquiu, N. Mex.	—, 1874	Dr. O. Loew.
160 B	San Ildefonso, N. Mex.	—, 1874	Dr. H. C. Yarrow.

6. FORMICA SCHAUFUSSI, Mayr.

Formica schaufussi, MAYR, Myrm. Beitr., 1866.—MAYR, Neue Form., 1870, 951.

New Jersey.

No.	Locality.	Date.	Collector.
L 37	New Mexico	—, 1874	Dr. H. C. Yarrow.

7. FORMICA TRUNCICOLA, Nyl., var. OBSCURIVENTRIS, Mayr.

Formica truncicola, NYL., Adn. Mon. Form., 907.

Formica truncorum, FABR., Syst. Piez., 403, §.

North and Middle Europe, Piedmont, and Spain.

Var. *obscuriventris*, MAYR, Neue Formic., 1870, 951.

Connecticut.

No.	Locality.	Date.	Collector.
L 21	Abiquiu, N. Mex.	—, 1874	Dr. O. Loew.
165 A	Pueblo, Colo.	—, 1874	C. E. Aiken.
374 A	Fort Garland, Colo.	—, 1874	F. Klett.
L 1	New Mexico.	—, 1874	Dr. O. Loew.
197 K	San Luis, Colo.	—, 1872	Dr. J. T. Rothrock.

This may be considered the American variety of *F. truncicola*.

CATAGLYPHIS, Först.

Cataglyphis, FÖRST., Verh. Naturh. v. Rheinl., vii, 1850, 485.

Monocombus, MAYR, Form. Austr., 1861, 109.

Myrmecocystus, WESM., Bull. Acad. Rog. Brux., 1838, 764.

1. CATAGLYPHIS MELLIGERA, Llave.

Cataglyphis melligera, LLAVE, Rog. Berl. Ent. Z., 1862, 254.—MAYR, Myrm. Stud., 701, 1862.

Formica melligera, LLAVE, Reg. Mem. Hist., 1832.

Myrmecocystus mexicanus, WESM., Bull. Ac. R. Brux., 1838, 766, ♀.

Myrmecocystus melligerus, LUC., Rev. Mag. Zoöl., 1860, 269.

Mexico and Texas.

No.	Locality.	Date.	Collector.
X Y	Santa Fé, N. Mex.	—, 1872	T. Collins.
L 37	New Mexico.	—, 1874	Dr. O. Loew.

This is the famous honey producing ant of Mexico.

5. Subfamily MYRMICIDAE.

DORYMYRMEX, Mayr.

Dorymyrmex, MAYR, Formic. Nov. Amer., 1868, 7.

1. DORYMYRMEX PYRAMICUS, Rog.

Prenolepis pyramica, ROG., Ber. Ent. Zeit., 1863, sp. 42, ♀, 160.

Brazil, Bahia, and Corrientes.

No.	Locality.	Date.	Collector.
153 E	Plaza del Alcade, N. Mex.	Aug., 1874	Dr. H. C. Yarrow.

POGONOMYRMEX, Mayr.*Pogonomyrmex*, MAYR, Formic. Nov. Amer., 1868, 11.**1. POGONOMYRMEX BARBATUS, Smith.***Myrmica barbata*, SMITH, Brit. Mus. Cat., 125.*Pogonomyrmex barbatus*, MAYR, Neue Formic., 1870, 971, 7, ♀.

Mexico and Texas.

No.	Locality.	Date.	Collector.
1299	Southern Arizona	—, 1874	H. W. Henshaw.
L 1	New Mexico	—, 1874	Dr. O. Loew.
L 67	Santa Fé, N. Mex.	—, 1874	Dr. O. Loew.
L 68	Santa Fé, N. Mex.	—, 1874	Dr. O. Loew.
318	Bowie Agency, Ariz.	—, 1874	Henry Johnson.

2. POGONOMYRMEX OPACICEPS, Mayr.*Pogonomyrmex opaciceps*, MAYR, Neue Formic., 1870, 971, ♀.

New Mexico.

No.	Locality.	Date.	Collector.
A 197 B	San Luis Valley, Colo.	Sept., 1872	Dr. J. T. Rothrock.
14 K	Colorado	—, 1872	Do.
L 97	New Mexico	—, 1874	Dr. O. Loew.
104 E	San Ildefonso, N. Mex.	—, 1874	Dr. H. C. Yarrow.
160 B	San Ildefonso, N. Mex.	—, 1874	Do.

3. POGONOMYRMEX ———!, *sp. nov.*

No.	Locality.	Date.	Collector.
L 9	New Mexico	—, 1874	W. D. Wheeler.

4. POGONOMYRMEX ———!, *sp. nov.*

No.	Locality.	Date.	Collector.
247 C	New Mexico	—, 1874	Dr. H. C. Yarrow.

APHAENOGASTER, Mayr.*Aphaenogaster*, MAYR, Verh. z.-b. V., 1853, 107, 87, REISE, Freg. Novara., 1865, 19.**1. APHAENOGASTER ——— !, *sp. nov.***

No.	Locality.	Date.	Collector.
1015 C	Camp Hall.....	Oct. 17, 1874	Jas. M. Rutter.

CHAPTER VIII.

REPORT

UPON

THE COLLECTIONS OF DIURNAL LEPIDOPTERA

MADE IN PORTIONS OF

COLORADO, UTAH, NEW MEXICO, AND ARIZONA,

DURING

THE YEARS 1871, 1872, 1873, AND 1874,

WITH NOTES UPON ALL SPECIES KNOWN TO INHABIT COLORADO.

BY

THEODORE L. MEAD;

AND A LIST OF ALL SPECIES COLLECTED,

BY

W. H. EDWARDS.

CHAPTER VIII.

The following notes upon the distribution of these butterflies have been largely made out from data furnished by Dr. H. C. Yarrow, of the expedition. The observations upon the Colorado species were made by me during the summer of 1871.

My thanks are due to Henry Edwards, esq., of San Francisco, for notes upon some species whose habits were unknown to me. These will be found under the headings of the respective species.

All the *Diurnal Lepidoptera* taken by the expedition were confided to W. H. Edwards, esq., of Coalburgh, W. Va., for determination; and his original descriptions of the new species discovered by the expedition have been introduced in their appropriate places in this report. Descriptions by the same author of one or two other species have been reprinted here where there were special reasons for it; but it was not thought necessary to give descriptions of all, since much the larger number are contained in the proceedings of two or three societies, which are readily accessible to most entomologists who would be likely to possess Rocky Mountain butterflies.

In regard to the synonymy, only those names have been given concerning which any doubt is likely to arise, since synonyms which have been entirely disused for half a century or more would uselessly encumber the pages of any work, except a mere synonymic list, the more so as the entomological world now displays such activity in the production of books of this latter class.

The reference immediately following the name of the species is to the best description or figure readily accessible to American students.

One hundred and twenty-one species are now known to inhabit Colorado; in 1867, but seventy-two were recorded as from the Rocky Mountains.

For convenience of reference, a sign (+) is prefixed to species not known to be found in Colorado.

PAPILIO, (Linn.) Latr.

PAPILIO ZOLICAON, Boisd.

Papilio Zolicaon, STRECKER, "Lepidoptera," pl. 6.—MORRIS, Syn. Am. Lep., 4.

In Colorado, *Zolicaon* appears two or three weeks later than the other Papilios. It inhabits all the mountainous parts of the Territory, was brought by the expedition from Southern Utah, and occurs westward to the Pacific Ocean.

This species may be at once separated from *P. Machaon*, or its variety, *Aliaska*, by the pupillated ocellus at the anal angle of secondaries.

PAPILIO ASTERIAS, Drury.

Papilio Asterias, HARRIS, Insects Injurious to Vegetation.

Papilio Polyxenes (obsolete), KIRBY, Cat. Di. Lep., 1871.

A. Polyxenes, SCUD., Syn. List., 1875.

This butterfly occurs rarely in Colorado, New Mexico, and California; eastward becoming more abundant. I have not found the species at elevations greater than 7,500 feet. Its time of flight is June and July.

†PAPILIO BAIRDII, Edw.

Papilio Bairdii, EDW., Proc. Ent. Soc. Phila., 1866.

Allied to *Asterias*; primaries more produced and narrower, and secondaries more rounded than in that species.

Male.—Expands four inches; upper side black; both wings crossed by yellow bands as in *Asterias*, the spots being similarly shaped, but larger than in that species, and fading gradually into the black ground on the inner side; at the anal angle a rounder black spot within a spot that is fulvous above, yellow below. There is no trace of blue between the yellow bands on secondaries, as there is in *Asterias*.

Under side black; marked as above, the yellow paler; the end of the cell on primaries a little yellow; the outer ends only of the spots beyond the cell on secondaries very slightly fulvous; each of the black spaces between the yellow bands on secondaries a little sprinkled with blue scales.

Body black; shoulders brown-yellow; two dorsal and a lateral row of yellow spots on the abdomen.—*Edwards, l. c.*

This species belongs to the group of Papilios, of which *Machaon* is the type, and is one of a number of forms closely related to *Asterias*, and probably derived from that species. All of these are characterized by the spotted abdomen; that of *Machaon* is banded. The larvæ of the whole group feed on umbelliferous plants. *P. Bairdii* is still excessively rare in collections. A single specimen, the original type, was brought from Arizona in 1865, and the expedition took specimens in New Mexico in 1871, and in Arizona in 1873.

† PAPILIO PILUMNUS, Boisd.

Papilio Pilumnus, STRECKER, Illustrations of Lepidoptera, 1873.

This species was taken by the expedition in 1871. It occurs in New Mexico and southward.

PAPILIO TURNUS, Linn.

This common eastern species has occasionally been found in the Rocky Mountains, which seem to be the limit of its westward range.

PAPILIO RUTULUS, Boisd.

Papilio Rutulus, EDW., Butterflies N. A., ii.—REAKIRT, Proc. Ent. Soc. Phila., 1866.

This species is very closely allied to *P. Turnus*. The only constant distinction seems to be that in *Rutulus* the submarginal ray on the under side of secondaries is continuous; in *Turnus* it is broken up into distinct spots. No melanized females of this species are known. All the specimens have rather elongated hind wings, as is the case with New England specimens of *Turnus*. The female is not so heavily marked with blue on the secondaries as in the latter species, but occasional specimens from the Eastern States approach very closely in marking to the normal female of *Rutulus*.

Rutulus was brought by the expedition from Southern Utah; is taken in Colorado in the month of June, there frequenting open woods and hill-sides where flowers are abundant. It is common in California. In Colorado, there is no second brood of *Papilio*.

PAPILIO DAUNUS, Bois.

Papilio Daunus, EDW., Butterflies N. A., ii.—RIDINGS, Proc. Ent. Soc. Phila., 1862.—STRECKER, "Lepidoptera."

This species may be at once distinguished from others nearly allied by

the narrow black markings, strongly arched primaries, and the three long tails of the secondaries.

Though apparently a mountain species in Colorado, it rarely occurs far above 7,500 feet elevation. It is an exceedingly rapid flier. The species has not been recorded from any locality north of Colorado. It was taken by the expedition in Southern Utah, and is known to range southward into Mexico. The Mexican specimens are more brightly colored, and are much larger than those found farther north. In Colorado, the species does not usually exceed four inches in expanse; those from Mexico sometimes measure five and one-half inches.

In Colorado, the species should be looked for during the month of June.

PAPILIO EURYMEDON, Boisd.

This species I have taken in the mountains of Colorado at 7,500 feet elevation; the species resembles *Rutulus*, but is easily distinguished by its pale ground color. On the Pacific slope, it occurs as far north as Washington Territory.

PARNASSIUS, Latr.

PARNASSIUS SMINTHEUS, Doubleday.

Parnassius Smintheus, EDW., Butterflies N. A., i.

Parnassius Delius, var., auct.

Parnassius Phæbus, var., KIRBY, Cat.

Parnassius Smintheus was brought by the expedition from Gray's Peaks, Colorado, and from the mountains of Southern Utah. It is found throughout the Rocky Mountain region, and a single specimen has been taken near the Yosemite Valley, California, where, however, *Clodius*, as a rule, takes its place. In Colorado, the species is abundant from the first foothills to the highest peaks. At moderate elevations, the first specimens come from chrysalis in May, and are seen flying or sucking the nectar from flowers of a common species of *Sedum* before their wings have thoroughly stiffened. Two or three weeks later, the females begin to appear; they are more heavily dusted with gray than the males, and at the highest elevations are often very dark, almost black, and smaller. Probably this darker color, harmonizing with the rocks and lichens, serves as a protection to the females, which is less needed by individuals inhabiting lower and more fertile local-

ities, where they can better conceal themselves in the herbage for the night, and where the general color given by the vegetation is more brown than black.

At the higher elevations the species appears later in the season, and at 12,000 feet may be found until the last of August.

The eggs are laid on *Sedum*; in shape they are flattened spheres, above with a small conical depression, in the center of which is the micropyle. The egg is chalky-white, and to the naked eye seems covered with little granulations, except a smooth round spot below, which is the surface of attachment to the plant.

The eggs do not hatch until the following spring, when a hole is eaten through the side of the egg by the larvæ. At first these are black, with a few bristling hairs. The adult caterpillar is not known, but probably resembles that of allied European species in being smooth and nearly black, with orange dots.

† PARNASSIUS CLODIUS, Ménétriés.

Parnassius Clodius, EDW., Butterflies N. A., i.

This species was brought by the expedition from Southern Utah; specimens have been taken in Montana, but the proper home of the species seems to be nearer the Pacific coast. It has not been found in Colorado.

NEOPHASIA, Behr.

NEOPHASIA MENAPIA, Felder.

Neophasia Menapia, EDW., Butterflies N. A., i.

This western species was taken in some numbers in Colorado by the Allen expedition of 1871. They were found early in August, but the precise locality I do not know. Colorado specimens have the outer half of costal margin of secondaries tinged with vermilion *in the male*. This, I believe, is not shown by Californian examples.

The larva is unknown. I copy the following description of the chrysalis of *N. Menapia*, from a very interesting paper by Henry Edwards, esq., on the Early Stages of Pacific Coast Lepidoptera, published in the Proceedings of the California Academy of Science for 1873:—

“*Chrysalis*.—Very long and tubular, with the beak sharply pointed;

slightly thickened toward base of abdomen. A small ridge-like protuberance on the thorax, and a smaller one near the head. Color immediately after change pale yellowish-green, with three narrow dorsal stripes silvery white. The lateral stripes inclosing the stigmata are a little broader, and bent upward anteriorly. Stigmata brownish. The neuration of the wings is plainly seen, and at their base is a well defined black spot. Toward the period of emergence, the chrysalis loses its bright-green color, and becomes of a dark-olive hue, almost black above; the silvery tone of the stripes changing to dirty white, the coloration of the wings and various organs being more distinctly seen. The chrysalis is attached to the trunks of pine and fir trees, with the head invariably directed upward, and to the fronds of *Pteris*, with the head always toward the point of the frond.

“Length, 0.80 inch; width, 0.15 inch.

“I was fortunate enough to discover the chrysalis of this highly interesting species during a recent trip to Vancouver Island, but the most diligent search did not reward me with the caterpillar. It doubtless feeds upon the Douglas spruce fir (*Abies Douglasii*), and should be sought for in the early part of July.”

PIERIS, Schrank.

PIERIS OLERACEA, Boisd.

Pieris Oleracea, HARRIS, Insects Injurious to Vegetation, 1862.

P. Oleracea I met with first near Fairplay (elevation 10,000 feet), June 12, where they were not uncommon at the edges of the woods. The specimens were fresh from chrysalis, and nearly pure white below. Later in June they were seen in most places where collections were made, though not in very great numbers; the species disappeared entirely by the last of July, and there is no second brood.

PIERIS PROTODICE, Boisd.

Pieris Protodice, RILEY, Am. Ent., ii, 77.

This species occurs everywhere in Colorado below timber line, and remains nearly all summer. Specimens were brought by the expedition from Arizona, and it is known to occur in California.

PIERIS VERNALIS, Edw.

Pieris Vernalis, EDW., Butterflies N. A., i.

P. Vernalis has been found in company with *Protodice* and *Occidentalis* in the mountains of Colorado; it is widely distributed, and as yet little is known of its habits. Usually it is only seen in early spring; but my friend, Mr. G. M. Dodge, late in autumn captured a single male near Princeton, Ill.

PIERIS OCCIDENTALIS, Reakirt.

Pieris Occidentalis, REAKIRT, Proc. Ent. Soc. Phila., 1866.

Pieris Callidice, var., STAUDINGER *in litt.*

This species was brought by the expedition from Southern Utah; its range commences near the Rocky Mountains, and extends to the Pacific Ocean. In Colorado, it is found on the plains as well as at considerable elevations, and remains from May till August.

†PIERIS BECKERII, Edw.

Pieris Beckerii, EDW., Butterflies N. A., i.

Pieris Chloridice, var., ZELLER.

Primaries produced apically; slightly excavated on costal and hind margins.

Male.—Expands two inches. Upper side pure white; the texture of the secondaries slighter than that of the primaries, discovering the spots of under surface; base of wings not powdered with black, as in allied species; primaries have the apical half of hind margin bordered by small black patches or clusters of scales, diminishing in size to middle of margin; anterior to these, two similar subapical patches, and a third in upper median interspace; on the arc a dense subrectangular spot (not reaching the costa) with a central white streak; secondaries immaculate. Fringes white, except against the apical spots; there black.

Under side white; the nervules at apex and on upper hind margin bordered by black scales and suffused with greenish-yellow; the spot on interspace black as on upper side; cellular spot enlarged, its base broadened and the posterior edge excavated.

Secondaries have all the nervures and their branches yellow; those

terminating on hind margin edged by broad bands of yellow-green, reaching to the middle of disk, and connected anteriorly; three large spots of same color about the cell, two being at the outer angles, and one above and reaching the costa; another large triangular subapical spot on costa; the nervures at base also banded with green; all these bands and spots slightly sprinkled with black scales.

Body above covered with gray hairs; beneath, abdomen yellowish; thorax white; legs white; palpi white, gray on upper side and at tip; antennæ white above and at base below, beyond brown; club black, nearly covered with rows of white scales; tip pale fulvous.

Female.—Expands two inches. Primaries less produced and broader than in male; same shade of color; the marginal spots enlarged and extended to second branch of median; in addition to the three submarginal spots, which are also enlarged, is another in submedian interspace, and a streak below this along inner margin; the cellular spot much enlarged, rhomboidal, with slight central streak; secondaries have a patch on costa, and four on the marginal nervules commencing at and posterior to subcostal; also an interrupted submarginal stripe opposite cell, posteriorly indistinct; under side as in male, except that a round black spot appears in submedian interspace on primaries.—*Edwards, l. c.*

This species has recently been asserted to be identical with *Chloridice* of Europe; but this seems to me extremely doubtful, since the same thing has been lately maintained regarding *P. Occidentalis* and *Callidice*, and even *Grapta Faunus*, *Satyrus*, and *Comma* have been called varieties of *C. Album*; all these species being abundantly distinct.

P. Beckerii was found by the expedition in Southern Utah. Regarding its habits, Mr. Henry Edwards, its discoverer, writes as follows:

“This beautiful species, characterized by Mr. W. H. Edwards as the finest of the North American *Pierides*, appears to be extremely limited in its range; the only locality at present known by me being the neighborhood of Virginia City, Nev. It is an early insect, being seen on the wing, if the weather be favorable, somewhere about the 10th of April, disappearing toward the close of May. It is a rapid flier, and is taken with great difficulty. The best time for its capture is in the early morning, when it

alights frequently on the flowers of the wild mustard and other cruciferous plants; but as soon as the sun is well up, it darts away on prolonged flights, and is rarely seen by the collector.

“I observed it once in the vicinity of Washoe Lake, Nevada, in some numbers, but the day was warm, and the insects extremely wild. Nothing is known at present of the earlier stages.”

NATHALIS, Boisd.

NATHALIS IOLE, Boisd.

Nathalis Irene, FITCH, 3d N. Y. Rep.

N. Iole is found throughout the Southwestern States and in Colorado. Specimens were also brought by the expedition from Utah, the most western point from which the species has been recorded. In Colorado, at 7,500 feet elevation, the species was met with about the 20th of June; and a few days later one or two were seen in the South Park. It is not uncommon in the mountains, like several other species which at the East are rarely found north of the cotton States, although, even in New England, they would hardly be subjected to as great or such continued extremes of cold as in these parts of Colorado. *D. Berenice* and *E. Claudia* are similar examples. A partial explanation might be found in the supposition that some bird which preys upon them or their larvæ at the East may be absent in the Rocky Mountains, though, as all birds reject the *Danaidæ*, this will not explain the occurrence of *Berenice*.

ANTHOCHARIS, Boisd.

ANTHOCHARIS AUSONIDES, Boisd.

Anthocaris Ausonides, EDW., Proc. Ent. Soc. Phila., 1863.

Anthocaris Ausonoides, auct. Amer.

Taken by the expedition in Colorado, where, in June, it is quite abundant throughout the mountain district, and may then be seen depositing its eggs upon wild *Cruciferae*. The larva is yellow, striped longitudinally with lead color, and dotted with black granulations; it attains its growth early in July, and changes to a curiously horned chrysalis, pale brownish in color, with a darker lateral line. The chrysalis tapers gradu-

ally and almost equally toward either extremity, and at first glance much resembles a curled and withered leaf.

The pupa state is assumed early in July; the perfect insect escapes the following season.

A. Ausonides is also found in California, where the specimens are usually larger and the females often have the secondaries suffused with a pale-yellow or creamy tint, rarely seen in Rocky Mountain specimens.

ANTHOCHARIS CREUSA, Doubleday.

A. Creusa from Colorado very closely resembles the preceding species; the difference mainly consisting in the greater amount and darker shade of the green on the lower surface of secondaries. *Creusa* seems to be confined to the Rocky Mountains.

ANTHOCHARIS JULIA, Edw.

Anthocaris Julia, Edw., Proc. Am. Ent. Soc., 1872.

This species has only been taken near Fairplay, South Park, Colo., where I found a number of specimens, June 12 to 14, in the woods and on the banks of Beaver Creek. It is the Rocky Mountain representative of the two Californian species *Sara* and *Reakirtii*.

COLIAS, (Fabr.) Leach.

COLIAS EURYTHEME, Boisd., and COLIAS KEEWAYDIN, Edw.

Colias Eurytheme and *Colias Keewaydin*, Edw., Butterflies N. A., i.

Both species were taken by the expedition. They range from the Mississippi Valley to the Pacific Ocean, and from the level of the sea to upward of ten thousand feet elevation. They are abundant from early spring until frost. Above eleven thousand feet, they are rarely found in Colorado; in fact, the usual American types are there almost entirely replaced by Arctic species, a considerable proportion of which are common to both hemispheres.

COLIAS PHILODICE, Godart.

This is not so abundant in Colorado as either of the preceding species. Most of the specimens were taken in June. Some of them exactly resemble eastern specimens; others are paler, and have a somewhat greenish tint on both surfaces.

COLIAS ALEXANDRA, Edw.

Colias Alexandra, EDW., Butterflies N. A., i.

This species was brought from the South Park, Colorado, by the expedition in 1873. The species appears about the middle of June, and for a time is abundant on all the headwaters of the Platte. Occasionally it may be taken on the Upper Arkansas, though there it is largely replaced by *C. Scudderii*.

The eggs are deposited on wild lupines, and the young larva closely resembles that of *Philodice*. By the last of August, the species has quite disappeared. There is but one brood in the season.

†COLIAS EDWARDSII, Behr.

Colias Edwardsii, EDW., Butterflies N. A., i.

Specimens were taken by the expedition at Owen's Lake, California. Concerning the species, Mr. Henry Edwards writes as follows:

"How far this may be found in a long series to differ from *C. Alexandra*, I am unable to determine at present. It may probably prove to be an extreme variety. It is only known to me from Virginia City, Nev., where it frequents the sides of mountains, flying with great rapidity, and evidently delighting in long and restless flights. It makes its first appearance about the beginning of April, and continues on the wing to the end of June. It is decidedly a rare insect."

COLIAS SCUDDERII, Reakirt.

Colias Scudderii, EDW., Butterflies N. A., i.

C. Scudderii was found by the expedition at Twin Lakes, Colorado, where it is not uncommon in July, appearing a little later than *Alexandra*. Nearly all the females of *Scudderii* are albinos, while in *Alexandra* white females are the rare exception.

A female, *C. Scudderii*, apparently mature, was inclosed in a box with dwarf lupines, but refused to lay eggs, although *Alexandra* laid freely upon the same. This would indicate that the species have different food plants, though of course the experiment is not conclusive.

COLIAS MEADII, Edw.

Colias Meadii, EDW., Butterflies N. A., i.

C. Meadii was first met with on the Arkansas divide, between Fairplay and California Gulch, Colorado, on the 8th of July. In the same locality, two weeks later, it was especially abundant, and thirty-four specimens were taken. Others were found on Mount Lincoln and Gray's Peaks. It is a strictly alpine insect, being scarcely ever found as low as 10,000 feet above the sea, and having its proper home just at timber line, or a little above. It disappears about the middle of August. In the Arctic regions of Europe and America, a species (*C. Hecla*) is found, resembling this in color and marking, but differing structurally; and Dr. Staudinger informs me that a very similar species is met with at high elevations in the Himalayahs.

TERIAS, Swain.

†TERIAS NICIPPE, Cramer.

This, unlike many other southern forms, does not seem to range northward in the Rocky Mountains. Specimens were taken by the expedition in Arizona; and it is recorded from San Diego, Cal.

DANAIS, (Latr.) Godart.

DANAIS ARCHIPPUS, Cramer.

Danais Erippus (obsolete), KIRBY, Syn. Cat.

Danais Plexippus (obsolete), SCUD., Syn. List, 1875.

Abundant everywhere in the Rocky Mountains below timber line.

DANAIS BERENICE, Cramer.

Danais Gilippus, SMITH-ABB., KIRBY, Cat.

Taken by the expedition in Southern Utah. In Colorado, this species is rare; one specimen was seen near Georgetown. It should be looked for early in August.

EUPTOIETA, Doubleday.

EUPTOIETA CLAUDIA, Cramer.

Argynnis Columbina, MORRIS, Syn. Lept. N. A.

Brought by the expedition from Arizona and Colorado. The species may be found among the foot-hills of the Rocky Mountains in May, and

soon becomes very abundant throughout the whole region. The specimens are quite similar to those of the Southern States, though perhaps a shade paler below. During July, the eggs are laid upon a species of *Sedum*; in some localities, on almost every little clump of the plant one or several eggs of *Claudia*, with occasionally one of *P. Smintheus*, may be found.

The eggs soon hatch, but the season is so short that in all probability the larvæ hibernate when half grown. The mature larva is dark reddish-brown, with steel-blue spines; the skin is highly polished, seeming to have a glaze like that of some stone ware. The chrysalis somewhat resembles that of *Melitæa*; it is pale-gray, with some yellow dots.

ARGYNNIS, Fabr.

† ARGYNNIS NOKOMIS, Edw.

PLATE XXXV, FIGS. 1, 2, 3, 4.

Argynnis Nokomis, EDW., Butterflies N. A., i.

Specimens of this magnificent insect were brought by the expedition from Arizona in 1871. Until that time but a single male was known—from the Bitter Root Mountains of Montana.

† ARGYNNIS NITOCRIS, Edw.

Argynnis Nitocris, EDW., Trans. Am. Ent. Soc., v.

Male.—Expands three inches. Upper side bright fulvous, much obscured by brown from base to middle of disk, except upon a portion of cell of primaries; both wings edged by two parallel, fine, black lines, which, on secondaries, inclose a rather broad fulvous space, on primaries a narrower space, divided by the black nervules; anterior to these lines on primaries a series of black lanceolate spots, the three or four next apex connected and resting upon the inner line, the others separated and not touching the line. On secondaries, a series of lunular separated spots; the rounded, extradiscal spots, as in *Nokomis*; small on secondaries, rather large on primaries. The markings on disk and to base as in *Nokomis*, heavy on primaries, light on secondaries; the discal band on the latter broken into small, separate lunules. The spot on the arc like the letter S. Fringe of secondaries light-fulvous; of primaries deep-fulvous. Black at tips of nervules.

Under side of primaries cinnamon-red from base to hind margin, and over entire wing, except a small subapical space across the subcostal nervules, which is bright ochraceous-yellow, and a brown patch just anterior to this on costal margin. The black markings repeated. The five lanceolate spots next apex inclosing silver lunules. Three silver spots on the brown costal patch, one of them minute.

Secondaries deep ferruginous from base to outer edge of the second row of spots; between this and the outer row a clear space, as in *Cybele*, bright ochraceous-yellow. The seven submarginal spots narrow segments of circles, edged above with ferruginous; the second row seven, rather small; the first, second, and sixth equal, subrotund; the third and fifth long oval; the fourth minute, and seventh sublunate; all heavily edged above with black. The third row of three large spots, the first and third sublunate, the second rounded, edged above with black. In cell a round spot, and below cell an oval, both ringed with black; all these spots well silvered; a silver patch at base of cell, and another at base of subcostal. Shoulder and abdominal margin lightly silvered.

Body above fulvous; beneath fulvous, with buff and gray hairs; legs fulvous; palpi fulvous, buff at sides; antennæ fuscous above, fulvous below; club black; tip fulvous.

Female.—Unknown.

From one male taken at White Mountains, Arizona, by H. W. Henshaw, August, 1873.—*Edwards, l. c.*

ARGYNNIS APHRODITE, Fabr.

Argynnis Aphrodite, EDW., Butterflies N. A., i.

This species was taken by the expedition in Arizona, and occurs also in Colorado, though it is very rare. These far western specimens differ considerably from the usual eastern type in being of a deeper hue; the males especially being darker red-brown below.

†ARGYNNIS NAUSICAA, Edw.

Argynnis Nausicaa, EDW., Trans. Am. Ent. Soc., v.

Male.—Expands 2.5 inches. Primaries strongly arched, moderately produced; hind margin straight.

Upper side deep-red fulvous on primaries, brightest on outer limb of secondaries, much obscured on basal area of each wing, but especially on secondaries, the dark portion reaching quite to the mesial band; hind margins edged by two heavy parallel lines, inclosing very narrow fulvous spaces throughout, divided by the black nervules; the submarginal lunules large, not touching the marginal lines, and inclosing spots of the ground color, except at apex of primaries, where they are paler; the rounded spots large; the mesial band heavy, confluent on secondaries; the marks in cell of primaries as in the allied species; on disk of secondaries a mark like the letter C inverted; fringes fulvous, fuscous at ends of nervules.

Under side of primaries almost wholly cinnamon-red, there being but a ferruginous patch near apex and buff in the middle of the subcostal interspaces; the markings repeated; the submarginal lunules black, the upper ones edged above by buff; the four or five inclosed spots next apex lightly silvered. Secondaries dark ferruginous, mottled very slightly with buff; the band between the two outer rows of spots clear buff, narrow, much encroached on by the ground color; all the spots well silvered; those of the outer row long, narrow next inner angle, lunular, and broad on the upper half of the wing, all edged anteriorly by ferruginous; of the second row, the first and fifth are largest and equal, long semi-oval, the sixth same shape, one-half the size of the fifth; the second and third equal, long, and narrow; the fourth minute; the seventh sublunate, all edged anteriorly by black; the third row of three spots sublunate, edged with black, in the cell two round spots, and below cell an oval, all ringed with black; a silver spot in subcostal interspace; the shoulder and inner margin lightly silvered.

Body dark fulvous, beneath gray fulvous on thorax; the abdomen buff; legs buff; palpi buff at sides, fulvous in front and at tip; antennæ fuscous above, fulvous below; club black; tip ferruginous.

Female.—Same size. Upper side deep fulvous, less obscured at base; the marginal lines on primaries confluent, and the lunules large, resting on the lines; the inclosed spots whitish next apex.

Under side of primaries as in the male, except that the upper outer part of cell is buff as well as the subcostal interspaces; on the ferruginous

patch a silver spot; the upper submarginal spots well silvered; secondaries more decidedly mottled with buff; the band still narrower.

From 2 ♂, 1 ♀, taken by H. W. Henshaw, August 21, 1874, at Rocky Cañon, Arizona.—*Edwards, l. c.*

ARGYNNIS HALCYONE, Edw.

Argynnis Halcyone, EDW., Butterflies N. A., i.

This species was found here and there toward the southern border of the South Park, Colorado. A worn female probably of this species was taken near Cañon City, September 20, though two weeks before the frost had put an end to all collecting in the mountains and South Park.

ARGYNNIS ATLANTIS, Edw.

Argynnis Atlantis, EDW., Butterflies N. A., i.

A few *Atlantis* were taken at 7,500 and 8,000 feet elevation in Colorado during June and July, both in the Platte and Arkansas valleys. This species emits a powerful musky odor when pinned, a peculiarity not noticed, so far as I am aware, in others of the genus.

ARGYNNIS HESPERIS, Edw.

Argynnis Hesperis, EDW., Butterflies N. A., i.

A. Hesperis appears at 7,500 feet elevation in Colorado during the latter part of June; the males much frequenting muddy spots in the road. They are very wary and difficult to catch in such situations, though after an alarm they frequently return to the same spot in the course of a few minutes. Farther up the mountain side, both sexes may be taken at flowers, especially those of the Horse-mint (*Monarda*). It was found sparingly near Fairplay, at Twin Lakes, and not far from the Middle Park, on the Georgetown road; but Turkey Creek Junction seemed to be the only locality where the species occurred in any number.

ARGYNNIS EDWARDSII, Reakirt.

Argynnis Edwardsii, EDW., Butterflies N. A., i.

In Colorado, this species is quite abundant, even on the plains in the immediate vicinity of water courses. Near Denver, on the banks of the Platte, it appears in the latter part of May. It is found also in the mount-

ains at all elevations up to timber line, and continues on the wing till late in August. Like many other *Argynnides*, the species becomes very scarce after its first appearance; in August suddenly re-appearing, the females seeming fresh though never quite perfect, while the males are old and worn.

At this time, the females begin to lay their eggs, and do not finally disappear until killed by the September frosts.

†ARGYNNIS NEVADENSIS, Edw.

Argynnis Nevadensis, EDW., Butterflies N. A., i.

This species seems to represent *A. Edwardsii* on the Pacific slope of the Rocky Mountains. It was originally discovered by Mr. Henry Edwards near Virginia City, Nev., and subsequently brought by the expedition from Southern Utah.

ARGYNNIS MEADII, Edw.

Argynnis Meadii, EDW., Trans. Am. Ent. Soc., 1872.

One specimen of this species was taken by me in Colorado at Turkey Creek Junction on the 6th of June. Several specimens have been brought from Montana.

The three closely allied species, *Edwardsii*, *Nevadensis*, and *Meadii*, seem to be related to each other in very much the same way as the eastern *Aphrodite*, *Cybele*, and *Atlantis*. In *Edwardsii*, the pale submarginal band below is narrower and sometimes almost obsolete, as in *Aphrodite*, and it ranges up to greater elevations than *Nevadensis*, which has this band comparatively broad in both sexes, as we see in *Cybele*. *Meadii* differs from either in tint, especially in the female; it is somewhat smaller, and probably, like *Atlantis*, is exclusively confined to the mountains. The peculiar bright-green coloration of the under side of secondaries in *Meadii*, however, has no parallel among our fritillaries.

ARGYNNIS EURYNOME, Edw.

Argynnis Eurynome, EDW., Trans. Am. Ent. Soc., 1872.

A. Eurynome was brought by the expedition from Twin Lakes, 1873. I found my first specimens, July 6, at Fairplay. After this, the species became quite abundant. It was taken in all parts of the South Park, on the Continental Divide, and in the Middle Park. A single specimen was

taken in California Gulch, which showed no trace of the usual silvering on the under side.

A female was placed in an ordinary tin vegetable can containing violet plants, and top covered by a cloth. Numerous eggs were obtained. These are more rounded than those of *Atlantis*, and their marking is more delicate.

ARGYNNIS MYRINA, Cramer.

Argynnis Myrina, HARRIS, Insects Injurious to Vegetation.

A few specimens were found in the Middle Park, Colorado, early in August. The species is said to occur in California.

ARGYNNIS BELLONA, Fabr.

Argynnis Bellona, HARRIS, Insects Injurious to Vegetation.

A single specimen, fresh from chrysalis, was taken near the Hot Springs, Middle Park, August 14.

The larva of *Bellona* resembles more closely that of *Cybele* than that of *Myrina*, thus affording additional evidence of the artificial character of the genus *Brenthis* erected to contain these smaller *Argynnides*.

ARGYNNIS EPITHORE, Boisd.

Argynnis Epithore, EDW., Proc. Ent. Soc. Phila., 1864.

Specimens from Colorado differ from Pacific coast individuals in having the dark markings of the upper side coalescent toward the base; below, the secondaries are darker purple, and show slight differences in the arrangement of the median band of spots. In Colorado, the species frequents the same localities as *A. Freya*, and has similar habits, but appears from one to two weeks later in the season, disappearing about the last of June. Both were found on Beaver Creek, near Fairplay, and near the Kenosha House, four miles from the South Park; elevation, 9,000 feet.

ARGYNNIS FREYA, Thunberg.

Argynnis Freya, GODART, Encyc. Méth. IX.,

A. Freya occurs in Arctic Europe, Labrador, and Colorado. It is first to appear of the small species of *Argynnis*. In May, or early in June, it may be found in some numbers near the South Park.

The small mountain streams in Colorado often widen and form swampy belts, perhaps fifty yards in width, overgrown with willows, grass, and herbage; violet plants are also abundant. Such boggy places are the favored resort of these butterflies. They often alight on the bushes and also on flowers, when alarmed flying up like some moth. Their wings move rapidly, and in this respect almost remind one of *Alypia*. The species almost entirely disappears by the 20th of June.

ARGYNNIS TRICLARIS, Hübner.

Argynnis Triclaris, HÜBNER, Exotische Schmetterlinge.

The first specimens of this species were taken near the Kenosha House, June 29, but it was found more abundantly near Fairplay.

The species has been considered a mere Arctic variety of a European species (*A. Aphirape*, Hübner), but all the Colorado specimens show great uniformity of marking; and the asserted existence of intergrades upon the continent of Europe cannot affect the status of our species, though perhaps furnishing an indication of the origin of the European form, as it would seem probable that the widely distributed and hardy *Triclaris* may be the parent species.

The last specimen of *Triclaris* was taken in the Arkansas Valley, July 14; the species seems to be rather local, though abundant near Fairplay.

ARGYNNIS HELENA, Edw.

Argynnis Helena, EDW., Trans. Am. Ent. Soc., 1871.

This species is nearly allied to *Chariclea*, Herbst, and seems to be its Rocky Mountain representative. It inhabits the highest peaks, and was found throughout all parts of the Snowy range which were visited. At 13,000 and 14,000 feet, though the temperature must descend below the freezing point every night through the summer, the species seems perfectly at home, and is often more abundant than below. Specimens may be found until the first of August.

MELITÆA, (Fabr.) Westwood.

MELITÆA CHALCEDON, Doubleday.

Melitæa Chalcedon, EDW., Butterflies N. A., i.

Said by Reakirt to be found in the Rocky Mountains. I took one

specimen at Turkey Creek Junction, which may be referable to this species, but it is certainly not a common species in the Territory.

MELITÆA ANICIA, Doubleday.

Melitæa Anicia, EDW., Proc. Ent. Soc. Phila., 1862.

The expedition of 1873 took this species in the South Park, Colorado; I did not meet with it in the Territory. Mr. Henry Edwards writes concerning it:—

“About this species there has been considerable confusion, Boisduval having unhesitatingly stated its identity with *Editha*, Boisduval. This, however, is an error. In a long series of this species, the form of the wing will alone be sufficient to distinguish the two forms.

“In *Editha*, the apices are rounded, and the wings are broader than in *Anicia*, while the ground color of the latter may be called red, that of *Editha* being black with red and white tessellations. *Anicia* is a mountain species, and is extremely abundant near Virginia City in May. I have taken it in several spots in the Sierra Nevada, particularly in Bear Valley, Placer County, and near Donner Lake. The caterpillar has been described to me as wholly black, feeding on a species of *Prunus*, but I am unable to verify this statement from my own observations. I am inclined to think that *M. Nubigena*, Behr. will be found to be a depauperated form of this species.”

MELITÆA NUBIGENA, Behr.

Melitæa Nubigena, BEHR., Proc. Cal. Acad. Nat. Sci., 1863.

M. Nubigena is quite common throughout the mountain district of Colorado in June and July. Several larvæ, probably of this species, were found, usually near the ground, concealed in the herbage or on the stems of their food plant, an indigenous species of *Plantago*. The ground color of these larvæ is white, slightly marbled with black; the head is black, bilobed, hairy. On the second segment is a black, collar-like mark. Each of the succeeding segments, except the last, bears seven black spines, finely bristled. The bases of the dorsal row yellowish; those of the adjacent rows black, and so on, alternating. Length, 1 inch. One larva suspended itself June 19, and became a chrysalis the next day. Pupa whitish-gray, marked with black and yellow dots, much as in *Phaeton*.

Unfortunately, none of the specimens reached maturity, so that the species remains a matter of conjecture; but *Nubigena* is by far the most abundant *Melitæa* in their locality.

MELITÆA EURYTION, Edw.

Melitæa Eurytion, EDW., MS.

This species is found associated with *Nubigena* in Colorado, but is much rarer, and does not seem to range to quite so great elevations. The most obvious point of distinction from *Nubigena* is that the yellow spots of the latter are largely obscured in *Eurytion* by fulvous.

†MELITÆA LEANIRA, Felder.

PLATE XXXVII, FIGS. 5, 6, 7, 8.

Melitæa Leanira, FELDER., Lep. Frag. Wien, 1859.

This species, which is by no means rare in California, has been taken in Southern Arizona by the expedition.

†MELITÆA PALLA, Boisd.

Melitæa Palla, BEHR, Proc. Cal. Acad. Nat. Sci., 1863.

This species was taken by the expedition of 1871, probably in Utah or Nevada. It is not known to occur in Colorado. Mr. Henry Edwards writes regarding it:—

“This is one of the commonest and most variable of Pacific coast butterflies, and is found in every cañon in California and Oregon from April to July. It is dimorphous—one form of the female being blackish, while the other is foxy-red. All intermediate grades are found, and suffused varieties are by no means rare.

“On a sunny day in May, this insect may be seen in countless numbers settling upon flowers; and as it is rather a lazy species, good specimens are easily obtained. The form described by Dr. Behr as *M. Whitneyi* is, I think, only a mountain variety, as I have recently met with some specimens near San Francisco which bear a remarkable resemblance to his types.”

“*Larva*.—Dull-black, with a double dorsal row of orange spots, forming, when viewed longitudinally, two interrupted lines. In the spaces between the spots are some irregular white patches. Along the sides are two simi-

lar double rows of orange blotches, with white spaces about the spiracles. The spiracles themselves are black. Each segment is provided with five rather long spines, from each of which project about sixteen or eighteen long black hairs. The base of each spine is surrounded by a dirty-white ring, and some minute white irrorations are scattered over the whole upper surface between the spines. Head rather small, black, very glossy. Feet ash-color, banded with black. Length, 1.05 inch. Food-plant, *Castilleja breviflora*.

"The caterpillars feed chiefly on the flowers, and are solitary in their habits, only one being usually found on each plant.

"*Chrysalis*.—Fawn-color, very faintly marked with pale-brown dots and dashes over the entire surface. On the thorax are two raised, shining points, and each of the segments, except the two last, possess a treble row of small, shining tubercles."

†MELITÆA HOFFMANNII, Behr.

Melitæa Hoffmannii, BEHR, Proc. Cal. Acad. Sci., 1863.

This species was also brought in by the expedition of 1871, but is not known from Colorado. Of it Mr. Henry Edwards writes:—

"*M. Hoffmannii*, Behr.—A very distinct and rather rare species, found only in the warm valleys of the Sierra Nevada, where it loves to fly among the flowers of *Compositæ*, and particularly the various species of *Artemisia*. I have taken it from May to July, but only at distant intervals, and never at a less altitude than from 2,500 to 3,000 feet above the sea level."

MELITÆA CALYDON, Edw.

Melitæa Calydon, EDW., MS.

M. Calydon was only found at Turkey Creek Junction, Colorado, June 20 to 30. About twenty-five specimens were taken. This species is allied to *Palla* of California, to which the males are very similar; the resemblance between the females, however, is less noticeable.

MELITÆA ARACHNE, Edw.

Melitæa Arachne, EDW., Trans. Am. Ent. Soc., 1869.

This species was quite rare, but occurred here and there in the mountain district below 9,000 feet, and one specimen was also taken on the plains

near Denver. Specimens were taken on Turkey Creek in June, at Twin Lakes about the middle of July, and near Denver on the 20th of August; this last specimen was quite fresh, so probably there is a second brood in the warmer parts of Colorado.

†MELITÆA MINUTA, Edw.

PLATE XXXVI, FIGS. 1-2.

Melitæa Minuta, EDW., Proc. Acad. Nat. Sci. Phila., 1861, 161.

This beautiful species, originally described from Texas by Mr. Edwards, was taken in the vicinity of Santa Fé, N. Mex., by Mr. H. W. Henshaw. Not known to occur in Colorado.

†MELITÆA ACASTUS, Edw.

Melitæa Acastus, EDW., Trans. Am. Ent. Soc., 1874.

Male.—Expands 1.5 inches. Size and form of *M. Palla*; *paler fulvous*; the spots and bands closely like that species, and on a fuscous ground; fringes similar also.

Under side of primaries pale fulvous, reddish next base and across the disk next the submarginal spots, yellow fulvous at extremity of and below cell and along the origin of the nervules; a fuscous patch on middle of inner margin, and four fuscous, rounded spots forming a bent oblique line reaching from costal edge to median nervule; hind margin edged by a narrow fulvous band, slightly wavy on inner edge; submarginal spots large, lanceolate, yellow-white, the three next inner angles suffused with fulvous; the three subapical spots yellow-white on fuscous ground; costal edge yellow-white.

Secondaries nearly covered with large yellow-white spots, in bands, separated by fuscous lines; the marginal edge bordered as in primaries; the submarginal spots lunular; the spots of second row small, subrectangular, and each except the two outer having a minute orange spot near its posterior edge, sometimes represented by a few scales only; the spots of the third, or discal row, long, conforming to the interspaces, almost a continuous band, the nervules that divide them being but partially fuscous; the anterior portion of these spots, on both margins, cut off by an irregular black line; the fourth row is basal and is separated from the third by a

broad space, and consists of four irregular, confluent spots; the outer edges of the band thus formed edged with black; the fourth spot confluent with the concolored abdominal margin; in cell, an orange bar on either side the triangular spot; a similar bar in the interspace above cell, and an orange lunule in submedian interspace next submedian nervure, and a small orange triangle at origin of lower branch of median; an orange bar also next the basal side of the fourth band. Body above black, with fulvous hairs; rings of abdomen edged with yellow; below, thorax and abdomen yellow-white; legs pale fulvous; palpi same above, yellow-white in front; antennæ fuscous, with narrow, white rings, below orange cretaceous next base; club fuscous, orange below and at tip.

Female.—Expands 1.9 inches. Color of upper side sometimes like male, sometimes paler. In some individuals, the submarginal spots and the third, or discal row, are paler than the rest of the wing, and the three outer rows on primaries likewise paler. Under side similar in color and markings to male.

From Montana, Nevada, and Southern Utah. Specimens have been received from the geological expedition for exploration of the Territories, and from this survey of 1872; also from Henry Edwards, esq. This species is at once distinguished from its allies by the yellow-white under surface, especially of secondaries; this color nearly occupying the whole wing.—*Edwards, l. c.*

PHYCIODES, Hübn.

PHYCIODES NYCTEIS, Doubleday.

Phyciodes Cœnone, SCUD., Proc. Essex Inst., 1863.

Occurs occasionally in the mountains at about 7,500 feet elevation late in June. Colorado specimens are much darker than those from the Eastern States; the black sometimes covering two-thirds of the surface above. Specimens from Texas in my collection are about intermediate between this heavily marked form and the usual eastern type.

PHYCIODES CARLOTA, Reak.

Phyciodes Carlota, REAKIRT, Proc. Ent. Soc. Phila., 1867.

M. Ismeria, 1833, BOISD. (never recognizably described or figured).

Not uncommon at the lower levels and near Denver. Females much

worn were taken early in June, so it is probable that the species appears about the first of May on the plains, though somewhat later in the mountains. None were seen in the neighborhood of the South Park at above 8,000 feet.

PHYCIODES THAROS, Boisd.

Phyciodes Tharos, HARRIS, Insects Injurious to Vegetation.

P. Tharos was found quite abundantly on Turkey Creek with *Carlota* and *Nycteis*. Like the latter, these are slightly darker than eastern specimens, but otherwise quite indistinguishable.

PHYCIODES MARCIA, Edw.

Phyciodes Marcia, EDW., Trans. Am. Ent. Soc., 1868.

With *Tharos* were also found one or two specimens of *Marcia*, in no wise differing from types of the species. It was also taken by the expedition in 1871, but the precise locality is not given.

PHYCIODES PALLIDA, Edw.

Phyciodes Pallida, EDW., Proc. Ent. Soc. Phila., 1864.

Brought by the expedition from Southern Utah. One specimen was taken in Colorado, probably at a low elevation.

PHYCIODES MATA, Reakirt.

Phyciodes Mata, REAKIRT., Proc. Ent. Soc. Phila., 1867.—STRECKER, Illustrations Lepidoptera, 1874.

The type of this species was collected in Colorado; since then none have been seen. The original description states that the specimen was bleached and faded. This is contradicted by Mr. Strecker in No. 8 of his "Illustrations", because the specimen had not been exposed to light after its capture; but I have taken several specimens of a *Phyciodes* near Salt Lake City, which had certainly been bleached by the action of the weather, and it seems to me probable from the figure and description that *P. Mata* is a faded specimen of *P. Pallida*, having the pale bands slightly more pronounced than in the usual type. This manner of variation is well exemplified in *P. Camillus*, the females of which sometimes have the usual yellow median and marginal bands pure white below (var. *Emissa*, Edwards).

PHYCIODES CAMILLUS, Edw.

Phyciodes Camillus, EDW., Trans. Am. Ent. Soc., 1871.

This is the most abundant *Phyciodes* in the mountains of Colorado, and is found at all elevations below timber line during the whole summer. These butterflies are very fond of flowers but do not often congregate at wet spots in the road like *Tharos*. Some of the males resemble that species quite closely, though of a different shade of fulvous above, and the under surface more resembles *Batesii*, Reakirt. The females are quite distinct; the most nearly allied species is the Californian *P. Pratensis*, Behr.

† PHYCIODES CANACE, Edw.

Phyciodes Canace, EDW., Proc. Am. Ent. Soc. Phila., 1871.

The type of this species was taken in Southern California. The only other known specimens are those collected by the expedition in 1871, probably in Arizona.

† PHYCIODES MYLITTA.

This species is not known to occur on the eastern slope of the Rocky Mountains; but the expedition obtained specimens from Southern Utah and Arizona.

Mr. Henry Edwards writes me as follows concerning its habits:

“*Ph. Mylitta* is a common species in California, appearing about April, and apparently double brooded, as I have taken fresh specimens as late as August. It is an extremely restless insect, much more so than any other of the genus with which I am acquainted, and, though settling frequently, it rarely remains long in one place. The larva feeds on various species of thistles (*Carduus*, *Cnicus*, &c.). Its published description is as follows:—Head small, bronze-black, entirely covered with short black hair. Viewed from above, the whole upper surface is velvety black, each segment being provided with six tubercular spines, very hairy to their tip. The lateral row of spines is dull ash color, with black hairs; the spines being shorter than those of the dorsal region. Feet and pro-legs dull ash color; the underside of the body with a fleshy tinge. Length, 0.75 inch. This species is gregarious in its habits, and terribly destructive to the plant on which it may be hatched; in many cases only the nerves of the leaves remaining. The caterpillars spin

a small web, and draw the leaves of the plant together. Chrysalis, ash color, with a slight metallic reflection. Dorsal region with three rows of slightly raised tubercles. The anal extremity is much incurved."

SYNCHLOE, Boisd.

†SYNCHLOE CROCALE, Edw.

PLATE XXXVII, FIGS. 1, 2, 3, 4.

Synchloe Crocale, EDW., Trans. Am. Ent. Soc., 1874.

Male.—Expands 1.7 to 1.9 inches. Upper side brownish black, spotted with white; primaries have a submarginal row of points, sometimes complete from apex to lower branch of median, but usually in part obsolete, the two spots on first and second median interspaces only appearing; a sinuous extradiscal row of points or small spots across the entire wing, seven in all, but sometimes the one next inner margin accompanied by an eighth; a discal row of conspicuous spots, also sinuous, usually incomplete by the absence of one spot from upper median interspace; this spot when present minute, and a narrow spot in cell often wanting; secondaries have a transverse row of spots on middle of wing, which are regular, narrow, elongated, and equal; at anal angle, a fulvous patch, which extends a little distance up the abdominal margin; fringes white; black at tips of nervules. Under side more decidedly brown; the spots on primaries repeated; the submarginal enlarged, mostly lunate; the extradiscal also enlarged; the discal nearly as above; two spots in cell, one near arc, one near base; a third below the origin of lower branch of median; shoulder ferruginous; secondaries have a submarginal series of yellow lunules; a broad yellow band across disk; a narrow yellow stripe near base, from costal edge to submedian nervure; half way between submarginal spots and discal band a series of yellow points, tortuous, commencing on costal margin near the band, crossing the wing in a double curve, the last point being on submedian interspace; these marks vary from points to conspicuous spots, and sometimes are nearly or quite obsolete; in middle of cell a yellow point; anal spot as above, ferruginous; the upper part of abdominal margin edged with yellow; a yellow patch on shoulder.

Body above blackish-brown, below gray-brown; legs ferruginous;

palpi white in front, black above and at tip; antennæ fuscous, finely annulated with white; club black above, gray below, fulvous at tip.

Female.—Expands 2.1 inches. Similar to male. In the only specimen examined, the fulvous patch at inner angle of secondaries was absent. Below cell of primaries two white points.

From several males and one female, taken at White Mountains, Arizona, in 1873, by H. W. Henshaw, of this expedition.

I submitted one of these specimens to Mr. A. G. Butler for determination, and he informed me that two examples from Mexico were in the British Museum collection, and that they were regarded by him as a distinct species, allied to *Lacinia* and *Hippodrome*.—*Edwards, l. c.*

GYROCHEILUS, Butler.

GYROCHEILUS TRITONIA, Edw.

Geirocheilus Tritonia, EDW., Trans. Am. Ent. Soc., 1874.

Male.—Expands 2.3 inches. Upper side velvety, blackish-brown, changing to brown on hind margin of primaries, with an olivaceous tint at apex; costal edge of primaries near apex yellow-white; beyond disk a transverse row of four white points, set in middle of the upper discoidal, and three next lower interspaces; the last point sometimes wanting on upper side; secondaries have a broad marginal band of dull ferruginous, even-edged within, reaching the margin on that part of wing between submedian nervure and the upper branch of median, beyond this last receding from the margin, but usually continued past the upper branch of sub-costal, and gradually diminishing to a point, sometimes, however, terminating squarely at the lower branch of same nervure; through this band runs an indistinct undulating brown line, parallel to and near the margin; beyond upper branch of median the space between this line and margin is brown, color of apex of primaries; fringes of primaries black at tips of nervules, yellow-white in the interspaces, of secondaries nearly all fuscous, there being but a few gray hairs in each interspace.

Under side smoky-brown; the white spots repeated, enlarged three fold, each forming the pupil of a rounded, black ocellus; secondaries have a broad extradiscal band, ferruginous and lilac, with scattered yellow scales

on the posterior half of wing, lilac on brown ground apically; on the anterior edge of the band, upon small ferruginous spaces free from lilac, is a row of straw-colored points and spots, commencing in a point on the lower subcostal interspace, and continuing to submedian nervure, just before which are two points; the three spots on the three median interspaces crescent or V-shaped; in some cases these larger spots re-appear on upper side; posterior to the band the submarginal area is brown, sharply lunated, each lunation forming internally a semi-circle, and through all runs a streak of ferruginous, more or less irrorated with yellow; sometimes the streak is limited to the three interspaces next abdominal margin.

Body blackish-brown; legs brown and gray; palpi gray in front, blackish above and at tip; antennæ brown, grayish next club, gray below; club yellowish.

From White Mountains, Arizona, and taken by H. W. Henshaw in 1873. This species is near *Patrobas*, Hewitson.—*Edwards, l. c.*

GRAPTA, Kirby.

GRAPTA SATYRUS, Edw.

Grapta Satyrus, Edw., Butterflies N. A., i.

A single specimen, taken on the 24th of June, at Turkey Creek Junction, shows this species to be an inhabitant of Colorado, but it must be extremely rare, as no others were seen during the season. This species approaches more nearly the usual type of the European *C. album* than any of the numerous other American species which have been confounded with that very variable butterfly; however, the discovery of the larva of *Satyrus* has proved its distinctness beyond a doubt. *Grapta C. album* varies toward all the forms which are represented by distinct species on this side of the Atlantic, and, also, toward several besides, while our corresponding species are all remarkably constant to their types, and a glance will show to which species any specimen should be referred. It may help to explain these facts to take into consideration the differences in the geological history of the two continents. As the genus is confined to temperate climates, it is quite possible that its archetype could not be produced or exist during a geologic era when the earth was so heated as to maintain a torrid temperature over its whole surface. At the close of this period, the climate of Central North

America passed at once to a warm-temperate on account of the extension of the continent into the arctic zone, while the climate of Europe passed in succession through a tropical and then subtropical condition before becoming adapted to the well-being of organisms requiring a moderate temperature (see Dana, Geology, p. 532). Hence we may regard these varieties of *C. album* as nascent species; our corresponding forms, having been long subjected to the action of natural selection and other segregating causes, have established themselves as independent species.

GRAPTA HYLAS, Edw.

Grapta Hylas, EDW., Trans. Am. Ent. Soc., 1872.

This pretty species seems quite local; in this respect resembling its near congener, *G. Faunus*. The first specimens were seen quite high up the mountain, near Berthoud's Pass, August 16, where, at a small patch of flowering plants, fifteen specimens were netted in the course of half an hour. A few *G. Zephyrus* were seen in the same locality. On the 28th, about twenty miles from the South Park, on the South Park road, a few more were found, with many *Zephyrus* and some *Vanessas*.

G. Hylas is uniformly smaller than *Faunus*, and the exquisite gray marbling of the under surface is quite different from the marking of any *Grapta* with which I am acquainted.

Mr. Scudder has ranked this species as a dimorphic form of *G. Zephyrus*, but for this he gives no reason, and I am at a loss to imagine one, unless it be assumed that every *Grapta* is necessarily dimorphic, and that only *Hylas* can correspond to *Zephyrus*.

It seems to me, though possible, highly improbable that this will prove to be the case, as *Zephyrus* is much like *Progne*, and the characteristic mark of the under surface of secondaries is angular as in that species, while that of *Hylas* is a well formed C, resembling the mark of *Faunus* or *Comma*.

It seems also unnecessary to create a possible synonym for *Zephyrus* true type (= var. *Thiodamas*, Scudder) before any experiments in rearing the two species have been made. The case of *Faunus* and *Gracilis* is similar to this, and here the only experiment in rearing which has been tried gave a negative result; the female *Gracilis*, which Mr. Scudder obtained, refused to lay eggs upon the food plant of *Faunus* (willow), and thus died.

GRAPTA ZEPHYRUS, Edw.

Grapta Zephyrus, EDW., Butterflies N. A., i.

P. Zephyrus var. *Thiodamas*, SCUD., Syn. List, 1875.

This was by far the most abundant species of its genus in Colorado. It was first seen June 5 at Turkey Creek (7,500 feet), but did not appear until about three weeks later near the South Park (9,000 feet). About twenty-five specimens were taken in June; probably these all had hibernated. Scarcely any were seen in July, while in August about thirty more were captured. The species was brought by the expedition from Arizona and Southern Utah. It is not uncommon in California.

VANESSA, (Fabr.) Westwood.

VANESSA ANTIOPA, Linn.

Was seen here and there through the mountain region, but was not common. It was brought by the expedition from Arizona and Utah.

VANESSA MILBERTII, Godart.

Vanessa Milbertii, HARRIS, Insects Injurious to Vegetation.

In the waste places, on the outskirts of Denver, nettles were abundant, and early in June almost every plant had upon it many caterpillars of *V. Milbertii*, in various stages of growth, and the females were still depositing their egg clusters. Some of the larvæ were reared, the perfect insects emerging early in July. The species is found throughout the mountains in considerable numbers.

VANESSA CALIFORNICA, Boisd.

Vanessa Californica, BOISD., Ann. Soc. Ent. de France, 1852.

But three or four specimens were seen in Colorado, all near Turkey Creek, toward the last of June. They alight frequently in the road, or on tree trunks, but are wary and difficult to approach.

PYRAMEIS, Hübner.

PYRAMEIS HUNTERA, Drury.

Cynthia Huntera, HARRIS, Insects Injurious to Vegetation.

Not at all a common species. One or two specimens were taken about the middle of June, and also later in the season in Colorado. The expedition also found the species in Arizona.

PYRAMEIS CARDUI, Linn.

Occurs here and there in Colorado and Utah in about the same numbers as *Huntera*.

†PYRAMEIS CARYE, Hübner.

Was brought in by the expedition of 1871, probably from Arizona. It is abundant in California; specimens may often be seen even in the streets of San Francisco.

PYRAMEIS ATALANTA, Linn.

Was met with, now and then, wherever nettles were abundant.

LIMENITIS, Fabr.

LIMENITIS WEIDEMEYERII, Edw.

PLATE XXXVIII, FIGS. 1, 2.

Limenitis Weidemeyerii, EDW., Butterflies N. A., i.

A specimen was taken June 6, but no more were seen until the 24th, in Colorado. By the last of July, the species has entirely disappeared. It frequents the banks of small creeks and neighboring road sides in the mountains, but at not more than 7,500 or 8,000 feet above the sea level. The expedition took specimens in Southern Utah and Arizona; those from the latter locality unusually large and handsome.

APATURA, Fabr.

†APATURA LEILIA, Edw.

Apatura Leilia, EDW., Trans. Am. Ent. Soc. Phila., Oct., 1874.

In markings allied to *Celtis*, but with the shape of *Clyton*, the primaries being more produced and hind margin more excavated than in *Celtis*; the hind margin of secondaries more sinuous, and the inner angle more produced.

Male.—Expands 1.8 inches. Upper side of primaries next base, and partly in the median interspaces, and of secondaries throughout, light red-brown; the remainder of primaries, which comprises the apical area to median and to cell, and the discal portion of the median interspaces, fuscous; hind margins bordered narrowly by fuscous; both wings have a submarginal black stripe, and a little anterior to this, a second, which on secondaries

ries is either very slightly crenated, or is crenated next outer angle, and serrated posteriorly; primaries have a transverse discal row of seven white spots arranged in a double curve, the first two and fifth nearly equal, the third and fourth minute, the sixth and seventh, near inner margin, equal, rather smaller than the fifth, and sometimes confluent; midway between this row and the margin is a second row of white spots and ocelli, the spots, two in number, being placed on the upper subcostal and the discoidal interspaces; the three ocelli, on the lower subcostal and the median interspaces, are black, rounded, the upper one small, with an indistinct pale iris, the others large, nearly equal, and each surrounded by a pale-brown nimbus; in the cell, two transverse, equal, subreniform spots, one at the outer extremity, the other near the middle; these spots are obscure brown centrally, black at the edges, and are separated by a space that is white, irrorated with brown scales.

Secondaries have the costal margin fuscous; upon the extradiscal area a series of six black ocelli arranged as in *Clyton* and *Celtis*, the second from costa largest and back of the line, the sixth minute, the others nearly equal, rather more than half the size of the second; each surrounded by a shade slightly paler than the ground, and several having within small eccentric clusters of blue scales; on the middle of costal margin a white patch, and five small, white spots in line with this pass round the extremity of the cell; in the cell, two faint fuscous spots; fringes white in the emarginations, fuscous at the ends of the nervules.

Under side of primaries chestnut-red at base below the cell, also within the cell next base, but partly covered with gray, especially along the subcostal nervure; remainder of wing pearl-gray, showing a brown subcolor on disk, and in the middle of each interspace on the apical area, and at inner angle; the gray becoming suffused with pale-blue as it approaches the hind margin; this margin narrowly edged with yellow-brown; the submarginal lines repeated, distinct, blackish-brown; the white spots repeated, enlarged, and in addition a white patch in the outer row on costa; the lower spot of this row, in discoidal interspace, nearly conceals a small ocellus, a narrow edge of black being discernible on the anterior side, and the yellow iris being nearly complete; the other three ocelli re-appear,

enlarge, each with blue scales and a well-defined yellow iris; the cellular spots as on upper side, the intervening space being clear white.

Secondaries pearl-gray, tinted with blue near hind margin; the gray shade least dense on the disk next before the ocelli, allowing a brown sub-color to appear; the submarginal lines repeated; the inner margin also bordered by a brown line; the white discal patch and spots repeated, and the line of spots extended across the wing to inner margin, following the course of a dark, wavy line; the spots in the cell distinct, being transverse bars; the interior one prolonged into the next upper interspace; the ocelli repeated, and each containing a large, blue patch, and edged by a narrow, yellow ring, which itself is edged indistinctly by fuscous; an additional ocellus on the inner margin, small, oval, also marked with blue.

Body above reddish-brown, beneath gray on thorax, yellowish on abdomen; legs ochraceous, the tibiæ gray; palpi clear white, fulvous above and at tip; antennæ yellow-fulvous, partly annulated with white; club fuscous at base, yellow at tip.

From two ♂, taken by H. W. Henshaw, August, 1874, at Camp Lowell and in Sonoita Valley, Arizona.—*Edwards, l. c.*

LIBYTHEA, Fabr.

†LIBYTHEA CARINENTA, Cramer.

Libythea Carinenta, CRAMER, ii, pl. 108.

This rare species was brought in by the expedition of 1871, probably from near the borders of Mexico; it occurs also in Texas, and ranges southward to Brazil.

CÆNONYMPHA, Hübner.

CÆNONYMPHA OCHRACEA, Edw.

Cænonympha Ochracea, EDW., Proc. Acad. Nat. Sci Phila., 1861.

This species was brought by the expedition from the South Park. It abounds throughout all the mountainous region of Colorado during June and July; but none were seen later than August. Seventy-five specimens were taken by me; they show no very great variations.

SATYRUS, (Latr.) Westwood.

SATYRUS NEPHELE, Kirby.

Hipparchia Nephele, HARRIS, Insects Injurious to Vegetation.

Two specimens were taken at Apex Gulch, just within the foot hills of the Rocky Mountains, early in August. No others were seen.

†SATYRUS WHEELERII, Edw.

PLATE XXXIX, FIGS. 1, 2, 3, 4.

Satyrus Wheelerii, EDW., Trans. Am. Ent. Soc., March, 1873.

Satyrus Hoffmani, STRECKER, Illustrations of Lepidoptera, June, 1873.

In the spring of 1873 Mr. Strecker called upon me, and noticing in my collection a specimen of this *Satyrus* ticketed *Wheelerii*, Edw., stated that he had possessed the species for some time, and at first had made out a manuscript description, supposing it distinct, but finally concluded it was merely a variety of *S. Gabbii*, Edw. In No. 4 of Mr. Strecker's "Illustrations of Lepidoptera", which reached me, I believe, in the early part of July, the species was figured as *Satyrus* var. *Hoffmani*; Mr. Strecker being under the impression that the name *Wheelerii* was yet unpublished. The latter name, however, has several months' priority, and must designate the species.

SATYRUS CHARON, Edw.

Satyrus Charon, EDW., Trans. Am. Ent. Soc., 1872.

Satyrus Etus, BOISD., Ann. Soc. Ent. France.

This species was first met with near Twin Lakes on the 9th of July. It was quite abundant in the sage brush and on flowers at the edge of the lake. Later in the season, it was found in both the South and Middle Parks, though not so abundantly as in the Arkansas valley, whence the expedition also brought specimens. Altogether one hundred and thirty-one specimens were taken by me. In August, females were obtained and inclosed with grass; several eggs were laid; they are whitish and very similar to those of *Nephele*.

†SATYRUS ARIANE, Boisd.

Satyrus Ariane, BOISD., Ann. Soc. Ent. France, 1853.

This species, though rare, is known to occur in California and Nevada. It was brought from Southern Utah by the expedition.

SATYRUS MEADII, Edw.

Erebia Meadii, EDW., Trans. Am. Ent. Soc., 1872.

While riding along the South Park road, this species was discovered near Bailey's ranch, about forty-five miles from Denver, and two specimens were taken on the 26th of August. None were to be found a few miles on either side of this point, so I returned and spent a week in observing the species and noting its habits. It must be very local, since, though not at all uncommon where first met with, none were seen elsewhere during the season. It evidently first appears there about the last of July, since nearly all the specimens were dilapidated, the males especially so. The species in mode of flight much resembles *S. Charon*, often alighting on dry bare spots in the grass and walking a few steps, then, after resting a few moments, flying off to some flower or other bare spot. A few eggs were obtained; they are like those of *Charon*; when first laid the eggs are nearly white, but in the course of two or three days become mottled with pale purple.

S. Meadii was at first referred to the genus *Erebia*. In some specimens, the fulvous spots in arrangement and tint are quite similar to *E. Epipsodea*, Butler; but the strongly dilated bases of the three principal veins of primaries would indicate that it is a true *Satyrus*, and this view receives support from the fact that the marking on the under side consists of short, transverse striæ, as in the undoubted *Satyri*. This, like *S. Ridingsii*, stands alone in a group, apart from the rest of the genus, and having no known analogues on this continent though similar species are found in Europe.

SATYRUS RIDINGSII, Edw.

Satyrus Ridingsii, EDW., Proc. Ent. Soc. Phila., 1865.

About the first of June, on the plains near Denver, a few specimens were found hiding in the short, parched grass, and flying up when disturbed, exactly as is the habit of *Drasteria* among the moths. The color of these butterflies harmonizes excellently with that of the dry herbage, and renders them quite difficult of detection, even when near at hand. It appears to be a rare species about Turkey Creek, but in the sage brush country, about Twin Lakes, (Arkansas Valley, 8,000 feet elevation), is very abundant in July, appearing there in company with *Satyrus Charon*. It is, however,

much less partial to flowers than is the case with that species, and has almost entirely the habits as well as the appearance of *Chionobas* rather than *Satyrus*. Specimens were brought from Southern Utah by the expedition.

EREBIA, Dalman.

EREBIA EPIPSODEA, Butler.

Erebia Rhodia, EDW., Trans. Am. Ent. Soc., 1871.

This species inhabits the mountains of Colorado below timber line. Specimens were brought from Fairplay by the expedition. It begins to appear about the first week in June, is common by the middle of that month, and remains until the last of July.

Dr. Staudinger, in a letter to me, claims that this species is identical with some varieties of the European *E. Medusa*. Not having specimens of the latter at hand, I cannot say how far this view may be well founded; but the species was originally described by Mr. Butler, of the British Museum, who certainly had abundant material for comparison, and it seems probable that the name will stand.

EREBIA TYNDARUS, Esper, var. CALLIAS, Edw.

Erebia Callias, EDW., Trans. Am. Ent. Soc., 1871.

Above timber line (about 11,000 feet) in Colorado, *E. Tyndarus* entirely replaces *E. Epipsodea*. It is a rare thing to find the former species below that elevation, though it is quite abundant on the bleak summits of the mountains. The first specimens seen were taken on the Arkansas divide, July 8, when six specimens were captured. A few were taken on peaks near Twin Lakes; but on recrossing the divide, July 21, the species had become much more abundant, and fifty specimens were secured in a short time. *E. Tyndarus* was also found on Mount Lincoln and Gray's Peaks. None were seen after the middle of August.

Dr. Staudinger, after receiving one or two specimens of this variety (*Callias*) of *E. Tyndarus*, wrote to me that the former was not a variety of *Tyndarus*, "because it was entirely identical with that species." After carefully examining all the European specimens at my command, it seems to me that there are sufficient differences to entitle our form to a separate des-

ignation as a variety, especially as those from Colorado are remarkably constant to their type; the seventy specimens taken showing scarcely a trace of variation among themselves. In comparing the two forms, the first noticeable point is the slender and delicate appearance of *Callias*; in specimens of each having the same breadth of wing the expanse of *Callias* is one-fifth greater than that of *Tyndarus*.

Among the minor points of difference may be enumerated the following:—In *Tyndarus*, on the under side of the primaries, the fulvous mark is bordered by a brown band parallel to the margin; while in *Callias* it shades off insensibly, extending much nearer the edge at the center of the outer margin than at the apex or external angle. The wavy bands and marbling are very indistinct in *Callias*, much more so than in any specimens of *Tyndarus* I have seen; and in the males it has almost exactly the appearance of moldiness. On the upper surface, the fulvous, which in *Tyndarus* forms five or six well defined spots, in *Callias* is represented by a patch, covering a considerable portion of the wing, and scarcely showing the nervures.

CHIONOBAS, Boisd.

CHIONOBAS SEMIDEA, Say.

Hipparchia Semidea, HARRIS, Insects Injurious to Vegetation.

C. Semidea is exceedingly rare in Colorado, and is only found on the extreme summits of the mountains. Near Twin Lakes, two specimens were taken, and others seen at an elevation of 13,000 feet, on a very steep mountain. The mountain side rose so precipitously that bowlders loosened near the top might sometimes be watched in their descent till lost to view three-quarters of a mile below; and just at the summit where these butterflies were found the ascent was even more difficult than lower down. The butterflies were very shy and wary; when alarmed, they usually flew, not along the side of the mountain, but either up or down, rendering pursuit almost impossible.

CHIONOBAS UHLERII, Reakirt.

Chionobas Uhlerii, REAKIRT, Proc. Ent. Soc. Phila., 1866.

C. Uhlerii was abundant in the lower mountain regions of Colorado, inhabiting grassy spots, and making only short flights when disturbed or otherwise, soon alighting and being lost to view in the short dry grass. It

may be found during the months of June and July. Seventy-three specimens were taken.

In this species, the number of ocelli above and the ornamentation of the secondaries below are quite variable. In some specimens, there is but a single ocellus—on the primaries; in others, four are present on the fore wings, and five upon the secondaries. On the under side of secondaries, some indication of the median band may generally be seen, but in some specimens the hind wings below are uniformly mottled with blackish transverse streaks; these about equally dividing the surface with the white ground color. In others, these streaks may become pale ochraceous, and quite indistinct on the outer half of the wing.

CHIONOBAS CHRYXUS, Hewitson.

Chionobas Chryxus, SCUD., Proc. Ent. Soc. Phila., 1865.

This *Chionobas* was found in more elevated regions than *C. Uhlerii*, still keeping, as a rule, below timber line. It was brought by the expedition from Gray's Peaks. My first specimens were taken July 8 on the Arkansas divide, in company with *Colias Meadii*, and other rare mountain species. It was not very uncommon by the road side. In the course of the day, eleven specimens were taken. One female was found with an egg adhering to the abdomen; this was white, melon-shaped, and considerably larger than the egg of *Satyrus Nephele*.

C. Chryxus seems to be found in small numbers through all the mountain region around the South Park, rarely, however, below 9,000 feet. None were seen after July.

THECLA, Fabr.

†THECLA HALESUS, Cramer.

Thecla Juanita, SCUD., Proc. Bost. Soc. Nat. Hist., 1868.

Brought in by the expedition of 1871. It is a subtropical species, and occurs from Florida to California.

THECLA CRYNALUS, Edw.

Thecla Crynalus, EDW., Proc. Am. Ent. Soc., 1873.

A few specimens of this perhaps the most beautiful of our *Theclas* were brought from Lake Pass, Colorado, by the Allen expedition of 1871. They were taken early in July.

THECLA NINUS, Edw.

Thecla Ninus, EDW., Trans. Am. Ent. Soc., 1871.

Three specimens of this species were taken on willow blossoms on the South Park road, four miles from the park, on the 17th of June. No others were seen during the season.

THECLA MELINUS, Hübner.

Thecla Humuli, HARRIS, Insects Injurious to Vegetation.

This was brought by the expedition from Colorado in 1871. I took one specimen, August 3, on the Georgetown road, in the mountains.

†THECLA SYLVINUS, Boisd.

Thecla Sylvinus, BOISD., Ann. Ent. Soc. France, 1852.

This Californian species was brought in by the expedition of 1871; but the precise locality was not noted.

†THECLA SIVA, Edw.

Thecla Siva, EDW., Trans. Am. Ent. Soc. Phila., 1874.

Male.—Expands 1 inch. Upper side castaneous, slightly brown at base; the costal margin of primaries and both hind margins rather broadly bordered with fuscous; secondaries have two tails, the outer one short, the other long, 0.16 inch; both dark fuscous, tipped with white; fringes fuscous.

Under side light fulvous, washed with pale metallic-green, densely on the costal and upper part of hind margins of primaries, and over the whole of secondaries; a common pure white band crosses the disks of both wings, on primaries a little convex outwardly, and formed of lunules which are not quite confluent; on secondaries, slightly wavy, and confluent; on the basal side of this band, the fulvous ground color is deeper than elsewhere, and on secondaries several of the white spots are edged by a line of black scales; between the band and base no spots or markings on either wing; secondaries have the hind margin edged with white, the outer angle fulvous; the interspaces along the margin between the discoidal nervules and anal angle gray, caused by black scales on a white ground; on the lower median interspace above, the gray patch is a rounded blackish spot on ferruginous ground, and

this, as well as the next patch on either side, is surmounted by a black lunule; anal angle black.

Body gray-brown above, beneath dark brown, with white hairs interspersed; the abdomen yellow-gray; legs dark brown and white; palpi white, fuscous at tip; antennæ annulated white and black; club black, tipped with pale fulvous.

From 2 ♂ taken by H. W. Henshaw at Fort Wingate, Ariz., July, 1874.

This species is allied to *Castalis* and *Smilacis*, being of similar size and shape. On the upper side deeper red than *Castalis*; on the under side there is much resemblance to *Castalis* in the shades of color and in the common band. But this last is much less irregular than in *Castalis*, in which the separate spots that compose the band are not confluent, and the two in the median interspaces are much behind the line of the rest. In *Siva*, the line is scarcely broken at this point, and is confluent. In *Castalis* are two conspicuous white spots nearer base of secondaries, which are not represented in *Siva*. *Smilacis* is fuscous on upper side, and below is most like *Castalis*; the band being very irregular and the two spots next base appearing.—*Edwards, l. c.*

†THECLA CALIFORNICA, Edw.

Thecla Californica, EDW., Proc. Acad. Nat. Sci. Phila., 1862.

T. Californica resembles *T. Cygnus* very closely. In the latter, however, the stigma upon the primaries of the male ends in a blunt point; in the former, it is rounded. The species was taken by the expedition in Southern Utah.

THECLA SÆPIUM, Boisd.

Thecla Sæpium, MORRIS, Syn. Am. Lep., 99.

The first specimens seen were near Apex Gulch, Colorado, August 3. In the course of about two hours, fifty specimens, mostly females, were taken on the Goldenrod flowers (*Solidago*). No specimens were taken elsewhere.

THECLA MOPSUS, Hübner.

Thecla Mopsus, HARRIS, Insects Injurious to Vegetation.

A few specimens were taken at Apex Gulch with *T. Sæpium*, and others were obtained toward the last of August at Bailey's ranch, on the South Park road.

THECLA IROIDES, Boisd.

Thecla Iroides; MORRIS, Syn. Am. Lep., 100.

The Colorado specimens of this species differ a little from the usual Californian types. In the male, the stigma upon primaries is longer and more sharply pointed.

Both sexes have scarcely any lobe at the anal angle of secondaries. The under surface is usually suffused with vinous; and the anal third of secondaries is densely powdered with gray scales. The fringe is dark-brown, except between the nervures, where its inner half is gray.

The species may be found toward the last of May and early in June among the foot hills of the Rocky Mountains, at above 7,000 feet elevation, usually flying by the road side or alighting upon damp spots.

THECLA ERYPHON, Boisd.

Thecla Eryphon, MORRIS, Syn. Am. Lep., 100.

A few specimens were taken early in June in Colorado, associated with *T. Iroides*.

CHRYSOPHANUS, Hübner.

CHRYSOPHANUS HELLOIDES, Boisd.

Polyommatus Helloides, MORRIS, Syn. Am. Lep., 86.

This species was brought by the expedition from Southern Utah. It is moderately abundant in all parts of Colorado; being found on the plains as well as near the summits of the highest peaks, and may be found from the first of June to the last of August.

In the South Park, and also near Turkey Creek Junction, a number of caterpillars were found, probably of this species. When full grown, they measured three-fourths of an inch in length. In shape, they were onisciform. The head is brownish, entirely retractile within the first segment. Body grass-green, covered with a slight reddish down. Young larva with a reddish-brown dorsal stripe. It feeds upon the Yellow Dock (*Rumex*). Those taken in the South Park were hidden on the surface of the ground under leaves or sticks, but the others were on plants growing in cultivated ground. During the day, these latter buried themselves to a depth of from one to two inches in the loose soil at the base of the plant; always, however, remaining

on the stem. Several changed to chrysalis, which is pale-greenish, finely mottled with dark-brown, but all died before completing their transformations. The larvæ are full grown by the last of June.

CHRYSOPHANUS CASTRO, Reakirt.

Polyommatus Castro, REAKIRT, Proc. Ent. Soc. Phila., 1867.

Whether this species is *Helloides* or not is difficult to determine; the only notable discrepancy in the descriptions is that *Castro* is said to have a "long discal bar" on secondaries, while in *Helloides* this is no longer than the discal spot of primaries. Dr. Boisduval, however, gives a description of *C. Nivalis*, which has been considered a synonym of *Castro*, and says that although allied to *Helloides*, it is "very distinct".

†CHRYSOPHANUS IANTHE, Edw.

Chrysophanus Ianthé, EDW., Trans. Am. Ent. Soc., 1871.

Specimens were brought by the expedition from Southern Utah; the original types were from Virginia City, Nev.; and these two are the only localities from which the species is recorded.

CHRYSOPHANUS SIRIUS, Edw.

Chrysophanus Sirius, EDW., Trans. Am. Ent. Soc., 1871.

This species was first discovered at Twin Lakes, July 12. On the 13th, forty males and two females were taken at a grassy spot near the head of the upper lake, in company with *Lycæna Heteronea*, the females of which closely resemble some varieties of *C. Sirius* ♀ both above and below. *C. Sirius* was also taken near Mount Lincoln, and at various points in the South and Middle Parks, but was quite rare except in the immediate vicinity of Twin Lakes.

LYCÆNA, (Fabr.) Oken.

LYCÆNA HETERONEA, Boisd.

Lycæna Heteronea, MORRIS, Syn. Am. Lep., 89.

The expedition brought specimens of *L. Heteronea* from Southern Utah. In Colorado, the first individuals were seen June 23 on Turkey Creek; but it was much more abundant at Twin Lakes early in July. Altogether fifty-nine specimens were taken. It occurs also in California.

LYCÆNA BATTOIDES, Boisd.

Lycæna Battoides, BOISD., Lépidoptères de la Californie, 1869.

This species is very similar to *Glaucion*, Edw., but is much darker, and more heavily marked beneath. A few specimens were taken in Colorado, nearly all on the headwaters of the Platte River, at moderate elevations. The species should be looked for in June and July.

LYCÆNA GLAUCON, Edw.

Lycæna Glaucion, EDW., Trans. Am. Ent. Soc., 1871.

Two or three specimens, apparently referable to this species, were taken on the South Park road in the latter part of June. It is also found in Nevada.

LYCÆNA ACMON, Hewitson & Westwood.

Lycæna Acmon, MORRIS, Syn. Am. Lep., 87.

This is an abundant species in Colorado, occurring at nearly all elevations from May to the 1st of September; and near the Yosemite Valley, California, I have taken specimens as late as the middle of October. The females of *L. Acmon* are usually brown, but occasionally varieties are found having the whole surface covered with blue scales, except a rather broad, marginal band of brown, which, on the secondaries, contains the orange streak. Between these extremes all intermediate variations may be found. *L. Acmon* was brought by the expedition also from Southern Utah.

LYCÆNA CALCHAS, Behr.

Lycæna Calchas, BEHR, Proc. Cal. Acad. Nat. Sci.

A single specimen was taken August 5, on Gray's Peak, at an elevation of 12,000 feet. One other was seen on a mountain near Twin Lakes at a similar elevation. The original types were found in the Sierra Nevada of California at high elevations.

†LYCÆNA ANNA, Edw.

Lycæna Anna, EDW., Proc. Acad. Nat. Sci. Phila., 1862.

Lycæna Cajona, REAKIRT, Proc. Ent. Soc. Phila., 1867.

I have no knowledge of specimens of this species from Colorado. It is probably not found east of Nevada. Until recently, it has been confounded with the following species.

LYCÆNA MELISSA, Edw.

PLATE XXXVI, FIGS. 5, 6, 7, 8.

Lycæna Melissa, EDW., Trans. Am. Ent. Soc., 1873.

This is a not very uncommon species near Denver in May or June. In the South Park and about Twin Lakes, it is abundant by the first week in July. Specimens were brought in by the expedition of 1871, probably from the vicinity of Fairplay. This is a much more heavily marked species than *Anna*, and the ground color below is gray instead of white.

LYCÆNA COMYNTAS, Godart.

Lycæna Comyntas, HARRIS, Insects Injurious to Vegetation.

This species is found occasionally in Colorado, and I have taken a single specimen in California, near Sacramento, October 6. In California, *L. Comyntas* is largely replaced by *Amyntula*, Boisd., which I believe to be distinct. *Amyntula* may be distinguished by the more delicate marking below. It is slightly larger, and the ground color of the under side is of a paler gray, often with a bluish tinge toward the base of the wings.

LYCÆNA ISOLA, Reakirt.

Lycæna Isola, REAKIRT, Proc. Acad. Nat. Sci. Phila., 1866.*Lycæna Alce*, EDW., Trans. Am. Ent. Soc., 1871.

A few specimens were taken on Turkey Creek late in June, and near Georgetown about the middle of August. The latter specimens were much worn and faded. *L. Isola* has been sent to me from Eastern Nebraska by Mr. George M. Dodge, and is of common occurrence in Texas.

LYCÆNA RUSTICA, Edw.

Lycæna Rustica, EDW., Proc. Ent. Soc. Phila., 1864.

L. Rustica frequents sunny places in the open pine forests, where it may be seen on flowers of *Compositæ*, in company with *Melitæa Nubigena* and many *E. Claudia*. The species appears early in June, is quite abundant at from 7,000 to 10,000 feet elevation, and remains on the wing until the last of August. Seventy-five specimens were taken during the season; they presented no very noticeable variations.

LYCÆNA RAPAHOE, Reakirt.

Lycæna Rapahoe, REAKIRT, Proc. Ent. Soc. Phila., 1867.

My specimens of *L. Sæpiolus*, Boisd., from Colorado, are somewhat darker on the under surface than Californian examples, but whether they are referable to *L. Rapahoe* could only be determined by reference to the type specimens.

LYCÆNA SÆPIOLUS, Boisd.

Lycæna Sæpiolus, MORRIS, Syn. Am. Lep., 88.

This is altogether the most abundant *Lycæna* of Colorado. It was brought by the expedition from the South Park, and seems to occur at all elevations below timber line.

A larva was found on Turkey Creek, which may be of this species. It was slug-shaped; body flesh color, obliquely striped with crimson. It fed upon *Sedum*. Unfortunately, the specimen was lost before it had completed its transformation, so its precise species is doubtful.

Of *L. Sæpiolus*, one hundred and twenty-four specimens were taken in June and July. The species is found in damp places rather than at flowers, often with *L. Lygdamas* and *Argynnis Epithore*.

LYCÆNA RUFESCENS, Boisd.

Lycæna Rufescens, BOISD., Lépidoptères de la Californie, 1869.

Two or three females were taken in company with *L. Sæpiolus*. They are distinguished by the plain fulvous color above, and deep brown under surface. I believe, however, that this will prove to be a female variety of the preceding species.

LYCÆNA LYGDAMAS, Doubleday.

Lycæna Lygdamas, EDW., Butterflies N. A., i.

This *Lycæna* is not uncommon in the mountains. The expedition brought specimens from the South Park. The species disappears by the last of June. In a female specimen in my collection, three of the dark spots on the under surface of each wing are reproduced above.

LYCÆNA ANTIACIS, Boisd.

Lycæna Antiacis, MORRIS, Syn. Am. Lep., 90.

A single female taken June 15 near the South Park seems to be of this

species. The shade of blue above is quite different from that of *Lygdamas*, and more inclined to purple.

LYCÆNA LYCEA, Edw.

Lycæna Lycea, EDW., Proc. Ent. Soc. Phila., 1864.

This species is especially abundant on the outskirts of Denver early in June. They are usually found among wild Blue Lupines, which there are common weeds, and very possibly the larva may feed upon this plant. Later in the season, in the South Park an empty egg and a caterpillar, both evidently of some *Lycæna*, were found on wild lupines. The larva was pale green, with one or two whitish dorsal stripes, but was lost before I had an opportunity to make a detailed description. *L. Lycea* is a very variable species; the black dots on the under surface are often encroached upon by their white margins to such an extent that only minute points remain. The species remains on the wing till August. About seventy specimens were taken. It was brought from the South Park by the expedition, but is not known to occur outside of Colorado.

†LYCÆNA PHERES, Boisd.

Lycæna Pheres, MORRIS, Syn. Am. Lep., 88.

Specimens of this species were brought by the expedition from Southern Utah; it occurs also in Nevada and California.

LYCÆNA DAUNIA, Edw.

Lycæna Daunia, EDW., Trans. Am. Ent. Soc., 1871.

Three specimens of this species, the only known examples, were taken on Turkey Creek during the last week in June.

LYCÆNA PSEUDARGIOLUS var. VIOLACEA, Edw.

Lycæna violacea, EDW., Butterflies N. A., i.

One specimen was taken, either near Denver or on Turkey Creek, early in June.

†LYCÆNA PIASUS, Boisd.

Lycæna Echo, EDW., Proc. Ent. Soc. Phila., 1864.

L. Piasus was collected by the expedition of 1871. Though not rare in California, it is not known to occur as far east as Colorado.

LYCÆNA NEGLECTA, Edw.

Lycæna Neglecta, EDW., Butterflies N. A., i.

This species occurs rarely in Colorado. One or two specimens were taken in June.

LEMONIAS, (Illiger) Westwood.

†LEMONIAS DUMETI, Behr.

Lemonias Dumeti, BEHR, Proc. Cal. Acad. Nat. Sci., 1865.

This species was taken by the expedition of 1871, probably in Utah or Arizona. It inhabits the extreme southwest of the United States.

†LEMONIAS CYTHERA, Edw.

PLATE XXXVI, FIGS. 3, 4.

Lemonias Cythera, EDW., Proc. Am. Ent. Soc., 1873.

Three males were collected by the expedition in Arizona. They are the only known examples

EPARGYREUS, (Hübner) Scud.

EPARGYREUS TITYRUS, Fabr.

Epargyreus Tityrus, HARRIS, Insects Injurious to Vegetation, pl. v.

I did not meet with this species in Colorado; but my brother, S. H. Mead, jr., gave me three specimens, which he took in the mountains near the South Park. They did not differ from eastern examples.

NISONIADES, Hübner.

NISONIADES PERSIUS, Scud.

Nisoniades Persius, SCUD., Proc. Essex Inst., 1862.

N. Persius is the most common species of its genus in Colorado. About twenty-five specimens were obtained. They differ somewhat from eastern individuals; but Mr. Scudder informs me that in Arizona still more aberrant forms are found, all of which, however, seem too near *Persius* to be separated specifically.

NISONIADES PETRONIUS, Scud.

Nisoniades Petronius, SCUD., MS.

Mr. Scudder writes, in a recent letter, that he has received from Mr. Edwards an undescribed Colorado *Erynnis* (*Nisoniades*), and will give it this name.

NISONIADES RUTILIUS, Scud.

Nisoniades Rutilius, SCUD., MS.

One individual, now in Mr. Scudder's hands for description, was taken June 23 at Turkey Creek Junction.

NISONIADES ICELUS, Lintner.

Nisoniades Icelus, LINTNER, 23d Rep. N. Y. State Illus. Nat. Hist., 1872.

One specimen was taken June 10 near Fairplay, South Park.

PHOLISORA, Scud.

PHOLISORA CATULLUS, Cramer.

Nisoniades Catullus, MORRIS, Syn. Am. Lep., 115.

Specimens were brought by the expedition from Southern Utah. One or two were seen near Denver early in June.

LEUCOSCIRTES, Scud.

†LEUCOSCIRTES ERICETORUM, Boisd.

Syrichthus Alba, EDW., Proc. Ent. Soc. Phila., 1866.

Brought in by the expedition of 1871, probably from Utah or Arizona. The species is also found in California.

HESPERIA, (Fabr.) Kirby.

HESPERIA TESSELLATA, Scud.

Hesperia Tessellata, SCUD., Rep. Peabody Acad. Sci., 1871.

This species is abundant throughout the West. In Colorado, it is found on the wing during June and July.

HESPERIA, *sp.* (?).

A *Hesperia*, very closely allied to *Centaureæ*, Rambur, frequents the high peaks about Twin Lakes, where seventeen specimens were taken in July, all above 11,000 feet elevation (timber line).

Mr. Scudder assures me that this species is distinct from *Ruralis*, Boisd., to which it was at first referred. It is probably not *Centaureæ*; but I have scarcely sufficient material for comparison at hand to safely describe it as distinct.

OARISMA, Scud.**OARISMA GARITÁ, Reakirt.**

Hesperia Garitá, REAKIRT, Proc. Ent. Soc. Phila., 1867.

T. Hylax, EDW., Trans. Am. Ent. Soc., 1871.

This is a rather rare species, and so far has not been taken outside of Colorado. A closely allied species, undescribed, unless a variety of *O. Powesheik*, is, however, found in the Yellowstone region of Montana. *O. Garitá* was collected by the expedition in the South Park. It occurs also at Twin Lakes, and may be found during June and a part of July.

POTANTHUS, Scud.**POTANTHUS OMAHA, Edw.**

Hesperia Omaha, EDW., Proc. Ent. Soc., Phila., 1863.

Habitat: "Pike's Peak, Colorado; Kanawha County, West Virginia" (Edwards).

I do not know this species.

AMBLYSCIRTES, Scud.**AMBLYSCIRTES KIWAN, Reakirt.**

Habitat: "Rocky Mountains." With this species, I am also unacquainted.

OCYTES, Scud.**OCYTES RIDINGSII, Reakirt.**

The male of this species appears to be undescribed. It is very similar to the female, and differs chiefly in being of a brighter fulvous above, and in the possession of the black, velvety, discal bar, or stigma, on the primaries; this shows beneath as a blackish line. The species was found at Twin Lakes in July, generally upon or near the Dwarf Lupines, which grew with bunch grass and low herbage, in open spaces between the plants of sage brush.

Altogether thirty-one specimens were taken.

PAMPHILA, (Fabr.) Westwood.**PAMPHILA NAPA, Edw.**

Hesperia Napa, EDW., Proc. Ent. Soc. Phila., 1864.

Brought by the expedition from Colorado. I found a few specimens in August near Georgetown, Colo., and two in the Yosemite Valley on the 21st of October.

† **PAMPHILA JUBA, Scud.**

Pamphila Juba, SCUD., Rep. Peabody Acad. Sci., 1871.

I do not know this species from Colorado, though very probably it may be found there. All my specimens were taken near Salt Lake City, Utah, early in October. There it seems to be not uncommon.

PAMPHILA COLORADO, Scud.

Pamphila Colorado, SCUD., Memoirs Bost. Soc. Nat. Hist., ii, 1874.

This species, with the following, appears late in the season. Specimens were taken on the Georgetown and South Park roads during the latter part of August.

PAMPHILA MANITOBA, Scud.

Pamphila Manitoba, SCUD., Memoirs Bost. Soc. Nat. Hist., ii, 1874.

Of this species I have two males, taken August 19 and 30; one at Idaho Springs, the other on the South Park road.

PAMPHILA NEVADA, Scud.

Pamphila Nevada, SCUD., Memoirs Bost. Soc. Nat. Hist., ii, 1874.

This is a smaller species than either of the two preceding. It is quite common, in June, in the mountains about the South Park, and in the park itself. It does not seem to appear later than July.

ATALOPEDES, Scud.‡ **ATALOPEDES HURON, Edw.**

Hesperia Huron, EDW., Proc. Ent. Soc. Phila., 1863, pl. i.

This species was brought in by the expedition of 1871, but the precise locality is not given. It occurs from New York to Texas.

POLITES, Scud.**POLITES DRACO, Edw.**

Pamphila Draco, EDW., Trans. Am. Ent. Soc., 1871.

P. Draco was moderately abundant in the mountains during June and the early part of July. Specimens were brought by the expedition from Southern Utah, and from Twin Lakes, Colorado. It is also found in California.

OCHLODES, Scud.**OCHLODES SONORA, Scud.**

Ochlodes Sonora, SCUD., Rep. Peabody Acad. Sci., 1871.

Individuals of this species, from Colorado, seem a little darker in color than those from California. Several specimens, all males, were obtained at Twin Lakes about the middle of July.

LIMOCHORES, Scud.**LIMOCHORES CERNES, Boisd. & LeC.**

H. Ahaton, HARRIS, Insects Injurious to Vegetation.

One male and one female of this species were taken in Colorado. They differ somewhat from the ordinary eastern type in that the wings are much suffused with fulvous.

NOCTUIDÆ—CATOCALA, Schrank.**CATOCALA EDITHA, Edw.**

Catocala Editha, EDW., Trans. Am. Ent. Soc. Phila., Oct., 1874, 112.

Male.—Expands 3.3 inches. Primaries light gray-brown, crossed longitudinally from base to a point just below apex by a blackish-brown stripe; the transverse lines distinct; the basal nearly entire from the costa to middle of submedian interspace, and there serrated in the form of the letter W, the middle serration being very small; the elbowed line has two prominent teeth, the upper one projecting about one-tenth inch; following these a deep obovate sinus that reaches nearly to the basal line; on the lower edge of this sinus the line is twice serrated, and then forms a re-entering angle to submedian nervure; a wavy, gray, serrated stripe crosses the extradiscal area, anteriorly following the course of the elbowed line, but posteriorly

nearly parallel to the hind margin; within the margin a series of brown points in the several interspaces, each on a gray streak coming from the margin, reniform, bright brown, edged on the basal side with black. Secondaries bright rosy-red; the median band rather broad, contracted on the middle on the outer side, even edged, and with a circular curve on the inner side, terminating in a blunt point a little within the abdominal margin; the marginal border broad, and somewhat sinuous within posteriorly; the margin narrowly edged with yellow-white, with fringes of same color.

On the under side, the red shade covers rather more than one-third of the wing, but is partly wanting on the submedian interspace outside of the median band.

From a single specimen taken in Sonoita Valley by H. W. Henshaw, July, 1874.

NOTE.—The plates to illustrate this report have been in some instances copied from those of Mr. W. H. Edwards in his recent work, *Butterflies of North America*, by permission; others have been figured from nature.

List of species of Lepidoptera collected in 1871, 1872, 1873, and 1874 in California, Nevada, Utah, Colorado, New Mexico, and Arizona, identified by

WILLIAM H. EDWARDS.

RHOPALOCERA.

PAPILIO, Fabr.

P. Pilumnus, Boisd.
Zolicaon, Boisd.
Daunus, Boisd.
Rutulus, Boisd.
Asterias, Drury.

P. Turnus, Linn.
Bairdii, Edw.
Americus, Kohl.
Philenor, Linn.

PARNASSIUS, Latr.

P. Clodius, Ménétriés.

P. Smintheus, Doubleday.

PIERIS, Boisd.

P. Protodice, Boisd.
Occidentalis, Reakirt.

P. Menapia, Felder.
Beckerii, Edw.

ANTHOCHARIS, Boisd.

A. Julia, Edw.

A. Ausonoides, Boisd.

NATHALIS, Boisd.

N. Iole, Boisd.

COLIAS, Fabr.C. Cæsonia, Stoll.
Eurydice, Boisd.
Eurytheme, Boisd.
Keewaydin, Edw.C. Alexandra, Edw.
Scudderii, Reakirt.
Edwardsii, Behr.
Meadii, Edw.**TERIAS, Swains.**

T. Nicippe, Cramer.

T. Mexicana, Boisd.

DANAIS, Latr.

D. Archippus, Cram.

D. Berenice, Cram.

EUPTOIETA, Doubleday.

E. Claudia, Cram.

ARGYNNIS, Fabr.A. Nokomis, Edw.
Nitocris, Edw.
Nausicaa, Edw.A. Nevadensis, Edw.
Eurynome, Edw.**MELITÆA, Fabr.**M. Anicia, Doub.
Palla, Boisd.
Hoffmanni, Behr.
Acastus, Edw.M. Nubigena, Behr.
Leanira, Felder.
Canace, Edw.
Minuta, Edw.**PHYCIODES, Doub.**P. Mylitta, Edw.
Camillus, Edw.P. Pallida, Edw.
Marcia, Edw.**SYNCHLOE, Doub.**

S. Crocale, Edw.

GRAPTA, Kirby.

G. Zephyrus, Edw.

VANESSA, Fabr.

V. Antiopa, Linn.

PYRAMEIS, Doub.P. Huntera, Drury.
Cardui, Linn.P. Carye, Hüb.
Atalanta, Linn.**JUNONIA, Doub.**

J. Lavinia, Hüb.

LIMENITIS, Fabr.

L. Weidemeyerii, Edw.
 Ursula, Fabr.

L. Lorquini, Boisd.
 Californica, Butler.

APATURA, Fabr.

A. Leilia, Edw.

LIBYTHERA, Fabr.

L. Carinenta, Cram.

GYROCHEILUS, Butler.

G. Tritonia, Edw.

CÆNONYMPHA, Westwood.

C. Ochracea, Edw.

SATYRUS, Westwood.

S. Wheeleri, Edw.
 Ariane, Boisd.
 Ridingsii, Edw.

S. Silvestris, Edw.
 Charon, Edw.

EREBIA, Dalman.

E. Epipsodea, But.

CHIONOBAS, Boisd.

C. Chryxus, Doub.
 Semidea, Harris.

C. Uhlerii, Reak.

THECLA, Fabr.

T. Halesus, Cram.
 Crysalus, Edw.
 Humuli, Harr.
 Sylvinus, Boisd.

T. Mopsus, Hüb.
 Siva, Edw.
 Californica, Edw.

CHRYSOPHANUS, West.

C. Helloides, Boisd.

C. Ianthé, Edw.

LYCÆNA, Fabr.

L. Piasus, Boisd.
 Pheres, Boisd.
 Battoides, Boisd.
 Sæpiolus, Boisd.
 Heteronea, Boisd.
 Amyntula, Boisd.

L. Lycea, Edw.
 Fea, Edw.
 Melissa, Edw.
 Helios, Edw.
 Acmon, Doub.
 Isola, Reak.

LEMONIAS, Westwood.

L. Dumeti, Behr.

L. Cythera, Edw.

PYRRHOPYGE, West.

P. Araxes, Hewitson.

EUDAMUS, Swains.

E. Cellus, Boisd.

NISONIADES, West.N. Funeralis, Scud.
Persius, Scud.

N. Catullus, Cram.

SYRICHTUS, Boisd.S. Tessellata, Scud.
Scriptura, Boisd.

S. Oceanus, Edw.

PAMPHILA, Fabr.P. Huron, Edw.
Napa, Edw.
Draco, Edw.P. Colorado, Scud.
Nevada, Scud.
Nereus, Edw.**ANCYLOXYPHA, Felder.**

A. Hylax, Edw.

HETEROCERA.**MEGATHYMUS, Scudder.**

M. Yuccæ, Boisd.

DEILEPHILA, Ochsenheimer.

D. Lineata, Fabr.

SPHINX, Linn.

S. Carolina, Linn.

EUCHRONIA, Packard.

E. Maia, Drury.

ATTACUS, Linn.

A. Cecropia, Linn.

CATOCALA, Schrank.

C. Editha, Edw.

C. Faustina, Strecker.

CHAPTER IX.

REPORT

UPON

NEW SPECIES OF ZYGAENIDAE AND BOMBYCIDAE

COLLECTED IN PORTIONS OF

CALIFORNIA AND ARIZONA

DURING

THE YEARS 1871, 1872, AND 1873.

BY

RICHARD H. STRETCH.

CHAPTER IX.

This collection, though small, is of much interest, as indicating what we may expect from Arizona when more is known of its fauna. Two of the species here enumerated range into Costa Rica and three into Mexico; two of them as far north as Portland in Oregon, and only one seems to be peculiar to Arizona. This linking of the United States to the tropical fauna of Central America and Mexico may largely swell the list of United States species. Nor should it be lost sight of that while the Mexican forms range into Arizona, the Gulf of California appears to have proved a barrier to their distribution in California. A number of specimens still remain to be identified in this collection.

BOMBYCIDAE.

ARCTIINAE.

EUCHAETES, Harris.

EUCHAETES ELEGANS, *sp. nov.*

PLATE XL, FIGS. 5, 6.

♂.—White. Head and palpi white, the latter rosy at the base, and the former very narrowly rosy behind, particularly near the eyes. Antennæ white; pectinations black. Prothorax, patagia, and thorax white. Abdomen *rosy* above; dusky white beneath, with a faint dorsal row of whitish spots, centered with dusky, and a lateral row of black spots. Legs whitish, with the coxæ of the anterior pair pale rosy. Wings pure glossy white, immaculate.

♀.—Similar to ♂, except that the colors of the abdomen are less distinct, and the last segment of the abdomen is tufted with dense whitish hairs, somewhat as in *E. egle* ♀.

Expanse of wings, ♂ ♀, 1.45 inches. Length of body, 0.55 inch.

HAB.—Owen's Valley, California. Described from one ♂ and ♀ in good preservation. In the form of the wings and general structure of the body, this species closely resembles *E. egle* and *E. oregonensis*, but the wings are narrower than in *E. collaris*. The color of the abdomen separates it readily from its allies found in the United States, though there is a very similar Mexican species with a rosy head.

Habits unknown.

COCHLIDIINAE.

LEUCARCTIA, Packard.

LEUCARCTIA ALBIDA, Stretch.

PLATE XL, FIGS. 4, 5.

♂.—White. Head and thorax white. Sides of the front next the eyes black. Palpi black, a little whitish below. Thorax beneath white. Antennæ black. Abdomen clear yellow-ocher above, except the apical segment and the basal hairs, which are white; beneath white. Each segment above has a transverse black spot. There is a lateral row of small black dots, and a faint indication of a sublateral row of the same color. Legs white above. Coxæ of anterior pair black, fringed with yellow hairs. Inside of femora yellow; those of the middle pair only partially so; those of the posterior pair only at the apex of the joints; tips all touched with black. Tibiæ of anterior and middle pairs streaked with dusky inwardly; posterior pair white. Tarsi dusky beneath. Wings pure white, both above and beneath; the anterior pair immaculate; secondaries showing faint traces of a discal spot and two submarginal spots. Expanse of wings, 1.20 inches. Length of body, 0.80 inch.

HAB.—Owen's Valley, California.

♀.—Unknown.

The specimen from which the description is given is in poor preserva-

tion, but may readily be distinguished from *L. acraea*, not merely by its smaller size and the absence of markings, which alone in such genera as this would scarcely warrant its separation under a specific name, but by the color of the posterior wings, which are totally different from the well known *L. acraea*. It may not be uninteresting to add that I have in my collection a ♂ exactly corresponding to the foregoing description, which I received from Costa Rica through Dr. Van Patten. This gentleman's collection was made in the table lands of the interior. I have also, from the same locality, a large *notodontid* (?), likewise identical with a specimen received from Arizona! When it is remembered that I am as yet acquainted with only five species of *Bombycina* from the district of Arizona and its vicinity, it is somewhat remarkable that two of these should be represented in a locality so widely removed as Costa Rica, and we may naturally look for many striking additions to our list of insects as we become more familiar with this as yet almost unknown country.

ZYGAENIDAE.

CASTNIINAE.

ARCTIA, Schrank.

ARCTIA DOCTA var. ARIZONIENSIS, Stretch.

PLATE XL, FIGS. 2, 3.

♂.—Head yellow-ocher; palpi black; antennæ brown; prothorax, patagia, and thorax somewhat hairy, pale whitish-yellow; the patagia each with a black dash and the thorax with a central black line.

Abdomen above pale vermilion; terminal segments black, beneath black, with a broad ventral pale yellowish stripe. Legs blackish; coxæ of anterior pair hairy, ocher yellow.

Anterior wings pale creamy-yellow, with the following reduced black spots: two basal streaks; three irregularly shaped angular subcostal spots, one of which is on the discal vein, one outside and one inside of the discal vein; two spots on the outer margin, one apical the other on the second meridian; a submarginal spot between the third and fourth median nervules; an elongated anal spot and a minute transverse spot on the submedian vein,

near the base. The middle subcostal spot is supplemented below the median vein by a very faint transverse streak. Fringes concolorous with wings.

Secondaries dirty white, thinly scaled, rosy along the inner margin, with a small blackish discal spot; a submarginal row of three blackish spots, the anal one small, the apical one extending from the costa to the first median nervule. There are also two marginal spots, one near the apex, the other about the middle of the inner margin.

Beneath as above, except that the fore wings are nearly white, and the costa of all the wings is decidedly yellow-ocher.

Expanse of wings, 1.60 inches. Length of body, 0.65 inch.

HAB.—Arizona.

Described from one ♂ received from my friend Mr. W. H. Edwards. The nearest ally of this beautiful species is *A. autholea*, Boisduval, which it much resembles. The number and location of the black markings in the primaries is identical, but they are much reduced in size. The chief point of difference is in the black markings on the secondaries, of which there is no trace in *A. autholea* ♂, while it may prove, however, to be merely a variety when we possess larger *suites* of these insects. It is at present sufficiently distinct to warrant a separate name.

ARCTIA YARROWII, Stretch.

PLATE XL, FIGS. 1, 2.

♂.—Head clothed with long black hairs. Thorax black, lemon-yellow outwardly. Abdomen black both above and beneath, densely and finely scaled, with an indistinct lateral row of crimson dots. Anal tuft silky, pale ferruginous. Legs black; anterior pair with crimson coxæ; in the middle pair the tips of the tibiæ and the femora are likewise crimson; on the hind pair the tips of the tibiæ and ends of the tarsi are also of the same color.

(Note.—The specimen from which this description is drawn has been pressed as flat as a botanical specimen, and the body parts do not admit of a more detailed description. The antennæ are wanting.)

Anterior wings velvety black, with very narrow fringes and markings as follows of clear lemon-yellow: five angular costal spots, of which the two nearest the base are quadrate; the third at the middle of the wing is

much narrower; all of these extend only to the median vein; the fourth is narrow, though wider than the third, and extends across the wing to the anal angle as an irregular band, being toothed outwardly about the middle at the point where it receives the termination of the fifth short irregular spot or band; below the submedian vein, near the base of the wing and opposite the costal spots 1 and 2, are two small, very reduced spots; and from the middle of the inner margin springs a very narrow, curved band, which unites with the middle of the fourth spot, forming with it and the fifth the usual terminal Arctian markings. The disposition of these markings is more like that of *E. carya* or *N. plantaginis* than any of the strictly American Arctians.

Posterior wings full, rounded, rather thinly scaled; basal half black, bounded outwardly by an irregular line extending from the basal two-fifths of the costa to the anal angle. Outer half orange-scarlet, inclining to orange near the apex. Fringes lemon-yellow. This outer half contains a small black spot on the discal vein, and a submarginal row of three larger black spots. The first of these lies across the interspace above the first median nervule; the second across the fourth median nervule; and the third, on the submedian vein close to the outer margin. There is besides a very narrow marginal spot about the middle of the outer margin.

Beneath, the markings are reproduced; those on the primaries, especially near the apex, being broader and more diffuse. All the light portion of the primaries, except near the apex, are suffused with crimson; this color being most intense near the base and along the subcostal vein. The secondaries are somewhat paler, and there is a crimson streak on the basal third of the costa, which does not appear above. Expanse of wings, 1.75 inches. Length of body, 0.80 inch.

HAB.—Arizona.

♀.—Unknown.

This species, without exception the most beautiful of the American Arctians, cannot be mistaken for any other. It belongs to the section in which the veins are not clearly marked with a distinctive color. The body reminds one of *Epicallia virginalis*, Boisduval, the under wings suggest the ♀ variety of *Nemeophila plantaginis* with red secondaries, while the orna-

mentation of the primaries recalls *E. caja*. It is so unlike any of our other species of the genus that further comparison is unnecessary. It is with much pleasure that I dedicate this beautiful insect to Dr. H. C. Yarrow, the surgeon and zoölogist of this expedition, and to whom I am indebted for many kindnesses.

EPICALLIA, Hübner.

EPICALLIA VIRGINALIS, Boisd.

Two specimens were received from Arizona similar to var. *guttata*, but with rather more ochreous spots on the secondaries, and with the yellow spots on the secondaries rather larger in size than in Californian specimens.

MELANCHROIA.

MELANCHROIA? INCONSTANS, Hübner.

Melanchroia? inconstans, WALKER, C. L., B. M., 389.

Ardonia secreta, WALKER, C. L., B. M., 222, supp.

One specimen from Arizona.

ALYPIA, Hübner.

ALYPIA BIMACULATA, H. S.

Agarista Grotei, BOISD., Lep. Cal. (1868-69).

One specimen in good condition from Arizona, with the secondaries immaculate. The type of this species was from Mexico.

GNOPHAELA.

GNOPHAELA HOPFFERI, Grote, var. DISCRETA Stretch.

Var. DISCRETA, *var. nov.*

Two specimens which I have referred to the above species may possibly prove to be specifically distinct, though I prefer at present to consider them merely as a local variety. While resembling *G. Hopfferi* in form, they are nearer to *G. vermiculata*, Grote, in color, particularly on the secondaries. The most prominent difference is in the yellowish spot of the primaries, which lies on the discal area. In *vermiculata*, this is cuneiform, and reaches nearly to the base of the wing; in *Hopfferi*, it is quadrate, and does not extend back of the base of the fourth median nervule; while in *discreta* it is intermediate in form. These specimens were from Arizona, and neither of the previously described forms have yet been received from that Territory.

CHAPTER X.

REPORT
UPON
THE COLLECTION OF DIPTERA
MADE IN PORTIONS OF
COLORADO AND ARIZONA
DURING
THE YEAR 1873.
BY
C. R. OSTEN-SACKEN.

CHAPTER X.

The small number of *Diptera* collected were preserved in alcohol, which renders specimens of this order more or less unfit for scientific purposes.

Furthermore, the specimens of this collection apparently have been transferred from other bottles to those in which they were ultimately examined, because in many cases only fragments of insects were found, while at the same time portions of the specimens which were wanting could not be discovered in the vials received. Under the circumstances, all that can be furnished is a meagre list of the few capable of identification.

The only available specimen in the collection was a fine *Lasia* (family *Acroceridæ*), new to science, the description of which is as follows :

LASIA KLETTII, *nov. sp.*

Metallic green ; feet black. Long. corp. 17 millimeters.* Altogether metallic green, with golden reflections ; upper side finely and evenly punctured ; venter more bluish ; feet altogether brownish-black ; proboscis black, by one-half longer than the body ; antennæ very short, black ; the basis of the third joint slightly reddish ; this joint is more than twice as long as the two first taken together, gradually tapering toward the tip. Wings distinctly infuscated ; tegulæ brownish, bordered with black. The specimen having been preserved in alcohol, its metallic surface is entirely deprived of pubescence ; some vestiges on the thorax prove that it was clothed with short pale hairs.

Camp Apache, Ariz., September, 1873. Collected by Francis Klett, to whom this species is dedicated.

OBSERVATION.—I place this species provisionally in the genus *Lasia*, to which it is related. It differs from Wiedemann's figure of *Lasia* in the

* The measurement is taken lengthwise through the body, from end to end, without taking into account its considerable gibbosity.

fact that the second longitudinal vein ends in the first and not in the costal vein.

It differs from *Eulonchus* in the eyes being contiguous between the antennæ and the vertex only, and not above and below the antennæ. The abdomen is very broad, and its upper side very convex; it is broad and cut squarely at the basis; broad and blunt at the tip (not tapering, as in *Eulonchus*).

The cuts represent this species, Fig. 1, *L. Klettii* magnified; (the hind tarsi are broken off; the hair line indicate the natural size).

Fig. 2, profile view of the same.

Fig. 3, wing magnified.

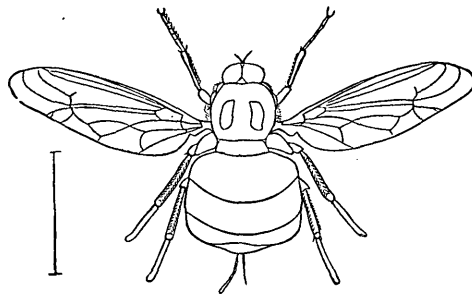


FIG. 1.

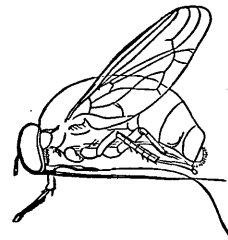


FIG. 2.

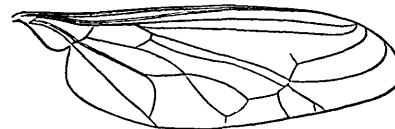


FIG. 3.

LIST OF SPECIMENS IDENTIFIED.

BOMBYLIARII.

ANTHRAX, Linn.

ANTHRAX OEDIPUS, Fabr.

Anthrax oedipus, FABR., Syst. Antl., 123, 22.—WIED., Dipt. Exot., i, 124, 8.—AUSS., Zweifl., i, 262, 12.—SAY, Jour. Acad. Nat. Sci. Phila., iii, 46, 6.—(*Anthrax irrorata*), WALKER, List, &c., ii, 253.

HAB.—Kentucky; Pennsylvania; West Indies; Nova Scotia; Rocky Mountains; Colorado.

A few specimens, collected in 1873 by Dr. J. T. Rothrock at Fairplay, Colo.

ANTHRAX SINUOSA, Wied.

Anthrax sinuosa, WIED., Dipt. Exot., i, 147, 42.—AUSS., Zweifl., i, 301, 64.

HAB.—Georgia; Colorado.

A few badly damaged specimens of this species were taken in 1873 at Twin Lakes, Colorado, by Dr. J. T. Rothrock.

TIPULIDAE.

TIPULA, Linn.

A number of specimens of this genus were collected in South Park, Colorado, and other localities, in 1873, by Dr. J. T. Rothrock, but, having been placed in alcohol, were in too bad condition for identification.

TABANIDAE.

TABANUS, Linn.

Some few specimens, collected in 1873, in San Luis Valley and South Park, Colorado, by Dr. J. T. Rothrock, arrived in fragmentary condition, consequently could not be identified as regards species.

LEPTIDES.

LEPTIS, Fabr.

A few specimens of *Leptis* (*Chrysopila*) were secured in 1873 by Dr. J. T. Rothrock in San Luis Valley, Colorado, but could not be identified.

It is greatly to be regretted that this collection of *Diptera*, consisting of thirty lots, on which great pains had been bestowed, should have been ruined while *en route* to Washington from the field; but under the circumstances the destruction was unavoidable. The collections of preceding years have never been received in Washington.

CHAPTER XI.

REPORT

UPON

THE COLLECTIONS OF COLEOPTERA

MADE IN PORTIONS OF

NEVADA, UTAH, CALIFORNIA, COLORADO, NEW MEXICO, AND ARIZONA,

DURING

THE YEARS 1871, 1872, 1873, AND 1874.

BY

HENRY ULKE.

CHAPTER · XI ·

The *Coleoptera* which have been collected by this expedition abound in specimens, while the number of species is also very large, no less than 389 having been secured, of which five are new to science. From the peculiar character of that part of the country visited (from Owens Valley, California, to Utah, Colorado, New Mexico, and Arizona), this fact might have been expected, and has already been observed by former collectors. In these desert regions there are two families in particular which are very characteristic, and whose numerous species represent almost exclusively the coleopterous fauna of these localities: they are the *Tenebrionidæ* and *Meloidæ*; the former live on the ground in great numbers and variations, while the latter are found on most every species of *Astragalus*. Of these vesicants, two new forms have been discovered, which, with some other new species, are described below.

DESCRIPTIONS OF NEW SPECIES.

BEMBIDIUM NEVADENSE.

PLATE XLI, FIG. 3.

Greenish-black, shining, subdepressed; upper and under surface brightly shining; thorax subquadrate, a little broader than long; sides rounded, margined, narrower at the base; hind angles rectangular, obliquely carinated, and at the base wrinkled; elytra finely striato-punctate, punctures diminishing toward the apex; interstitial lines depressed; at the humerus and before the apex dark rufous spots; antennæ deep piceous; basal joints rufous; legs dark brown. Length, .20 inch = 5 millimeters. *Nevada*. This species is allied to *B. lucidum*, *bimaculatum*, etc., but is more blackish, and a little smaller.

DASYTES RUFICOLLIS.

PLATE XLI, FIG. 5.

Body testaceous, shining, and clothed with grayish pubescence; head and thorax reddish-yellow, finely punctured, clothed with cinereous pubescence, the latter rounded and wider than long; elytra dark-bronzed, with the sides and apex reddish-yellow, finely punctured and clothed with cinereous pubescence; abdomen dark-bronzed; prothorax and legs reddish-yellow; antennæ reddish-yellow, with the last five joints dark piceous. Length, 0.9 inch = 2 millimeters. *Nevada*. This species is readily known from all others by its rufous head and thorax.

EPICAUTA WHEELERI.

PLATE LXI, FIG. 4.

Body black, covered with grayish pubescence; thorax rusty-red. Head sparsely punctured and covered with coarse, grayish pubescence; medial line black, shining; thorax rounded, as broad as long, covered with a thick, felt-like, reddish-brown pubescence, edged with lighter-colored, bristle-like hairs; elytra densely clothed with short cinereous pubescence; body beneath black, with coarse, gray pubescence; femora and tibiæ with a black spot at the end; tarsi and antennæ black. Length, 0.35–0.40 inch = 9–11.5 millimeters. *Arizona*. I dedicate this beautiful species with great pleasure to Lieut. George M. Wheeler, Corps of Engineers, U. S. A., who, by the large collections made under his directions, has rendered important services to natural science.

LYTTA LUGUBRIS.

PLATE LXI, FIG. 2.

Uniformly black, moderately shining. Head quadrate, scabrous, with large punctures, and a small, frontal, yellow spot; thorax hexagonal, and sculptured like the head; elytra evenly scabrous; body beneath more shining and uniformly punctured; legs and antennæ dark piceous. Length, 0.45–0.80 inch = 11.5–20 millimeters. *Owens Valley, California*. Resembles *L. childii* and *mærens*, but may be known at once by the angulated form and coarser sculpture of the head and thorax.

CROSSIDIUS INTERMEDIUS.

PLATE LXI, FIG. 1.

Fulvous, flavo-pubescent. Head and thorax roughly punctured, blackish, thickly covered with yellowish hairs; thorax a little broader than long, with the sides angulated, pointed, and the hind angles prominent; elytra fulvous, densely clothed with flavous pubescence, deeply and closely punctured, the punctures becoming larger toward the base; abdomen flavous; antennæ and legs brown-red. Length, 0.45–0.65 inch = 11–17 millimeters. *Arizona*. This species is closely allied to *C. suturalis*, which differs from it in having the head, thorax, feet, and antennæ black. Some of the females of our species have also a sutural vitta, which extends backward from the anterior third of the elytra, forming a very elongate oval spot like the one in *suturalis*.

LIST OF SPECIMENS.

No.	Name.	Locality.	Date.	Collector.	Habitat.
CICINDELIDÆ.					
(?)	<i>Tetracha carolina</i> , Linn.....	Arizona.....	1871	F. Bischoff.....	Colorado, New Mexico, and Arizona.
(?)	<i>Cicindela purpurea</i> , Oliv.....	Nevada.....	1871	do.....	Do.
(?)	<i>Cicindela guttifera</i> , Lec.....	Arizona.....	1871	do.....	Do.
(?)	<i>Cicindela pusilla</i> , Say.....	California and Nevada.....	1871	do.....	Do.
(?)	<i>Cicindela hemorrhagica</i> , Lec.....	do.....	1871	do.....	Do.
D D	<i>Cicindela prasina</i> , Lec.....	Mineral Springs, Ariz.....	1873	F. Klett.....	Do.
4	<i>Cicindela pulchra</i> , Say.....	Camp Apache, Ariz.....	1873	H. W. Henshaw.....	Do.
A	<i>Cicindela pulchra</i> , Say.....	do.....	1873	G. M. Keasbey.....	Do.
D D	<i>Cicindela pulchra</i> , Say.....	Mineral Springs, Ariz.....	1873	F. Klett.....	Do.
79	<i>Cicindela pulchra</i> , Say.....	South Park, Colo.....	1873	Dr. J. T. Rothrock..	Do.
379 G	do.....	Colorado, New Mexico, and Arizona.	1874	Lieut. S. Blunt.....	Do.
1330	<i>Cicindela hirticollis</i> , Say.....	San Ildefonso, N. Mex.....	1874	Dr. H. C. Yarrow....	Do.
1225	<i>Cicindela punctulata</i> , Fabr..	Camp Bowie, Ariz.....	1874	J. M. Rutter.....	Do.
160 A	<i>Cicindela micans</i> , var. of <i>punctulata</i> , Fabr.	San Ildefonso, N. Mex.....	1874	Dr. H. C. Yarrow....	Do.
CARABIDÆ.					
(?)	<i>Elaphrus californicus</i> , Mann.	California.....	1871	F. Bischoff.....	Eastern, Western, Pacific States.
104	do.....	South Park, Colo.....	1873	Dr. J. T. Rothrock..	Do.
.....	<i>Calosoma triste</i> , Lec.....	Camp Apache, Ariz.....	1873	H. W. Henshaw.....	Colorado and New Mexico.
(?)	<i>Calosoma cancellatum</i> , Esch.	California.....	1871	F. Bischoff.....	Do.
(?)	<i>Calosoma luxatum</i> , Say.....	California and Nevada.....	1871	do.....	Do.
1293	<i>Calosoma carbonatum</i> , Lec..	Near Camp Crittenden, Ariz.....	1874	J. M. Rutter.....	New Mexico and Arizona.
104	<i>Calosoma obsoletum</i> , Say...	South Park, Colo.....	1873	Dr. J. T. Rothrock..	Nebraska, Dakota, Kansas, Colorado.
180	<i>Calosoma calidum</i> , Fabr....	Plains south of Denver, Colo.	1873	do.....	Northern, Southern, Eastern, Western States.

List of specimens—Continued.

No.	Name.	Locality.	Date.	Collector.	Habitat.
CARABIDÆ.					
(?)	<i>Carabus agassii</i> , Lec.....	Nevada.....	1871	F. Bischoff.....	Western States.
29	..... do	Southern Arizona.....	1873	H. W. Henshaw.....	Do.
L 62	..... do	Rio Grande.....	1874	Dr. O. Loew.....	Do.
666	<i>Carabus serratus</i> , Say.....	Denver, Colo.....	1873	H. W. Henshaw.....	Northern, Eastern, Southern, Middle States.
184	<i>Carabus tædatus</i> , Fabr.....	Roaring Fork, Colo.....	1873	Dr. J. T. Rothrock..	Western States to Alaska.
180	..... do	Plains S. of Denver, Colo.....	1873	..... do	Do.
(?)	<i>Brachinus fidelis</i> , Lec.....	California.....	1871	F. Bischoff.....	
(?)	<i>Brachinus kansanus</i> , Lec.....	Arizona.....	1871	..... do	
P 1	<i>Pasimachus elongatus</i> , Lec..	Camp Apache, Ariz.....	1873	H. W. Henshaw.....	Western States.
H	..... do	New Mexico.....	1874	(?)	Do.
1283	<i>Pasimachus californicus</i> , Chaud.	Camp Crittenden, Ariz.....	1874	J. M. Rutter.....	Texas to Arizona.
180	<i>Cymindis cribricollis</i> , Dej..	Plains S. of Denver, Colo..	1873	Dr. J. T. Rothrock..	Eastern States to Oregon.
379 G	..... do	Fort Garland, Colo.....	1874	Lieut. S. Blunt.....	Do.
184	<i>Cymindis reflexa</i> , Lec.....	Roaring Fork, Colo.....	1873	Dr. J. T. Rothrock..	Do.
Y 7	<i>Lebia atriceps</i> , Lec.....	Colorado Springs, Colo.....	1874	Dr. H. C. Yarrow.....	Kansas, Colorado, New Mexico, Arizona.
A 3	<i>Lebia viridis</i> , Say.....	Pueblo, Colo.....	1874	C. E. Aiken.....	Eastern, Southern, Western States.
(?)	<i>Platynus californicus</i> , Dej..	California and Nevada.....	1871	..... do	
(?)	<i>Platynus subsericeus</i> , Lec..	Nevada.....	1871	..... do	
(?)	<i>Platynus harrisii</i> , Lec.....	..... do	1871	..... do	Northeast and West.
105 A	..... do	Taos, N. Mex.....	1874	Dr. H. C. Yarrow.....	Do.
(?)	<i>Platynus chalceus</i> , Lec.....	Nevada.....	1871	F. Bischoff.....	
197 A	<i>Platynus placidus</i> , Say.....	San Luis Valley, Colo.....	1873	Dr. J. T. Rothrock..	Eastern and Western States.
184	..... do	Roaring Fork, Colo.....	1873	..... do	Do.
104	<i>Platynus obsoletus</i> , Say.....	South Park, Colo.....	1873	..... do	Northern, Eastern, Western States.
184	<i>Pterostichus protractus</i> , Lec	Roaring Fork, Colo.....	1873	Dr. J. T. Rothrock..	Nebraska, Colorado, Nevada
(?)	..... do	Nevada and California.....	1871	F. Bischoff.....	Do.
55 A	..... do	Fort Garland, Colo.....	1874	Dr. H. C. Yarrow.....	Western States.
(?)	<i>Pterostichus scitulus</i> , Lec..	Nevada.....	1871	F. Bischoff.....	
(?)	<i>Pterostichus lucublandus</i> , Say	..... do	1871	..... do	
197 B	<i>Pterostichus longulus</i> , Lec..	San Luis Valley, Colo.....	1873	Dr. J. T. Rothrock..	Colorado and New Mexico.
184	..... do	Roaring Fork, Colo.....	1873	..... do	Do.
25	..... do	Fort Wingate, N. Mex.....	1873	H. W. Henshaw.....	Do.
166 A	..... do	San Ildefonso, N. Mex.....	1874	Dr. H. C. Yarrow.....	Do.
197 G	<i>Pterostichus luzotii</i> , Dej....	San Luis Valley, Colo.....	1873	Dr. J. T. Rothrock..	Northern and Western States to Oregon.
(?)	<i>Amara scitula</i> , Zim.....	California.....	1871	F. Bischoff.....	
(?)	<i>Amara (Bradytus) libera</i> , Lec	Utah.....	1872	..... do	
(?)	<i>Amara fallax</i> , Lec.....	Nevada.....	1871	F. Bischoff.....	
(?)	<i>Amara interstitialis</i> , Zim.....	..... do	1871	..... do	
(?)	<i>Amara (Lirus) jacobinæ</i> , Lec	Utah.....	1872	..... do	
184	<i>Amara Eschscholtzii</i> , Chaud.	Roaring Fork, Colo.....	1873	Dr. J. T. Rothrock..	High peaks of Colorado and Alaska.
180	..... do	South of Denver, Colo.....	1873	..... do	Do.
371 B	<i>Amara confusa</i> , Lec.....	Rio Grande, Colo.....	1873	H. W. Henshaw.....	Colorado, Nebraska, Utah.
1 ?	..... do	Between Santa Fé and Fort Wingate, N. Mex.	1873	T. V. Brown.....	Do.
577	<i>Amara obesa</i> , Say.....	San Luis Valley, Colo.....	1873	Dr. J. T. Rothrock..	Eastern, Southern, Western States.
H 52	<i>Amara polita</i> , Lec.....	New Mexico.....	1874	Dr. H. C. Yarrow.....	Western States.
(?)	<i>Amara terrestris</i> , Lec.....	..... do	1874	(?)	Do.
(?)	<i>Chlænius sericeus</i> , Say.....	California and Nevada.....	1871	F. Bischoff.....	
(?)	<i>Chlænius pennsylvanicus</i> , Say	..... do	1871	..... do	

List of specimens—Continued.

No.	Name.	Locality.	Date.	Collector.	Habitat.
CARABIDÆ.					
(?)	<i>Chlœnius tricolor</i> , Dej.	California and Nevada....	1871	F. Bischoff.....	Southern and Western States.
(?)	<i>Chlœnius solitarius</i> , Say....	New Mexico.....	1874	(?)	
(?)	<i>Anisodactylus californicus</i> , Dej.	California.....	1871	F. Bischoff.....	
(?)	<i>Anisodactylus ptychrous</i> , Lec.	..... do	1871	..... do	
(?)	<i>Anisodactylus viridescens</i> , Lec.	..... do	1871	..... do	
(?)	<i>Agonoderus maculatus</i> , Lec.	..... do	1871	..... do	East, South, and West.
1250	<i>Agonoderus pallipes</i> , Fabr.	Santa Fé, N. Mex.	1874	H. W. Henshaw....	
(?)	<i>Diplochila obtusa</i> , Lec.	Nevada.....	1871	F. Bischoff.....	
(?)	<i>Bradycellus rupestris</i> , Say....	..... do	1871	..... do	
(?)	<i>Bradycellus californicus</i> , Lec.	Nevada and California....	1871	..... do	
(?)	<i>Stenolophus limbalis</i> , Lec.	..... do	1871	..... do	Western States.
(?)	<i>Harpalus oblitus</i> , Lec.	Nevada.....	1871	..... do	
248 W	..... do	Pagosa, Colo.....	1874	C. E. Aiken.....	
(?)	<i>Harpalus obesus</i> , Lec.	Nevada.....	1871	F. Bischoff.....	
(?)	<i>Harpalus caliginosus</i> , Fabr.	Utah.....	1872	.....
1324	<i>Harpalus caliginosus</i> , Fabr.	Camp Lowell, Ariz.	1874	Henry Johnson....	East, South, and West.
104	<i>Harpalus fraternus</i> , Lec.	South Park, Colo.....	1873	Dr. J. T. Rothrock..	Western States to Oregon.
197 G	<i>Harpalus amputatus</i> , Say....	San Luis Valley, Colo....	1873	..... do	Kansas, Nebraska, New Mexico.
666	..... do	Denver, Colo.....	1873	H. W. Henshaw....	Do.
H	..... do	New Mexico.....	1874	(?)	Colorado and New Mexico.
L 40	<i>Harpalus retractus</i> , Lec.	..... do	1874	Dr. O. Loew.....	Western States.
105 A	<i>Harpalus funestus</i> , Lec.	Taos, N. Mex.	1874	Dr. H. C. Yarrow....	Do.
105 A	<i>Harpalus desertus</i> , Lec.	..... do	1874	..... do	Do.
1 ?	<i>Cratognathus setosus</i> , Lec.	Between Santa Fé and Fort Wingate, N. Mex.	1873	T. V. Brown.....	
(?)	<i>Bembidium 4-maculatum</i> , Linn.	Nevada.....	1871	F. Bischoff.....	
(?)	<i>Bembidium nevadense</i> , Ulke.	..... do	1871	..... do	
105 A	<i>Bembidium perspicuum</i> , Lec.	Taos, N. Mex.	1874	Dr. H. C. Yarrow....	Western States.
166 A	<i>Bembidium rapidum</i> , Lec.	San Ildefonso, N. Mex....	1874	..... do	Do.
(?)	<i>Nothopus zabroides</i> , Lec.	Vicinity of Abiquiu, N. Mex.	1874	Dr. O. Loew.....	Do.
55 A	<i>Cratacanthus dubius</i> , Beauv.	Fort Garland, Colo.....	1874	Dr. H. C. Yarrow....	East, South, and West.
52 H	<i>Piosoma setosum</i> , Lec.	Colorado Springs, Colo....	1874	..... do	Kansas, Colorado, New Mexico.
.....	<i>Discoderus impotens</i> , Lec.	.....	1874	.....	New Mexico and Arizona.
DYTISCIDÆ.					
(?)	<i>Agabus lugens</i> , Lec.	California.....	1871	F. Bischoff.....	
(?)	<i>Agabus morosus</i> , Lec.	Nevada.....	1871	..... do	
(?)	<i>Colymbetes binotatus</i> , Har.	..... do	1871	..... do	
M	..... do	Cañon de Chelle, N. Mex.	1873	G. M. Keasbey....	
195	..... do	Rio Grande, Colo.....	1873	Dr. J. T. Rothrock..	
393	<i>Colymbetes densus</i> , Lec.	Fort Garland, Colo.....	1873	H. W. Henshaw....	Colorado, Nebraska, Wyoming.
P	<i>Colymbetes sculptilis</i> , Harris	New Mexico.....	1874	Dr. H. C. Yarrow....	Eastern and Western States.
M	<i>Laccophilus truncatus</i> , Mann	Cañon de Chelle, N. Mex.	1873	G. M. Keasbey....	Western and Pacific States.
166 A	<i>Laccophilus maculosus</i> , Say.	San Ildefonso, N. Mex....	1874	Dr. H. C. Yarrow....	Eastern and Western States.
1223	<i>Hydroporus striatellus</i> , Lec.	Camp Lowell, Ariz.	1874	H. W. Henshaw....	Arizona to California.
149	<i>Dytiscus marginicollis</i> , Lec.	South Park, Colo.....	1873	Dr. J. T. Rothrock..	Western States.
197 G	..... do	San Luis Valley, Colo....	1873	..... do	Do.
247 A	..... do	Tierra Amarilla, N. Mex..	1874	Dr. H. C. Yarrow....	Do.
273	<i>Dytiscus confluens</i> , Say....	Pagosa, Colo.....	1874	..... do	Do.
(?)	<i>Rhantus binotatus</i> , Harris...	(?)	1873	(?)	Eastern, Western, Pacific States.

List of specimens—Continued.

No.	Name.	Locality.	Date.	Collector.	Habitat.
HYDROPHILIDÆ.					
(?)	<i>Hydrophilus californicus</i> , Lec	California and Arizona....	1871	F. Bischoff.....	Eastern, Southern, Western States.
M	<i>Hydrophilus glaber</i> , Herbst.	Cañon de Chelle, N. Mex..	1873	G. M. Kearsbey	
666	..... do	Denver, Colo	1873	H. W. Henshaw ...	
35	..... do	Santa Fé to Fort Wingate, N. Mex.	1873	Dr. O. Loew.....	Do.
(?)	..... do	New Mexico.....	1874	(?)	Do.
1301	<i>Hydrophilus triangularis</i> , Say	Arizona	1874	H. W. Henshaw ...	Everywhere.
.....	<i>Hydrophilus sublævis</i> , Lec.	.....	1874	.....	Western States.
(?)	<i>Hydrophilus ellipticus</i> , Lec.	Vicinity of Abiquiu, N. Mex.	1874	Dr. O. Loew.....	Southern and Western States.
(?)	<i>Hydrocharis glaucus</i> , Lec	Arizona	1871	F. Bischoff.....	Arizona to California.
1223	<i>Berosus punctatissimus</i> , Lec.	Camp Lowell, Ariz	1874	H. W. Henshaw....	
STRAPHYLINIDÆ.					
(?)	<i>Creophilus villosus</i> , Grav...	California and Nevada...	1871	F. Bischoff.....	Everywhere in United States.
197 G	..... do	San Luis Valley, Colo	1873	Dr. J. T. Rothrock..	Do.
103	..... do	Fort Garland to Costilla, Colo.	1874	Dr. H. C. Yarrow...	Do.
(?)	<i>Philonthus renæus</i> ?, Rossi ..	California	1871	F. Bischoff	High peaks of Colorado and Alaska.
184	<i>Porrhodites brevicollis</i> , Mükl	Roaring Fork, Colo	1873	Dr. J. T. Rothrock..	
SILPHIDÆ.					
(?)	<i>Necrophorus hecate</i> , Bland..	Nevada	1871	F. Bischoff	Western States.
103	..... do	Fort Garland to Costilla, Colo.	1874	Dr. H. C. Yarrow...	Do.
179	<i>Necrophorus Melsheimeri</i> , Kirby.	Colorado	1873	Dr. J. T. Rothrock..	Northern and Western States.
1018 A	..... do	San Carlos, Ariz	1874	J. M. Rutter.....	Do.
4	<i>Necrophorus marginatus</i> , Fabr.	Camp Apache, Ariz	1873	H. W. Henshaw ...	Western and Southwestern States.
(?)	<i>Silpha lapponica</i> , Herbst....	Nevada and California....	1871	F. Bischoff.....	All around the temperate and arctic parts of globe.
666	..... do	Denver, Colo	1873	H. W. Henshaw....	
104	..... do	South Park, Colo	1873	Dr. J. T. Rothrock..	
(?)	..... do	Vicinity of Abiquiu, N. Mex.	1874	Dr. O. Loew.....	Do.
(?)	<i>Silpha truncata</i> , Say	Nevada.....	1871	F. Bischoff.....	Do.
500 A	..... do	Pescado, N. Mex	1873	H. W. Henshaw....	
526	..... do	Arizona	1873	..... do	
H D	..... do .....	..... do	1873	Dr. O. Loew.....	Kansas, New Mexico, Arizona.
1279	..... do	Camp Crittenden, Ariz....	1874	Henry Johnson....	
(?)	<i>Silpha ramosa</i> , Say.....	California and Nevada....	1871	F. Bischoff.....	Western and Pacific States.
180	..... do	Plains S. of Denver, Colo.	1873	Dr. J. T. Rothrock..	Do.
4	..... do	Camp Apache, Ariz	1873	H. W. Henshaw....	Do.
(?)	<i>Philhydrus imbellis</i> , Lec....	Utah	1872	.....
DERMESTIDÆ.					
(?)	<i>Dermestes marmoratus</i> , Say.	California and Nevada....	1871	F. Bischoff.....	Western and Pacific States.
666	..... do	Denver, Colo	1873	H. W. Henshaw ...	Do.
P	..... do	New Mexico.....	1874	Dr. H. C. Yarrow...	Do.
666	<i>Dermestes fasciatus</i> , Lec....	Denver, Colo.....	1873	H. W. Henshaw ...	Kansas, New Mexico, Utah.
666	<i>Dermestes cunicus</i> , Germ....	..... do	1873	..... do	Throughout United States.
1293	<i>Dermestes vulpinus</i> , Fabr....	Near Camp Crittenden, Ariz.	1874	J. M. Rutter.....	From Atlantic to Pacific States.
HISTERIDÆ.					
(?)	<i>Saprinus lugens</i> , Er.....	Nevada and California....	1871	F. Bischoff.....	Western, Southwestern, and Pacific States.
666	..... do	Denver, Colo.....	1873	H. W. Henshaw....	

List of specimens—Continued.

No.	Name.	Locality.	Date.	Collector.	Habitat.
HISTERIDÆ.					
363	<i>Saprinus lugens</i> , Er.....	Camp Bowie, Ariz.....	1874	H. W. Henshaw....	Western, Southwestern, and Pacific States.
666	<i>Hister Ulkei</i> , Horn	Denver, Colo.....	1873	..... do	Kansas, Colorado, Wyoming.
EROTYLIDÆ.					
A	<i>Erotylus Boisduvalii</i> , Lec...	Camp Apache, Ariz.....	1873	G. M. Keasbey.....	Colorado, New Mexico, Arizona.
698	..... do .....	..... do	1873	F. Klett	Do.
39	..... do	Denver to Georgetown, Colo.	1873	Dr. J. T. Rothrock..	Do.
L 40	..... do	New Mexico.....	1874	Dr. O. Loew.....	Do.
PARNIDÆ.					
(?)	<i>Helichus suturalis</i> , Lec	Arizona	1871	F. Bischoff.....	
(?)	<i>Helichus productus</i> , Lec....	..... do	1871	..... do	
SCARABÆIDÆ.					
(?)	<i>Trox morsus</i> , Lec.....	Arizona	1871	F. Bischoff.....	New Mexico and Arizona.
(?)	..... do	Camp Apache, Ariz.....	1874	J. M. Rutter	Do.
(?)	<i>Trox alternans</i> , Lec.....	Nevada and Arizona.....	1871	F. Bischoff	Western States.
29	..... do	Southern Arizona	1873	H. W. Henshaw	Do.
575	<i>Trox punctatus</i> , Germ .....	..... do	1873	..... do	Eastern, Southern, Western States.
Y 7	..... do	Colorado Springs, Colo....	1874	Dr. H. C. Yarrow...	Do.
736	<i>Trox scutellaris</i> , Say	Camp Grant, Ariz	1874	H. W. Henshaw	New Mexico and Arizona.
25	<i>Canthon ebenus</i> , Say	Fort Wingate, N. Mex.....	1873	..... do	Western States.
246 F	..... do	Tierra Amarilla, N. Mex..	1874	Dr. H. C. Yarrow...	Do.
1324	<i>Canthon hudsonias</i> , Forst...	Camp Lowell, Ariz	1874	Henry Johnson	Eastern, Southern, Western States.
S	<i>Phanæus carnifex</i> , Fabr	Camp Apache, Ariz.....	1873	H. W. Henshaw	Do.
25	..... do	Fort Wingate, N. Mex.....	1873	..... do	Do.
1297	..... do	Southern Arizona.....	1874	..... do	Do.
500 A	<i>Serica curvata</i> , Lec	Pescado, N. Mex	1873	..... do	Kansas, New Mexico.
393, 6	<i>Serica frontalis</i> , Lec	Fort Garland, Colo.....	1873	..... do	Southern and Western States.
4	<i>Macroductylus angustatus</i> , Beauv.	Camp Apache, Ariz	1873	..... do	Do.
699 A	..... do	Arizona	1873	T. V. Brown	Do.
4	<i>Diplotaxis brevicollis</i> , Lec ..	Mineral Springs, Ariz.	1873	H. W. Henshaw	Western States.
575	..... do	Arizona	1873	..... do	Do.
D D	..... do	Mineral Springs, Ariz.....	1873	F. Klett.....	Do.
500	..... do	Pescado, N. Mex	1873	H. W. Henshaw	Do.
698	..... do	Camp Apache, Ariz.....	1873	F. Klett	Do.
371 B	..... do	Rio Grande, Colo.....	1873	H. W. Henshaw	Do.
1328	..... do	San Ildefonso, N. Mex	1874	Dr. H. C. Yarrow...	Do.
D D	<i>Diplotaxis frondicola</i> , Lec...	Mineral Springs, Ariz.....	1873	F. Klett	Eastern, Southern, Western States.
379 A	<i>Diplotaxis atratula</i> , Lec.....	Pueblo, Colo	1874	A. Barnes	Colorado to Arizona and New Mexico.
(?)	<i>Diplotaxis Haydenii</i> , Lec....	(?)	1874	George Alborn	Western States.
1273	<i>Athyreus serratus</i> , Lec	Camp Lowell, Ariz.....	1874	H. W. Henshaw	Arizona.
39	<i>Bolboceras lazarus</i> , Fabr....	Santa Fé, N. Mex	1874	Dr. J. T. Rothrock..	Southern and Western States.
A 3	<i>Onthophagus luteobrosus</i> , Fabr.	Pueblo, Colo	1874	C. E. Aiken	Everywhere except Pacific States.
180	<i>Lachnosterna fraterna</i> , Lec ..	South of Denver, Colo	1873	Dr. J. T. Rothrock..	Eastern, Southern, Western States.
118	<i>Lachnosterna submucida</i> , Lec	Southern Arizona.....	1874	J. M. Rutter	Arizona and New Mexico.
500 A	<i>Listrochelus texanus</i> , Lec ..	Pescado, N. Mex	1873	H. W. Henshaw	Texas and New Mexico.
500	<i>Polyphylla decemlineata</i> , Say	..... do	1873	..... do	Western States.
118	..... do	Southern Arizona.....	1874	J. M. Rutter	Do.

List of specimens—Continued.

No.	Name.	Locality.	Date.	Collector.	Habitat.
SCARABÆIDÆ.					
H D	<i>Plusiotis gloriosa</i> , Lec	Gila River, Ariz	1873	Dr. O. Loew	Arizona.
B	..... do	Camp Apache, Ariz	1873	G. M. Keasbey	Do.
698	..... do	do	1873	F. Klett	Do.
1097	..... do	Arizona	1874	H. W. Henshaw	Do.
699	<i>Xyloryctes Satyrus</i> , Fabr	Camp Apache, Ariz	1873	T. V. Brown	Eastern, Southern, Western States.
1273	..... do	Camp Lowell, Ariz	1874	H. W. Henshaw	Do.
699	<i>Strategus Julianus</i> , Burm	Camp Apache, Ariz	1873	T. V. Brown	Texas to Arizona; Mexico.
1195	<i>Strategus cessus</i> , Lec	Camp Bowie, Ariz	1874	H. W. Henshaw	Arizona.
B	<i>Dynastes Tityus</i> , Linn	Camp Apache, Ariz	1873	G. M. Keasbey	
Y 7	<i>Tostegoptera lanceolata</i> , Say	Colorado Springs, Colo	1874	Dr. H. C. Yarrow	Western States.
713 A	<i>Cotalpa consobrina</i> , Horn	Camp Lowell, Ariz	1874	J. M. Rutter	New Mexico and Arizona.
L 40	<i>Cyclocephala immaculata</i> , Burm	New Mexico	1874	Dr. O. Loew	East, South, West.
1273	<i>Cyclocephala longula</i> , Lec	Camp Lowell, Ariz	1874	H. W. Henshaw	Arizona.
39	<i>Ligyris gibbosus</i> , Deg	Santa Fé, N. Mex	1874	Dr. J. T. Rothrock	Eastern and Western States.
1283	<i>Allorhina mutabilis</i> , Gory	Near Camp Crittenden, Ariz	1874	J. M. Rutter	Texas to Arizona and New Mexico.
H 3	<i>Euryomia inda</i> , Linn	Pueblo, Colo	1874	Wm. H. Hance	Eastern, Southern, Western States.
TRITOMIDÆ.					
29	<i>Typhæa fumata</i> , Linn	Southern Arizona	1873	H. W. Henshaw	Distributed by commerce all over the world.
PHALACRIDÆ.					
H D	<i>Olibrus striatulus</i> , Lec	Gila River, Ariz	1873	Dr. O. Loew	
H 3	<i>Phalacrus penicillatus</i> , Say	Pueblo, Colo	1874	Wm. H. Hance	Western States.
104 A	<i>Phalacrus politus</i> , Mels	do	1874	Dr. H. C. Yarrow	Eastern and Western States.
MELOLONTHIDÆ.					
(?)	<i>Serica frontalis</i> , Lec	California	1871	F. Bischoff	
(?)	<i>Diploaxis brevicollis</i> , Lec	do	1871	do	
(?)	<i>Diploaxis obscura</i> , Lec	California and Nevada	1871	do	
(?)	<i>Polyphylla crinita</i> , Lec	do	1871	do	
(?)	<i>Cyclocephala longula</i> , Lec	California	1871	do	
(?)	<i>Xyloryctes satyrus</i> , Fabr	Arizona	1871	do	
(?)	<i>Cremastochilus angularis</i> , Lec	California	1871	do	
LUCANIDÆ.					
36	<i>Dorcus mazama</i> , Lec	Santa Fé to Fort Wingate, N. Mex	1873	F. Klett	New Mexico.
1	..... do	do	1873	T. V. Brown	Do.
1323	..... do	San Ildefonso, N. Mex	1874	Dr. H. C. Yarrow	Colorado to Arizona.
Y 120	<i>Passalus cornutus</i> , Fabr	do	1874	do	Eastern, Southern, Western States.
COCCINELLIDÆ.					
(?)	<i>Anisosticata vittigera</i> , Mann	California	1871	F. Bischoff	New Mexico, Arizona, California.
(?)	..... do	Near Abiquiu, N. Mex	1874	Dr. O. Loew	Do.
(?)	<i>Coccinellatransversoguttata</i> , Hald	Nevada and California	1871	F. Bischoff	Everywhere.
179 G	..... do	San Luis Valley, Colo	1873	Dr. J. T. Rothrock	Do.
197 B	..... do	do	1873	do	Do.
35	..... do	Colorado	1873	do	Do.
104	..... do	South Park, Colo	1873	do	Do.
.....	..... do	Eagle River, Colo	1873	do	Do.
184	..... do	Roaring Fork, Colo	1873	do	Do.
(?)	..... do	(?)	1874	George Alborn	Western States.

List of specimens—Continued.

No.	Name.	Locality.	Date.	Collector.	Habitat.
COCCINELLIDÆ.					
(?)	<i>Coccinella 9-notata</i> , Herbst.	Nevada	1871	F. Bischoff	
H 3	do	Pueblo, Colo	1874	Wm. H. Hance	Everywhere.
137 A	<i>Coccinella monticola</i> , Mels.	Taos, N. Mex	1874	Dr. H. C. Yarrow	Western States.
104 A	<i>Coccinella abdominalis</i> , Say.	Pueblo, Colo	1874	do	Everywhere.
Y 7	<i>Coccinella picta</i> , Rand	Colorado Springs, Colo ..	1874	do	Northern, Eastern, Western States.
(?)	<i>Hippodamia 13-punctata</i> , Linn	California and Nevada ..	1871	F. Bischoff	
(?)	<i>Hippodamia spuria</i> , Lec	Nevada	1871	do	
(?)	<i>Hippodamia 5-signata</i> , Muls.	do	1871	do	
(?)	<i>Hippodamia obsoleta</i> , Lec	California	1871	do	
184	<i>Hippodamia parenthesis</i> , Say	Roaring Fork, Colo	1873	Dr. J. T. Rothrock ..	Everywhere.
104 A	do	Pueblo, Colo	1874	Dr. H. C. Yarrow ..	Do.
575	<i>Hippodamia convergens</i> , Guér.	Arizona	1873	H. W. Henshaw	Do.
305	do	San Ildefonso, N. Mex	1874	Dr. H. C. Yarrow ..	Do.
305	<i>Hippodamia maculata</i> , Deg.	do	1874	do	Do.
36	<i>Epilachna maculiventris</i> , Bld	Santa Fé to Fort Wingate, N. Mex.	1873	F. Klett	
305	<i>Epilachna corrupta</i> , Muls ..	San Ildefonso, N. Mex	1874	Dr. H. C. Yarrow ..	Kansas to Arizona.
D D	<i>Chilocorus bivulnerus</i> , Muls.	Mineral Springs, Ariz	1873	F. Klett	Everywhere.
234 H	do	Tierra Amarilla, N. Mex ..	1874	W. G. Shedd	Eastern and Western States.
B 2	<i>Hyperaspis fimbriolata</i> , Mels	Pueblo, Colo	1874	A. Barnes	Do.
CUCUJIDÆ.					
Y 120	<i>Cucujus clavipes</i> , Fabr	San Ildefonso, N. Mex	1874	Dr. H. C. Yarrow ..	Eastern, Southern, Western States.
NITIDULIDÆ.					
39	<i>Carpophilus pallipennis</i> , Say.	Santa Fé, N. Mex	1874	Dr. J. T. Rothrock ..	Everywhere.
L 40	<i>Nitidula ziczac</i> , Say	New Mexico	1874	Dr. O. Loew	Western States.
(?)	<i>Meligethes ruficornis</i> , Lec ..	Near Abiquiu, N. Mex	1874	do	Do.
ELMIDÆ.					
5	<i>Elmis similis</i> , Horn	Abiquiu, N. Mex. (Hot Springs).	1874	Dr. H. C. Yarrow ..	New Mexico to Arizona.
BUPRESTIDÆ.					
(?)	<i>Gyascutus oblitteratus</i> , Lec ..	California	1871	F. Bischoff	
(?)	<i>Gyascutus cælatus</i> , Lec	Arizona	1874	(?)	Arizona.
1019 E	<i>Gyascutus sphenicus</i> , Lec	San Carlos, Ariz	1874	H. W. Henshaw	Do.
(?)	<i>Anthaxia retifera</i> , Lec	California and Nevada	1871	F. Bischoff	
371 B	<i>Calcophora angulicollis</i> , Lec	Rio Grande, Colo	1873	H. W. Henshaw	Colorado and Oregon.
35	<i>Pocillonota cyanipes</i> , Say ..	Thirty miles west of Denver, Colo.	1873	Dr. J. T. Rothrock ..	Western States.
393 C	<i>Ancylochira confluens</i> , Say ..	Fort Garland, Colo	1873	H. W. Henshaw	Do.
29	<i>Ancylochira subornata</i> , Lec ..	Southern Arizona	1873	do	Colorado, Oregon.
4	<i>Melanophila miranda</i> , Lec ..	Camp Apache, Ariz	1873	do	Colorado, New Mexico, Utah, Arizona.
445	do	Fort Wingate, N. Mex	1873	do	Do.
R 1	do	Camp Apache, Ariz	1873	Dr. O. Loew	Do.
36	do	Santa Fé to Fort Wingate, N. Mex.	1873	F. Klett	Do.
699	do	Camp Apache, Ariz	1873	T. V. Brown	Do.
H D	do	Gila River, Ariz	1873	Dr. O. Loew	Do.
A	do	Camp Apache, Ariz	1873	G. M. Keasbey	Do.
35 (?)	do	Santa Fé to Fort Wingate, N. Mex.	1873	Dr. O. Loew	Do.
1330	do	San Ildefonso, N. Mex	1874	Dr. H. C. Yarrow ..	
104	<i>Melanophila longipes</i> , Say ..	South Park, Colo	1873	Dr. J. T. Rothrock ..	Northern, Western States; Alaska.

List of specimens—Continued.

No.	Name.	Locality.	Date.	Collector.	Habitat.
BUPRESTIDÆ.					
(?)	<i>Melanophila atropurpurea</i> , Say.	Near Abiquiu, N. Mex...	1874	Dr. O. Loew.....	Western States.
61	<i>Psiloptera Woodhousei</i> , Lec.	Gila River, Ariz.....	1874	Dr. C. G. Newberry	New Mexico and Arizona.
1273	<i>Psiloptera Webbii</i> , Lec.....	Camp Lowell, Ariz.....	1874	H. W. Henshaw....	Arizona.
(?)	<i>Acmaeodera gibbula</i> , Lec.....	Arizona.....	1874	(?)	Do.
(?)	<i>Agrilus politus</i> , Say.....	Pueblo, Colo.....	1874	C. E. Aiken.....	Eastern, Southern, Western States.
ELATERIDÆ.					
(?)	<i>Cryptohypnus bicolor</i> , Esch.	California.....	1871	F. Bischoff.....	Northern and Western States; Oregon.
184	..... do	Roaring Fork, Colo.....	1873	Dr. J. T. Rothrock..	Do.
(?)	<i>Crepidotritus puberulus</i> , Mann.	California.....	1871	F. Bischoff.....	
(?)	<i>Limonius occidentalis</i> , Cand.	..... do	1871	..... do	
(?)	<i>Limonius nitidulus</i> , Horn....	Nevada.....	1871	..... do	
(?)	<i>Melanactes densus</i> , Lec.....	California.....	1871	..... do	
(?)	<i>Euthysanius pretiosus</i> , Lec..	..... do	1871	..... do	
500 A	<i>Anelastes Druryi</i> , Kirby....	Pescado, N. Mex.....	1873	H. W. Henshaw....	Southern, Western, and Pacific States.
698	..... do	Camp Apache, Ariz.....	1873	..... do	Do.
36	..... do	Santa Fé to Fort Wingate, N. Mex.	1873	F. Klett.....	Do.
4	..... do	Camp Apache, Ariz.....	1873	H. W. Henshaw....	Do.
575	..... do	Arizona.....	1873	..... do	Do.
D D	..... do	Mineral Springs, Ariz.....	1873	T. V. Brown.....	Do.
1	..... do	Santa Fé to Fort Wingate, N. Mex.	1873	F. Klett.....	Do.
699 A	..... do	Arizona.....	1873	T. V. Brown.....	Do.
234 H	<i>Monocrepidius vespertinus</i> , Fabr.	Tierra Amarilla, N. Mex..	1873	W. G. Shedd.....	Eastern, Southern, Western States.
TELEPHORIDÆ.					
(?)	<i>Chauliognathus scutellaris</i> , var., Lec.	Arizona.....	1871	F. Bischoff.....	
1273	..... do	Camp Lowell, Ariz.....	1874	H. W. Henshaw....	New Mexico, Arizona, Texas.
(?)	<i>Chauliognathus basalis</i> , Lec.	Tierra Amarilla, N. Mex..	1874	W. G. Shedd.....	New Mexico and Utah.
MALACHIDÆ.					
(?)	<i>Collops vittatus</i> , Say.....	Nevada and California....	1871	F. Bischoff.....	
104	<i>Collops cribrus</i> , Lec.....	South Park, Colo.....	1873	Dr. J. T. Rothrock..	Kansas, New Mexico, Nevada.
1	<i>Collops bipunctatus</i> , Say....	Camp Apache, Ariz.....	1873	H. W. Henshaw....	Kansas, New Mexico, Colorado.
A	..... do .....	..... do	1873	G. M. Keasbey.....	Do.
L	..... do	New Mexico.....	1874	Dr. O. Loew.....	Kansas, New Mexico, Colorado, Arizona.
500 A	<i>Collops 4-maculatus</i> , Fabr..	Pescado, N. Mex.....	1873	H. W. Henshaw....	Eastern, Southern, Western States.
575	..... do	Arizona.....	1873	..... do	Do.
H D	<i>Pristoscelis serrulatus</i> , Lec..	Gila River, Ariz.....	1873	Dr. O. Loew.....	Arizona.
H D	<i>Listrus senilis</i> , Lec.....	..... do	1873	..... do	
(?)	<i>Dasytes senilis</i> , Lec.....	Nevada.....	1871	F. Bischoff.....	
(?)	<i>Dasytes ruficollis</i> , Ulke.....	..... do	1871	..... do	
LAMPHYRIDÆ.					
184	<i>Podabrus lævicollis</i> , Kirby..	Roaring Fork, Colo.....	1873	Dr. J. T. Rothrock..	
CLERIDÆ.					
(?)	<i>Trichodes ornatus</i> , Say.....	Nevada and California....	1871	F. Bischoff.....	
(?)	<i>Clerus moestus</i> , Klug.....	California.....	1871	..... do	

List of specimens—Continued.

No.	Name.	Locality.	Date.	Collector.	Habitat.
CLERIDÆ.					
1185	<i>Clerus spinolæ</i> , Lec	Camp Bowie, Ariz	1874	J. M. Rutter	New Mexico and Arizona.
699 A	<i>Clerus nigriventris</i> , Lec	Arizona	1873	T. V. Brown	Do.
699 A	<i>Cymatodera cancellata</i> , Lec	do	1873	do	Do.
SPONDYLIDÆ.					
247 A	<i>Parandra brunnea</i> , Fabr	Tierra Amarilla, N. Mex	1874	Dr. H. C. Yarrow	Eastern, Southern, Western States.
CERAMBYCIDÆ.					
(?)	<i>Prionus californicus</i> , Motsch	California	1871	F. Bischoff	Nebraska, Arizona, and Pacific States.
657	do	Arizona	1873	Dr. O. Loew	
A	do	Camp Apache, Ariz	1873	G. M. Keasbey	Do.
1223	do	Camp Lowell, Ariz	1874	H. W. Henshaw	Do.
(?)	<i>Criocephalus productus</i> , Lec	California	1871	F. Bischoff	Northern and Western States.
500	<i>Criocephalus agrestis</i> , Kirby	Pescado, N. Mex	1873	H. W. Henshaw	
D D	do	Mineral Springs, Ariz	1873	F. Klett	Do.
699	do	Camp Apache, Ariz	1873	T. V. Brown	Do.
	do	Santa Fé to Fort Wingate, N. Mex.	1873	Dr. O. Loew	Do.
1	do	do	1873	T. V. Brown	Do.
180	do	Plains S. of Denver, Colo	1873	Dr. J. T. Rothrock	Do.
(?)	<i>Criocephalus asperatus</i> , Lec	New Mexico	1874	Dr. O. Loew	New Mexico and Arizona.
(?)	<i>Crossidius intermedius</i> , Ulke	Arizona	1871	F. Bischoff	Nebraska, New Mexico.
(?)	<i>Monohammus clamator</i> , Lec	California	1871	do	
36	do	Santa Fé to Fort Wingate, N. Mex.	1873	F. Klett	
234 H	do	Tierra Amarilla, N. Mex	1874	W. G. Shedd	Western States.
247 A	<i>Monohammus scutellatus</i> , Say	do	1874	Dr. H. C. Yarrow	Atlantic to Pacific States.
(?)	<i>Callidium janthinum</i> , Lec	California	1871	F. Bischoff	Southern and Western States.
(?)	<i>Tetraops basalis</i> , Lec	Arizona	1871	do	
L 40	<i>Tetraops femoratus</i> , Lec	New Mexico	1874	Dr. O. Loew	
A 3	<i>Tetraops canescens</i> , Lec	Pueblo, Colo	1874	C. E. Aiken	Western States.
B 2	<i>Tetraops annulatus</i> , Lec	do	1874	A. Barnes	Kansas, Colorado, New Mexico.
(?)	<i>Acmæops strigilata</i> , Fabr	Nevada	1871	F. Bischoff	Colorado and New Mexico.
(?)	<i>Acmæops marginalis</i> , Lec	do	1871	do	
(?)	<i>Leptura convexa</i> , Lec	Nevada and California	1871	do	
246 F	<i>Leptura cribripennis</i> , Lec	Tierra Amarilla, N. Mex	1874	Dr. H. C. Yarrow	Colorado and Oregon.
371 B	<i>Asemum atrum</i> , Esch	Rio Grande, Colo	1873	H. W. Henshaw	High peaks of Colorado; Hudson Bay; Alaska.
183	<i>Argaleus lituratus</i> , Kirby	Colorado	1873	Dr. J. T. Rothrock	Do.
180	do	Twin Lakes, Colo	1873	do	Do.
179	do	Colorado	1873	do	Do.
52	do	Camp Apache, Ariz	1873	H. W. Henshaw	Do.
1	<i>Plectrodera scalator</i> , Fabr	do	1873	do	Eastern, Southern, Western States.
699	<i>Calloides nobilis</i> , Say	do	1873	T. V. Brown	Northern, Eastern, Western States.
371 B	<i>Stenocorus lineatus</i> , Oliv	Rio Grande, Colo	1873	H. W. Henshaw	Northern, Eastern, Western, Southern States.
A	<i>Monilema crassum</i> , Lec	Camp Apache, Ariz	1873	G. M. Keasbey	Texas, Arizona, New Mexico.
699	do	do	1873	T. V. Brown	Do.
B 6	<i>Monilema lævigatum</i> , Bland	Pueblo, Colo	1874	A. Barnes	Colorado and New Mexico.
52 H	<i>Ergates spiculatus</i> , Lec	Colorado Springs, Colo	1874	Dr. H. C. Yarrow	Colorado to Arizona.
1301	<i>Mallodon angularis</i> , Lec	Arizona	1874	Henry Johnson	Arizona.
118	<i>Elaphidion procerum</i> , Lec	Southern Arizona	1874	J. M. Rutter	Kansas to Arizona.
363	<i>Callichroma plicatum</i> , Lec	Camp Bowie, Ariz	1874	H. W. Henshaw	Texas to Arizona.

List of specimens—Continued.

No.	Name.	Locality.	Date.	Collector.	Habitat.
CERAMBYCIDÆ.					
(?)	<i>Dendrobias quadrimaculatus</i> , Dup.	Arizona.....	1874	(?)	Texas to Arizona.
(?)	<i>Batyle Pearsalli</i> , Bland.....	New Mexico.....	1874	Dr. O. Loew.....	Colorado and New Mexico.
713 A	<i>Perarthrus vittatus</i> , Lec.....	Camp Lowell, Ariz.....	1874	J. M. Rutter.....	Louisiana, Texas, Arizona.
1019 E	<i>Cyllene infaustus</i> , Lec.....	San Carlos, Ariz.....	1874	H. W. Henshaw.....	Western States.
P	<i>Xylotrechus sagittatus</i> , Germ	New Mexico.....	1874	Dr. H. C. Yarrow..	Southern and Western States.
247 A	<i>Pachyta liturata</i> , Kirby.....	Tierra Amarilla, N. Mex..	1874	..... do	Northern and Western States to Alaska.
CHRYSOMELIDÆ.					
(?)	<i>Saxinis saucia</i> , Lec.....	California and Nevada....	1871	F. Bischoff.....	
(?)	<i>Glyptoscelis albidus</i> , Lec.....	California.....	1871	..... do	
(?)	<i>Chrysochus cobaltinus</i> , Lec..	California and Nevada....	1871	..... do	
577	..... do	Camp Apache, Ariz.....	1873	H. W. Henshaw.....	Western and Pacific States.
(?)	..... do	New Mexico.....	1874	Dr. O. Loew.....	Kansas to California.
H 3	<i>Chrysochus auratus</i> , Fabr..	Pueblo, Colo.....	1874	Wm. H. Hance.....	Eastern and Western States.
(?)	<i>Chrysomela multipunctata</i> , Say.	California and Nevada....	1871	F. Bischoff.....	
(?)	<i>Chrysomela tortuosa</i> , Rogers	Arizona.....	1871	..... do	
(?)	..... do .....	..... do	1874	(?)	Arizona and New Mexico.
35 (?)	<i>Chrysomela exclamationis</i> , Fabr.	Colorado.....	1873	Dr. J. T. Rothrock..	Western and Southwestern States.
B 6	..... do	Pueblo, Colo.....	1874	A. Barnes.....	Do.
B 6	<i>Chrysomela 10-lineata</i> , Say..	..... do	1874	..... do	Southern and Western States.
(?)	<i>Chrysomela serpentina</i> , Rog	Arizona.....	1874	(?)	Arizona.
(?)	<i>Diabrotica tenella</i> , Lec.....	..... do	1871	F. Bischoff.....	
H 3	<i>Diabrotica tricineta</i> , Say.....	Pueblo, Colo.....	1874	Wm. H. Hance.....	Kansas to Arizona.
H D	..... do	Gila River, Ariz.....	1873	Dr. O. Loew.....	Do.
(?)	<i>Disonycha punctigera</i> , Lec..	California and Nevada....	1871	F. Bischoff.....	
160 A	..... do	San Ildefonso, N. Mex....	1874	Dr. H. C. Yarrow..	Western States to California.
248 W	<i>Disonycha alternata</i> , Ill.....	Pagosa, Colo.....	1874	C. E. Aiken.....	Southern and Western States.
52 H	<i>Disonycha triangularis</i> , Say..	Colorado Springs, Colo....	1874	Dr. H. C. Yarrow..	Do.
(?)	<i>Trirhabda attenuata</i> , Say.....	Nevada.....	1871	F. Bischoff.....	
(?)	<i>Trirhabda canadensis</i> , Kirby	California and Nevada....	1871	..... do	
1	<i>Trirhabda convergens</i> , Lec..	Santa Fé to Fort Wingate, N. Mex.	1873	T. V. Brown.....	Nebraska, New Mexico, Nova Scotia.
(?)	<i>Haltica opulenta</i> , Lec.....	Nevada.....	1871	F. Bischoff.....	
(?)	<i>Cassida 6-punctata</i> ?, Fabr..	..... do	1871	..... do	
H D	<i>Colaspis convexa</i> , Say.....	Gila River, Ariz.....	1873	Dr. O. Loew.....	Southern, Eastern, Western States.
52 H	<i>Colaspis tristis</i> , Oliv.....	Colorado Springs, Colo....	1874	Dr. H. C. Yarrow..	Do.
35	<i>Luperus longulus</i> , Lec.....	Santa Fé to Fort Wingate, N. Mex.	1873	Dr. O. Loew.....	Colorado, Nebraska, Nevada.
1184	<i>Lema nigrovittata</i> , Guer.....	Camp Bowie, Ariz.....	1874	J. M. Rutter.....	Texas and Arizona to California.
(?)	<i>Coscinoptera pyropyga</i> , Lac	Arizona.....	1874	(?)	Arizona and New Mexico.
A 3	<i>Plagioderma scripta</i> , Fabr..	Pueblo, Colo.....	1874	C. E. Aiken.....	Everywhere.
1328	<i>Plagioderma oviformis</i> , Lec..	San Ildefonso, N. Mex....	1874	Dr. H. C. Yarrow..	Western States.
(?)	<i>Monoxia obtusa</i> , Lec.....	Vicinity of Abiquiu, N. Mex	1874	Dr. O. Loew.....	New Mexico and Arizona.
B 2	<i>Monoxia guttulata</i> , Lec.....	Pueblo, Colo.....	1874	A. Barnes.....	Western States.
104 A	<i>Graptodera carinata</i> , Germ	San Ildefonso, N. Mex....	1874	Dr. H. C. Yarrow..	Do.
1328	<i>Graptodera suplicata</i> , Lec..	..... do	1874	..... do	Kansas to California.
52 H	<i>Graptodera foliacea</i> , Lec.....	Colorado Springs, Colo....	1874	..... do	Western States.
H 3	<i>Orchestris albionica</i> , Lec.....	Pueblo, Colo.....	1874	Wm. H. Hance.....	Texas to California.
B 2	<i>Orchestris Lewisii</i> , Crotch..	..... do	1874	A. Barnes.....	Western States.
52 H	<i>Systema mitis</i> , Lec.....	Colorado Springs, Colo....	1874	Dr. H. C. Yarrow..	Do.

List of specimens—Continued.

No.	Name.	Locality.	Date.	Collector.	Habitat.
TENEBRIONIDÆ.					
(?)	<i>Edrotes ventricosus</i> , Lec....	California.....	1871	F. Bischoff.....	
(?)	<i>Emmenastus longulus</i> , Lec..	Arizona.....	1871	do.....	
1311	do.....	do.....	1874	H. W. Henshaw.....	Arizona.
(?)	<i>Cryptoglossa</i> (?).....	Utah.....	1872	do.....	
(?)	<i>Asida marginata</i> , Lec.....	Arizona.....	1871	F. Bischoff.....	
(?)	<i>Asida confluens</i> , Lec.....	Utah.....	1872	Dr. H. C. Yarrow..	
M	do.....	Cañon de Chelle, N. Mex.	1873	G. M. Keasbey ..	Colorado Desert.
H D	<i>Asida sordida</i> , Lec.....	Gila River, Ariz.....	1873	Dr. O. Loew.....	Colorado and New Mexico.
197 G	do.....	San Luis Valley, Colo.....	1873	Dr. J. T. Rothrock..	Do.
5	do.....	Colorado Chiquito River..	1873	Dr. C. G. Newberry.	Do.
1015	do.....	Rio Grande, Colo.....	1874	Dr. O. Loew.....	Colorado, New Mexico, and Arizona.
698	<i>Asida convexa</i> , Lec.....	Camp Apache, Ariz.....	1873	F. Klett.....	Do.
248 W	do.....	Pagosa, Colo.....	1874	C. E. Aiken.....	Do.
H D	<i>Asida rimata</i> , Lec.....	Gila River, Ariz.....	1873	Dr. O. Loew.....	Arizona.
D D	do.....	Mineral Springs, Ariz.....	1873	F. Klett.....	Do.
1015	do.....	Camp Lowell, Ariz.....	1874	J. M. Rutter.....	Arizona to Colorado.
M	<i>Asida elata</i> , Lec.....	Cañon de Chelle, N. Mex.	1873	G. M. Keasbey ..	Texas to Oregon.
(?)	do.....	Abiquiu to Jemez, N. Mex.	1874	G. Thompson.....	Do.
A 3	<i>Asida opaca</i> , Say.....	Pueblo, Colo.....	1874	C. E. Aiken.....	Western States.
1283	<i>Asida costipennis</i> , Lec.....	Camp Crittenden, Ariz.....	1874	J. M. Rutter.....	New Mexico and Arizona.
1015	<i>Asida convexicollis</i> , Lec....	Camp Lowell, Ariz.....	1874	do.....	Do.
1279	<i>Asida subcylindrica</i> , Horn..	Camp Crittenden, Ariz.....	1874	Henry Johnson ..	Arizona.
(?)	<i>Eusattus reticulatus</i> , Lec....	Arizona.....	1871	F. Bischoff.....	
500	do.....	Pescado, N. Mex.....	1873	H. W. Henshaw.....	New Mexico and Arizona.
500 A	do.....	do.....	1873	do.....	Do.
699	do.....	Camp Apache, Ariz.....	1873	T. V. Brown.....	Do.
H D	do.....	Gila River, Ariz.....	1873	Dr. O. Loew.....	Do.
35	do.....	Santa Fé to Fort Wingate, N. Mex.	1873	do.....	Do.
(?)	do.....	New Mexico.....	1874	do.....	Kansas to Arizona.
(?)	<i>Eusattus muricatus</i> , Lec....	California and Nevada.....	1871	F. Bischoff.....	
H D	do.....	Gila River, Ariz.....	1873	Dr. O. Loew.....	New Mexico to Oregon.
(?)	<i>Eusattus difficilis</i> , Lec.....	New Mexico.....	1874	do.....	New Mexico and Arizona.
(?)	<i>Coniontis robusta</i> , Horn.....	California.....	1871	F. Bischoff.....	
(?)	<i>Coniontis nemoralis</i> , Esch.....	do.....	1871	do.....	
180	<i>Coniontis ovalis</i> , Lec.....	Plains S. of Denver, Colo..	1873	Dr. J. T. Rothrock..	Colorado, Utah, Oregon.
(?)	<i>Eleodes obscura</i> , Say.....	Nevada.....	1871	F. Bischoff.....	
1014	do.....	Camp Lowell, Ariz.....	1874	J. M. Rutter.....	Oregon to Arizona.
(?)	<i>Eleodes sulcipennis</i> , Mann..	Arizona.....	1871	F. Bischoff.....	
713 A	do.....	Camp Lowell, Ariz.....	1874	J. M. Rutter.....	Oregon, through California, Nevada and New Mexico, to Arizona.
(?)	<i>Eleodes carbonaria</i> , Say.....	Nevada.....	1871	F. Bischoff.....	Colorado, New Mexico, Arizona, and Texas.
H D	do.....	Gila River, Ariz.....	1873	Dr. O. Loew.....	Do.
L 10	do.....	New Mexico.....	1874	do.....	Do.
(?)	<i>Eleodes obsoleta</i> , Say.....	Nevada.....	1871	F. Bischoff.....	
H D	do.....	Gila River, Ariz.....	1873	Dr. O. Loew.....	Kansas, New Mexico, Arizona.
197 G	do.....	San Luis Valley, Colo.....	1873	Dr. J. T. Rothrock..	Do.
36	do.....	Santa Fé to Fort Wingate, N. Mex.	1873	F. Klett.....	Do.
104	do.....	South Park, Colo.....	1873	Dr. J. T. Rothrock..	Do.
A 3	do.....	Pueblo, Colo.....	1874	C. E. Aiken.....	Do.
(?)	<i>Eleodes humeralis</i> , Lec....	California.....	1871	F. Bischoff.....	

List of specimens—Continued.

No.	Name.	Locality.	Date.	Collector.	Habitat.
TENEBRIONIDÆ.					
(?)	<i>Eleodes extricata</i> , Say	California, Nevada, Arizona.	1871	F. Bischoff.....	
371 B	..... do	Rio Grande, Colo.	1873	H. W. Henshaw	Western States to Oregon.
4	..... do	Camp Apache, Ariz.	1873	..... do	Do.
197 G	..... do	San Luis Valley, Colo.	1873	Dr. J. T. Rothrock..	Do.
D D	..... do	Mineral Springs, Ariz.	1873	F. Klett.....	Do.
36	..... do	Santa Fé to Fort Wingate, N. Mex.	1873	..... do	Do.
35	..... do .....	..... do	1873	Dr. O. Loew.....	Do.
248 W	..... do	Pagosa, Colo.	1874	C. E. Aiken.....	Western States.
(?)	<i>Eleodes armata</i> , Lec	Arizona.....	1871	F. Bischoff.....	
(?)	<i>Eleodes longicollis</i> , Lec.....	..... do	1871	..... do	
1014	..... do	Camp Lowell, Ariz.	1874	J. M. Rutter	New Mexico and Arizona.
(?)	<i>Eleodes grandicollis</i> , Mann ..	California and Nevada....	1871	F. Bischoff.....	
(?)	<i>Eleodes nigrina</i> , Lec.....	Nevada.....	1871	..... do	
105 A	..... do	Taos, N. Mex	1874	Dr. H. C. Yarrow...	Kansas to Oregon.
(?)	<i>Eleodes hispilabris</i> , Say.....	Nevada and Arizona.....	1871	F. Bischoff	Texas, Kansas, Colorado, Arizona, Oregon.
H D	..... do	Gila River, Ariz	1873	Dr. O. Loew	Do.
197 G	..... do	San Luis Valley, Colo.	1873	Dr. J. T. Rothrock..	Do.
393 C	..... do	Fort Garland, Colo.	1873	H. W. Henshaw	Do.
698	..... do	Camp Apache, Ariz	1873	F. Klett	Do.
180	..... do	Plains S. of Denver, Colo. .	1873	Dr. J. T. Rothrock..	Do.
379 G	..... do	Fort Garland, Colo.	1874	Lieut. S. Blunt	Western States.
(?)	<i>Eleodes hirsuta</i> , Lec.....	California.....	1871	F. Bischoff.....	
(?)	<i>Eleodes tenebrosa</i> , Horn.....	..... do	1871	..... do	
445	<i>Eleodes dispersa</i> , Lec.....	Fort Wingate, N. Mex.....	1873	H. W. Henshaw	New Mexico.
.....	..... do	Camp Apache, Ariz.	1873	..... do	Do.
R 1	..... do .....	..... do	1873	Dr. O. Loew.....	Do.
25	..... do	Fort Wingate, N. Mex.....	1873	H. W. Henshaw	Do.
500 A	..... do	Pescado, N. Mex	1873	..... do	Do.
36	..... do	Santa Fé to Fort Wingate, N. Mex.	1873	F. Klett.....	Do.
35(?)	..... do .....	..... do	1873	Dr. O. Loew.....	Do.
1(?)	..... do .....	..... do	1873	T. V. Brown.....	Do.
(?)	..... do	Taos, N. Mex	1874	(?)	New Mexico and Arizona.
R 1	<i>Eleodes suturalis</i> , Say.....	Camp Apache, Ariz.	1873	Dr. O. Loew.....	Kansas, Nebraska, New Mexico, Colorado.
500 A	<i>Eleodes tricolorata</i> , Say.....	Pescado, N. Mex	1873	H. W. Henshaw	Texas and Western States.
500	..... do .....	..... do	1873	..... do	Do.
36	..... do	Santa Fé to Fort Wingate, N. Mex.	1873	F. Klett	Do.
1	..... do .....	..... do	1873	T. V. Brown.....	Do.
(?)	..... do	Abiquiu, N. Mex	1874	Dr. O. Loew	Southern and Western States.
104	<i>Eleodes quadricollis</i> , Esch ..	South Park, Colo.	1873	Dr. J. T. Rothrock..	Colorado to California.
1(?)	..... do	Santa Fé to Fort Wingate, N. Mex.	1873	T. V. Brown.....	Do.
271 E	..... do	Pagosa, Colo.	1874	Dr. H. C. Yarrow ..	Do.
.....	<i>Eleodes caudifera</i> , Lec	Camp Apache, Ariz.	1873	H. W. Henshaw	Colorado and New Mexico.
500 A	..... do	Pescado, N. Mex	1873	..... do	Do.
35	..... do	Santa Fé to Fort Wingate, N. Mex.	1873	Dr. O. Loew.....	Do.
1	..... do .....	..... do	1873	T. V. Brown.....	Do.
184	<i>Eleodes pimelioides</i> , Mann ..	Roaring Fork, Colo.	1873	Dr. J. T. Rothrock..	
4	<i>Eleodes arata</i> , Lec.....	Camp Apache, Ariz.	1873	H. W. Henshaw	
A	..... do .....	..... do	1873	G. M. Keasbey.....	
D D	..... do	Mineral Springs, Ariz	1873	F. Klett.....	

List of specimens—Continued.

No.	Name.	Locality.	Date.	Collector.	Habitat.
TENEBRIONIDÆ.					
25	<i>Eleodes arata</i> , Lec.....	Fort Wingate, N. Mex ..	1873	H. W. Henshaw	Arizona and New Mexico.
1184	..... do	Camp Bowie, Ariz	1874	J. M. Rutter	
(?)	<i>Eleodes sponsa</i> , Lec	Taos, N. Mex	1874	(?)	Do.
(?)	<i>Blapstinus dilatatus</i> , Lec....	Arizona	1871	F. Bischoff.....	Western States.
1330	<i>Blapstinus pratensis</i> , Lec....	San Ildefonso, N. Mex....	1874	Dr. H. C. Yarrow..	
(?)	<i>Cerenopus sulcipennis</i> , Lec...	Arizona	1871	F. Bischoff.....	Colorado, New Mexico, Arizona.
(?)	<i>Coelocnemis punctata</i> , Lec...	California and Arizona...	1871	do	
52	<i>Epitragus canaliculatus</i> , Say.	Camp Apache, Ariz.....	1873	H. W. Henshaw	Western States.
1019 E	..... do	San Carlos, Ariz	1874	do	Arizona.
H 1	<i>Epitragus pruinosis</i> , Horn..	Camp Bowie, Ariz	1874	do	Arizona and California.
1273	<i>Eurymetopon rufipes</i> , Esch.	Camp Lowell, Ariz	1874	do	F. Klett
D D	<i>Embaphion contusum</i> , Lec...	Mineral Springs, Ariz	1873	do	
36	..... do	Santa Fé to Fort Wingate, N. Mex.	1873	do	H. W. Henshaw
445	..... do	Fort Wingate, N. Mex....	1873	do	
500 A	..... do	Pescado, N. Mex	1873	do	Lieut. R. Birnie
385	<i>Embaphion planum</i> , Horn ..	San Juan River, N. Mex....	1874	do	
105 A	<i>Trimytis pruinosa</i> , Lec.....	Taos, N. Mex	1874	Dr. H. C. Yarrow..	New Mexico and Arizona.
(?)	<i>Ipthimus sublævis</i> , Bland ..	do	1874	(?)	Western States.
Y120	<i>Nyctobates pennsylvanica</i> , De Geer.	San Ildefonso, N. Mex....	1874	Dr. H. C. Yarrow..	New Mexico.
MELOIDÆ.					
(?)	<i>Epicauta oblita</i> , Lec	California	1871	F. Bischoff	Southern and Western States to California and Oregon.
(?)	<i>Epicauta wheeleri</i> , Ulke ..	Arizona	1871	do	
(?)	<i>Epicauta maculata</i> , Say ..	Nevada	1871	do	Texas to Kansas and Oregon.
4	..... do	Camp Apache, Ariz.....	1873	H. W. Henshaw	
(?)	..... do	New Mexico	1874	Dr. O. Loew.....	New Mexico, Colorado.
35	<i>Epicauta conspersa</i> , Lec....	Santa Fé to Fort Wingate, N. Mex.	1873	do	
104	<i>Epicauta pruinosa</i> , Lec....	South Park, Colo.....	1873	Dr. J. T. Rothrock..	Eastern, Southern, Western States.
169	..... do	San Luis Valley, Colo.....	1873	do	
36	..... do	Santa Fé to Fort Wingate, N. Mex.	1873	F. Klett	Colorado to Arizona.
Y120	<i>Epicauta pennsylvanica</i> , De Geer.	San Ildefonso, N. Mex....	1874	Dr. H. C. Yarrow ..	
S	<i>Epicauta corvina</i> , Lec.....	Camp Apache, Ariz.....	1873	H. W. Henshaw	Kansas, Colorado, Nebraska, Montana.
(?)	<i>Lytta vulnerata</i> , Lec.....	California and Arizona ..	1871	F. Bischoff.....	
(?)	<i>Lytta lugubris</i> , Ulke.....	California	1871	do	Do.
104	<i>Lytta nuttalli</i> var. <i>fulgifera</i> , Lec.	South Park, Colo.....	1873	Dr. J. T. Rothrock..	Arizona and New Mexico.
104	<i>Lytta sphaericollis</i> , Say.....	do	1873	do	Western States.
A	<i>Lytta biguttata</i> , Lec.....	Camp Apache, Ariz.....	1873	G. M. Keasbey	
(?)	<i>Nemognatha bicolor</i> , Lec....	California and Nevada ..	1871	F. Bischoff.....	Kansas, New Mexico, Arizona.
52 H	..... do	Colorado Springs, Colo ..	1874	Dr. H. C. Yarrow..	
(?)	<i>Nemognatha lurida</i> , Lec....	California	1871	F. Bischoff.....	Texas, New Mexico, Arizona.
445	..... do	Fort Wingate, N. Mex....	1873	H. W. Henshaw	
L 32	..... do	New Mexico.....	1874	Dr. O. Loew.....	Texas and Kansas to Arizona.
(?)	<i>Nemognatha apicalis</i> , Lec....	Nevada	1871	F. Bischoff.....	
B 6	..... do	Pueblo, Colo	1874	A. Barnes	H. W. Henshaw
500 A	<i>Nemognatha nigripennis</i> , Lec.	Pescado, N. Mex	1873	do	
L 32	<i>Nemognatha immaculata</i> , Say.	New Mexico.....	1874	Dr. O. Loew.....	

List of specimens—Continued.

No.	Name.	Locality.	Date.	Collector.	Habitat.
MELOIDÆ.					
B	<i>Megetra vittata</i> , Lec	Camp Apache, Ariz	1873	G. M. Keasbey	New Mexico and Arizona.
S 1	..... do	Arizona	1873	E. E. Howell	Do.
A	..... do	Camp Apache, Ariz	1873	G. M. Keasbey	Do.
M	..... do	Cañon de Chelle, N. Mex ..	1873	..... do	Do.
699	..... do	Camp Apache, Ariz	1873	T. V. Brown	Do.
H D	..... do	Gila River, Ariz	1873	Dr. O. Loew	Do.
L 10	..... do	New Mexico	1874	..... do	Do.
35	<i>Pyrota terminata</i> , Lec	Thirty miles west of Den- ver, Colo.	1873	Dr. J. T. Rothrock ..	Texas and Colorado.
1273	<i>Pyrota mylabrina</i> , Chev ..	Camp Lowell, Ariz	1874	H. W. Henshaw	Colorado, New Mexico, Arizona.
L	<i>Meloe sublaevis</i> , Lec	New Mexico	1874	Dr. O. Loew	New Mexico.
1297	<i>Macrobasis immaculata</i> , Say ..	Southern Arizona	1874	H. W. Henshaw	Texas to Arizona.
166 A	<i>Macrobasis segmentata</i> , Say ..	San Ildefonso, N. Mex ..	1874	Dr. H. C. Yarrow ..	Western States.
A 3	<i>Zonitis atripennis</i> , Say	Pueblo, Colo	1874	C. E. Aiken	Do.
161	<i>Zonitis flavida</i> , Lec	San Ildefonso, N. Mex	1874	Dr. H. C. Yarrow ..	Do.
H 3	<i>Zonitis bilineata</i> , Say	Pueblo, Colo	1874	Wm. H. Hance	Do.
379 A	<i>Gnathium minimum</i> , Say .....	..... do	1874	A. Barnes	Do.
CURCULIONIDÆ.					
(?)	<i>Sphenophorus simplex</i> , Lec ..	California and Nevada	1871	F. Bischoff	
(?)	<i>Sphenophorus gentilis</i> , Lec ..	..... do	1871	..... do	
1330	<i>Sphenophorus 13-punctatus</i> , Ill.	San Ildefonso, N. Mex	1874	Dr. H. C. Yarrow ..	Atlantic to Pacific States.
35	<i>Calandra remotepunctata</i> , Gyll.	Santa Fé to Fort Wingate, N. Mex.	1873	Dr. O. Loew	Distributed by commerce everywhere.
(?)	<i>Tanymecus lautus</i> , Lec	Arizona	1874	(?)	Arizona.
236 C	<i>Ophryastes vittatus</i> , Say	Tierra Amarilla, N. Mex ..	1874	Prof. E. D. Cope ..	Western States.
(?)	<i>Cleonus trivittatus</i> , Say	(?)	1874	George Alborn	Do.
(?)	<i>Larinus molitor</i> , Lec	Arizona	1874	(?)	Arizona.
1330	<i>Balaninus constrictus</i> , Say ..	San Ildefonso, N. Mex	1874	Dr. H. C. Yarrow ..	Western States.
.....	<i>Rhynchites æneus</i> , Boh .....	..... do	1874	..... do	Eastern and Western States.
SCOLYTIDÆ.					
371 B	<i>Dendroctonus terebrans</i> , Lec ..	Rio Grande, Colo	1873	H. W. Henshaw	
(?)	..... do	California	1871	F. Bischoff	
52 H	..... do	Colorado Springs, Colo ..	1874	Dr. H. C. Yarrow ..	Everywhere.
.....	<i>Hylastes gracilis</i> , Lec .....	..... do	1874	..... do	Western States.
CEDEMERIDÆ.					
1297	<i>Oxaxis pallida</i> , Lec	Southern Arizona	1874	H. W. Henshaw	New Mexico and Arizona.
ANTHICIDÆ.					
55 A	<i>Notoxus serratus</i> , Lec	Fort Garland, Colo	1874	Dr. H. C. Yarrow ..	Western States.
L	<i>Notoxus subtilis</i> , Lec	New Mexico	1874	Dr. O. Loew	Do.
MELANDRYIDÆ.					
Y 120	<i>Penthe pimelia</i> , Fabr	San Ildefonso, N. Mex ..	1874	Dr. H. C. Yarrow ..	Eastern, Southern, Western States.
MORDELLIDÆ.					
B 2	<i>Mordellistena æmula</i> , Lec ..	Pueblo, Colo	1874	A. Barnes	Western States.
BRUCHIDÆ.					
160 A	<i>Bruchus fraterculus</i> , Horn ..	San Ildefonso, N. Mex	1874	Dr. H. C. Yarrow ..	Western States.

Number of Species collected.

Cicindelidæ	10	Elateridæ	8
Carabidæ	69	Telephoridæ	3
Dytiscidæ	11	Malachidæ	8
Hydrophilidæ	7	Lampyridæ	1
Staphylinidæ	3	Cleridæ	5
Silphidæ	7	Spondylidæ	1
Dermestidæ	4	Cerambycidæ	33
Histeridæ	2	Chrysomelidæ	34
Erotylidæ	1	Tenebrionidæ	52
Parnidæ	2	Meloidæ	27
Scarabæidæ	33	Curculionidæ	10
Tritomidæ	1	Scolytidæ	2
Phalacridæ	3	Ædemeridæ	1
Melolonthidæ	7	Anthicidæ	2
Lucanidæ	2	Melandryidæ	1
Coccinellidæ	17	Mordellidæ	1
Cucujidæ	1	Bruchidæ	1
Nitidulidæ	3		
Elmidæ	1		
Buprestidæ	51		
		Total	389

CHAPTER XII.

REPORT

UPON

THE COLLECTIONS OF HEMIPTERA

MADE IN PORTIONS OF

NEVADA, UTAH, CALIFORNIA, COLORADO, NEW MEXICO, AND ARIZONA,

DURING

THE YEARS 1871, 1873, AND 1874.

BY

Prof. P. R. UHLER.

CHAPTER XII.

The specimens of *Hemiptera* from this expedition, sent to me for examination, are few in number, but they embrace some very interesting species.

A *Calocoris*, which I have provisionally separated from *C. rapidus*, Say, may be the extreme limit of bright color attained by that species. I suspect this to be the case, because specimens of that species, from the less considerable elevations in Colorado Territory, retain the black spots of the pronotum, and some of the fuscous-gray of the hemelytra which obtains in the specimens from the Atlantic region.

The *Corisas* exhibit the minute vermiculate and less distinct marking common to most of the species from Mexico. *Chlorochroa Sayi*, Stål, the most beautiful green Pentatomid of the West, seems to find its most congenial home in Owen's Valley, and must be quite abundant there, if we may judge from the large proportion of them brought home by the expedition.

CORIMELAENIDAE.

CORIMELAENA, White.

CORIMELAENA EXTENSA, Uhler.

PLATE XLII, FIG. 6.

Corimelaena extensa, UHLER, Proc. Ent. Soc. Phila., 1863, 155.

Obtained in Owen's Valley, California, by F. Bischoff. Previously reported from Dakota, Arizona, Vancouver's Island, and San Francisco.

PENTATOMIDAE.

BROCHYMENA, Amyot et Serv.

BROCHYMENA OBSCURA, Amyot et Serv.

Brochymena obscura, H. SCHF., Wanz. Ins., v, 68, f. 513.

One specimen, of more distinct pattern of punctation than usual, from Owen's Valley, California, taken by F. Bischoff.

PERILLUS, Stål.**PERILLUS CLAUDUS, Say.**

Perillus claudus, SAY, Jour. Acad. Nat. Sci. Phila., iv, 312.

From Owen's Valley, California, by F. Bischoff.

COSMOPEPLA, Stål.**COSMOPEPLA CONSPICILLARIS, Dallas.**

Cosmopepla conspicillaris, DALLAS, Brit. Mus. Hemipt., i, 225.

From Owen's Valley (F. Bischoff). This is a most variable species in both color and size. Specimens measure from 4 to $7\frac{1}{2}$ millimeters in length, by 3 to 5 millimeters in width. The orange band across the pronotum sometimes invades almost two-thirds of its surface posteriorly, and the black color is replaced by pale dirty rufous.

LIODERMA, Uhler.**LIODERMA VIRIDICATA, Uhler, *sp. nov.*****PLATE XLII, FIG. 11.**

Ovate, polished, bright grass-green above, tolerably coarsely, deeply, and here and there confluent punctured between transverse, wavy rugæ; beneath very finely, remotely punctured, excepting on the disks of the pleural pieces, which are more coarsely punctured. Head as long as the pronotum, triangularly rounded in front, transversely rugulose; the lateral margins whitish, and more finely and less closely punctured than the vertex; tylus smooth, very remotely punctured, the tip piceous; antennæ,—basal joint and basal half of second joint green, the apical half of second and the remaining joints piceous, pubescent; the second joint longest, the third not more than one-half the second, the fourth and fifth shorter, subequal. Rostrum reaching to the base of the third ventral segment, green, with the base, the middle line and the apical joint piceous, second joint very long, reaching from the base of the head to the middle coxæ, the apical joint shortest. Pronotum flattened, but with a slightly convex slant forward and sideways; the lateral margins broadly whitish, bowed; the anterior angles truncated, to fit against the eyes; the posterior angles broadly rounded; the anterior margin broadly sinuated; the posterior margin straight, but sinuated each

side at the humeri; callosities smooth, almost impunctured, bounded behind by an impressed line. Mesosternum slenderly and feebly carinated. Legs green, clothed with long, slender, remote hairs, the tarsi and tip of tibiae piceous; femora with remote wrinkles. Scutellum broad and blunt, almost flat, the apex broadly white. Outer margin of corium broadly yellowish-white; the membrane dusky. Tergum minutely punctured, dusky on the disk, excepting two or three of the apical segments.

Length, 8–9 millimeters; humeral width, $4\frac{1}{2}$ – $5\frac{1}{4}$ millimeters.

Taken by Dr. J. T. Rothrock, from near Roaring Fork, Colorado.

CHLOROCHROA, Stål.

CHLOROCHROA SAYI Stål.

Chlorochroa sayi, STÅL, Svenska Vetensk. Akad. Handl., x, 33, No. 6.

Many specimens from Owen's Valley, (F. Bischoff); also from Snake River and from Teton Basin (Dr. Josiah Curtis); and from Roaring Fork (Dr. J. T. Rothrock). Specimens had been previously collected in Arizona and near San Francisco by Dr. George Horn.

COREIDAE.

METAPODIUS, Westw.

METAPODIUS GRANULOSUS, Dallas.

Metapodius granulatus, DALLAS. Brit. Mus. Cat. Hemipt., ii, 430, No. 7.

Metapodius thomasi, UHLER, U. S. Geol. Surv. Terr., 1872, 399.

Collected by Dr. Oscar Loew near the Gila River, Arizona, in October. After a close examination of other and darker specimens, and on a minute comparison with the original description and with specimens from Mexico, I am enabled to perceive that the name given by me belongs to a pale variety of the species, and must be set aside as a synonym.

PACHYLIS, Lep.

PACHYLIS GIGAS, Burm.

Pachylis gigas, BURM., Handb., ii, 338, No. 3.

Collected in Southern Arizona by H. W. Henshaw. This is a Mexican form, which has not hitherto been reported from the United States.

LEPTOGLOSSUS, Guer.**LEPTOGLOSSUS CORCULUS, Say.**

- 1 *Leptoglossus corculus*, SAY, Hemipt. New Harmony, 12, No. 1.

From Owen's Valley, California, by F. Bischoff.

ALYDUS, Fab.**ALYDUS EURINUS, Say.**

1. *Alydus eurinus*, SAY, Jour. Acad. Nat. Sci. Phila., iv, 324, No. 5.

Common in many parts of the United States, both East and West of the Mississippi River.

From near Gila River, Arizona, by Dr. Oscar Loew.

This species is not confined to the West, but occurs also in most parts of the Eastern United States.

ALYDUS QUINQUESPINOSUS, Say.

- 2 *Alydus quinquespinosus*, SAY, Jour. Acad. Nat. Sci. Phila., iv, 323.

A damaged specimen from Owen's Valley, California, by F. Bischoff. It differs from the usual type in having less black on the pronotum, in lacking the white base of apical joint of antennæ, and in having the humeral angles more acute.

CATORHINTHA, Stål.**CATORHINTHA SELECTOR, Stål.**

- Catorhintha selector*, STÅL, Ofversigt Vet. Handl., 1859, 471, No. 3.

Gila River, Arizona, October (Dr. Oscar Loew). Previously known only from Mexico.

NEIDES, Latr.**NEIDES SPINOSUS, Say.**

- Neides spinosus*, SAY, Am. Ent., i, pl. 14.

One specimen from Owen's Valley by F. Bischoff.

SCOLOPOCERUS, Uhler, gen. nov.

General features of *Dasycoris*, Dallas. Body oblong-ovate, depressed. Head subquadrate, a little wider than long, the anterior angles acuminate, the tylus vertical, blunt; eyes small, deeply seated, with the surface behind each elevated into a lobe. Antennæ very stout, cylindrical, almost of equal

thickness throughout, closely beset with acute granules, which form also a crown on the ends of the joints; the basal joint longer than the second, the third longest, fourth very short, conical at tip, having only the base granulate. Rostrum extending nearly to the intermediate coxæ. Pronotum narrowing anteriorly, a little longer than wide, the lateral margins bluntly elevated. Sternum deeply grooved, almost to the base of the metasternum. Scutellum scarcely longer than wide, the lateral margins feebly elevated. Legs short, the posterior pair placed wide apart. Basal joint of the posterior tarsi nearly as long as the second and apical united. Hemelytra,—costal margins parallel, let into the surface of the tergum, and leaving an elevated and wide connexivum each side; nervures of the membrane very numerous, irregular, and ramose. Osteoles situated behind and beyond the intermediate coxæ.

SCOLOPOCERUS SECUNDARIUS, Uhler, *sp. nov.*

PLATE XLII, FIG. 5.

Form similar to *Dasycoris pilicornis*, Burm.; fusco-testaceous, freckled with black and fuscous; both the upper and lower surface granulated with black and brown; beneath paler than above. Antennæ appearing black by reason of the close set granules. Head testaceous, beset with remote, round, black granules anteriorly and near the outer angles; ocelli red, set in round, black dots; elevations behind the eyes with a few black points. Gular surface whitish-testaceous, with coarse, irregular granulations, some of which, on the cheeks, form longitudinal series continuously with the bed of the antennæ. Rostrum extending to behind the middle of mesosternum, dark piceous, paler at base and at the ends of the joints; basal joint shorter than the head, second a very little longer than the apical one, third not more than one-half as long as the second. Pronotum dull rufo-testaceous, pitted with large and irregularly placed piceous punctures, and with granules in some of them; lateral margins sinuated and granulated, the submargin linearly depressed; middle line distinct to near the base, the intra-humeral submargin a little tumid. Scutellum pitted and granulated with piceous. Legs rather closely granulated with black on a dull testaceous ground, the granules forming two or three bands at base of tibiæ, and a broader one at

their apex; tarsi piceous, the upper side of the basal joint testaceous. Corium pitted with remote piceous varioles, some of which contain a central granule; the base and principal nervule with coarse piceous granules; membrane with densely ramose, brown nervules. Tergum dull orange-testaceous, the surface with fine piceous punctures, and the penultimate segment with a broad piceous indentation each side; the connexivum tumid on each of the four central segments, beset with dense and minute piceous granules. Venter paler, faintly ochreous, finely and irregularly punctured, but with rufous and piceous remote granules, which are coarser and coalesce near the sides, forming longitudinal irregular lines of spots.

Length, 7 millimeters; width across the humeri, 2 millimeters.

Collected in the vicinity of the Gila River, in Arizona, by Dr. Oscar Loew.

DASYCORIS, Dallas.

DASYCORIS HUMILIS, Uhler.

PLATE XLII, FIG. 8.

Dasycoris humilis, UHLER, U. S. Geol. Surv. Terr., 1872, 403.

A specimen of the curious short-winged form was collected by Dr. Oscar Loew near the Gila River in October.

AUFEIUS, Stål.

AUFEIUS IMPRESSICOLLIS, Stål.

Aufeius impressicollis, STÅL, Kongl. Svensk. Acad., ix, 222.

One specimen from the vicinity of the Gila River, collected by Dr. Oscar Loew.

LYGAEIDAE.

LYGAEUS, Fab.

LYGAEUS RECLIVATUS, Say.

1. *Lygæus reclivatus*, SAY, Jour. Acad. Nat. Sci. Phila., iv, 321.

From Owen's Valley, California (F. Bischoff), and from Fort Wingate, N. Mex., July 10; vicinity of Gila River (Dr. Oscar Loew); Goat's Peak (Dr. J. T. Rothrock) and from Cañon Chelle, September (G. M. Keasbey).

A species common in Arizona, Nevada, and California, but rare in the eastern parts of the United States.

LYGAEUS FACETUS, Say.

2. *Lygæus facetus*, SAY, Hemipt., New Harmony, 13, No. 2.

Collected in Owen's Valley, California, by F. Bischoff. These specimens are of the usual type, having the full complement of red on the pronotum.

LYGAEUS BICRUCIS, Say.

3. *Lygæus bicrucis*, SAY, Jour. Acad. Nat. Sci. Phila., iv, 322, No. 2.

No specimens were actually brought in by the survey; but the species is not uncommon in New Mexico, Nevada, and other regions traversed by some of the collectors connected therewith.

NYSIUS, Dallas.

NYSIUS ANGUSTATUS, Uhler.

PLATE XLII, FIG. 1.

Nysius angustatus, UHLER, U. S. Geol. Surv. Montana, 1870, 406.

A very small, pale specimen is in the collection from Owen's Valley.

MEGALONOTUS, Fieb.

MEGALONOTUS SODALICIUS, Uhler, *sp. nov.*

PLATE XLII, FIG. 2.

Dull piceous black; form of *M. chiragra*, Fab. Sparingly clothed with minute golden pubescence, which is more dense on the venter, and almost absent from the prostethium. Head stout, very minutely densely shagreened. Antennæ rufous; the apical joint and sometimes the base and apex of the second joint piceous; the basal joint scarcely more than one-half the length of the head; second longest, a little longer than the fourth; third about two-thirds as long as the second. Rostrum rufo-flavous, reaching to the middle of the mesosternum; the apical joint piceous; the basal a little shorter than the head; second longest; third and fourth short, subequal. Pronotum almost one-fourth wider than long, indistinctly and very minutely scabrous; the lateral margins distinctly, but very narrowly reflexed throughout, pale piceous or testaceous, feebly sinuated behind the middle; the anterior angles bluntly rounded; the humeral angles prominent, testa-

ceous; the posterior margin sinuated, rufo-piceous. Scutellum almost flat, minutely scabrous and punctate, the apex sometimes piceous or testaceous. Legs rufous or rufo-testaceous; the coxal plates more or less piceous; anterior femora stout, armed beneath with five small piceous spines; bristles of the tibiæ and outer surface of the tarsi piceous. Pectus and venter obsoletely, minutely punctured and shagreened. Hemelytra dull testaceous, not densely, but distinctly, and somewhat closely punctured with piceous; the clavus black at base and on the outer margin; corium with the two principal nervures and a large spot extending outward from the inner angle of the tip black, membrane white, with a large blackish spot extending from the middle to the apex.

Length, 4 millimeters; humeral width, $1\frac{1}{2}$ millimeters.

Owen's Valley, California; Virginia City, Nev.; Oregon; and Texas.

LARGIDAE.

LARGUS, Hahn.

LARGUS CINCTUS, H. Schf.

Largus cinctus, H. SCHF., Wanz. Ins., vii, 6, No. 683.

Collected by Dr. Oscar Loew in the vicinity of the Gila River, Arizona.

PHYTOCORIDAE.

MIRIS, Fab.

MIRIS INSTABILIS, *sp. nov.*

PLATE XLII, FIG. 9.

General aspect of *M. virens*, Linn.; green, greenish or pale testaceous, clothed with close, yellow pubescence. Head broad, conical, the apex a little upturned each side; both before and behind the eyes is a longitudinal blackish stripe; vertex densely pubescent, minutely, confluent punctured, with a bald spot near the base, in the center of which runs the short, longitudinal groove; antennæ robust, rufous, the basal joint sometimes greenish, a little longer than the head, densely clothed with long pubescence; eyes round and prominent, posteriorly placed in contact with the pronotum;

rostrum reaching to behind the intermediate coxæ. Pronotum convex behind, the surface finely, deeply, and partly confluent punctured; the lateral margins broadly sinuated and with the carinate edge sharply prominent; the lateral black vittæ of the head are continued to each side of the scutellum, and sometimes extend broadened along the hemelytra to the apex of the corium; anterior angles callous exteriorly; the lateral carina abbreviated before reaching to them; humeral angles slightly recurved behind; the median line distinct and paler; propleura coarsely, confluent punctured, crossed longitudinally by a slender brown or red line, which is continued interruptedly to near the apex of the venter; meso- and meta-pleura punctured on the disk. Hemelytra pale straw-yellow on the exterior margin, and also on the edge of the inner margin, minutely, closely punctured, pubescent; cuneus generally pale green; membrane hyaline, or tinged with brown, with the nervures rufous or pale brown, sometimes with a fuscous short streak extending beyond the nervure. Wings hyaline or faintly smoky and iridescent, with the nervures brown. Scutellum with finer punctures than the pronotum, those of the middle and base being sometimes fuscous; the median line pale and smooth. Tergum green or pale rufous; the disk more or less fuscous. Venter green or pale rufo-testaceous, invested with rather close, yellow, sericeous pubescence, usually with a slender vitta of interrupted red or fuscous lines against the impression bounding the connexivum. Legs green, pubescent, often having the tarsi and tibiæ rufous; the posterior femora usually with two rows of rufous or piceous dots on the upper surface, and two similar rows beneath; the nails and tip of joint next to them piceous.

Length, 6–7½ millimeters; width across the humeri, 1¾–2 millimeters.

Collected at Roaring Fork, Colorado, by Dr. J. T. Rothrock.

I had formerly accepted the determination of Dr. Harris in referring this species to *Miris dorsalis*, Say; but after having closely compared specimens from many parts of North America with his description, the discrepancies are too great to permit such a reference.

This species inhabits a large part of North America, and it may yet prove to be only the western form of the European *M. laevigatus*, Linn.

HADRONEMA, Uhler.**HADRONEMA MILITARIS, Uhler.**

PLATE XLII, FIG. 12.

Hadronema militaris, UHLER, U. S. Geol. Surv. Montana, 1870, 412.

From Roaring Fork, Colorado, by Dr. J. T. Rothrock. It seems to be very widely distributed throughout the Territories west of the Mississippi basin, and extends across to the Pacific coast.

CALOCORIS, Fieber.**CALOCORIS PALMERII, Uhler.**

PLATE XLII, FIG. 4.

1. *Calocoris palmerii*, UHLER, U. S. Geol. Surv. Montana, 1870, 410, No. 2.

A few varieties were collected near the Gila River in Arizona by Dr. Oscar Loew.

CALOCORIS SUPERBUS, *sp. nov.*

PLATE XLII, FIG. 3.

2. *Calocoris superbus*, UHLER, *sp. nov.*

Having the same form and general characters as *C. rapidus*, Say. It differs, however, in being bright scarlet; the rostrum extending only to the posterior line of the middle coxæ; the antennæ black, and having only the base of the third joint pale; the scutellum blood-red, with the lateral margin black; the clavus and inner margin broadly black; the areole of the membrane deeply infuscated; the pectus orange-red; and the middle line of the venter blackish. Legs black, but with pale yellowish coxæ. Tergum a little infuscated.

Length, $7\frac{1}{2}$ millimeters; breadth across the humeri, $2\frac{3}{4}$ millimeters. One female from Owen's Valley, California (F. Bischoff).

LOPIDEA, Uhler.**LOPIDEA MEDIA, Say.***Lopidea media*, SAY, Heteropt. New Harmony, 22, No. 11.

One female of the usual variety was collected in Owen's Valley, California, by F. Bischoff.

LYGUS, Hahn.

LYGUS ANNEXUS, Uhler.

PLATE XLII, FIG. 10.

Lygus annexus, UHLER, U. S. Geol. Surv. Montana, 1870, 413, No. 2.

Very common as far east as to the Mississippi River in Minnesota.

A few specimens of the paler varieties were brought from Owen's Valley, California (F. Bischoff).

NABIDAE.

NABIS, Latr.

NABIS FERUS, Linn.

Nabis ferus, LINN., Fauna Suecica, 962.

One specimen from Owen's Valley, California (F. Bischoff).

ARADIDAE.

ARADUS, Fabr.

ARADUS AFFINIS, Kirby.

1. *Aradus affinis*, KIRBY, Fn. B.-Am., 279, No. 2.

From Owen's Valley, California (F. Bischoff).

ARADUS ACUTUS, Say.

2. *Aradus acutus*, SAY, Hemipt. New Harmony, 28, No. 2.

Two very pale specimens from Owen's Valley, California (F. Bischoff); also from Roaring Fork, Colorado (Dr. J. T. Rothrock). The eastern specimens are generally dark fuscous, while all that I have thus far examined from the region west of the Rocky Mountains have been more or less pale rust-brown.

PHYMATIDAE.

PHYMATA, Latr.

PHYMATA EROSA, Linn.

Phymata erosa, LINN., Syst. Nat., ed. xii, ii, 718.

A specimen of the ordinary type from Owen's Valley, collected by F. Bischoff.

SALDAE.

SALDA, Fab.

SALDA INTERSTITIALIS, Say.

Salda interstitialis, SAY, Jour. Acad. Nat. Sci., Phila., iv, 324.

From Roaring Fork, Colorado, collected by Dr. J. T. Rothrock.

HYDROMETRIDAE.

LIMNOPORUS, Stål.

LIMNOPORUS RUFOSCUTELLATUS, Latr.

Limnopus rufoscutellatus, LATR., Genera Crust. et Ins., 134, No. 2.

“ From stagnant water above the Rio Grande in Colorado” (Dr. J. T. Rothrock).

HYGROTRECHUS, Stål.

HYGROTRECHUS REMIGIS, Say.

Hygrotrechus remigis, SAY, Hemipt. New Harmony, 35, No. 2.

From Owen's Valley, California (F. Bischoff), and from Cañon Chelle, Arizona, in September (G. M. Keasbey).

NAUCORIDAE.

ABEDUS, Stål.

ABEDUS OVATUS, Stål.

Abedus ovatus, STÅL, Stettiner Ent. Zeit., xxiii, No. 341.

Collected by Dr. C. G. Newberry at Colorado Chiquito, July 30 ; by H. W. Henshaw, at Cave Spring, Ariz., July 31 ; by G. M. Keasbey, at Zuñi, N. Mex., in August ; and in the Gila River, Arizona, October, by Dr. Oscar Loew.

ZAITHA, Amyot & Serv.

ZAITHA FUSCIVENTRIS, Dufour.

Zaitha fusciventris, DUFOUR, Ann. Soc. Ent. de France, ser. iv, iii, 389.

One specimen from Owen's Valley, California, by F. Bischoff. This species extends from Central America through Mexico and into New Mexico, California, and Texas.

NEPIDAE.

RANATRA, Fab.

RANATRA QUADRIDENTATA, Stål.

Ranatra quadridentata, STÅL., Ofversigt Kong. Vet. Akad. Förhandl., 1861, 204.

One specimen from Owen's Valley, California, by F. Bischoff. It corresponds exactly with specimens from Western Mexico.

NOTONECTIDAE.

NOTONECTA, Linn.

NOTONECTA INSULATA, Kirby.

Notonecta insulata, KIRBY, Fn. B.-Am., 285, No. 399.

Owen's Valley, California (F. Bischoff).

This species seems to extend entirely across the continent, north of the fortieth parallel, and on the Pacific side extends as far south as San Francisco

CORISIDAE.

CORISA, Geoff.

1. CORISA DISPERSA, *sp. nov.*

PLATE XLII, FIG. 7.

Pale dull testaceous, robust, lineated with dark brown. Head broad, the cheeks remotely, obsoletely punctured, an impressed line at the inner margin of the eyes coarsely punctured, and each side of the middle line of face with a series of coarse shallow punctures; occiput angularly produced, carinated, broadly impressed on each side. Eyes subtriangular, the inner angle rectangular. Pronotum broad, short, pale, having eight, or rarely nine, brown transverse lines, of which the three central ones are abbreviated and more slender; the surface minutely rastrated; the anterior margin emarginated, and with a very short carina just behind this; the posterior margin broadly rounded. Legs pale testaceous; the tip of the basal joint of the intermediate tarsi brown; palæ of the female falcate, acute at tip, almost as long as the femora; in the male, the anterior tibiæ are flattened, curved inward, and the palæ are very short, broad, placed obliquely, and of the form of an arrow head with the basal angles rounded. Hemelytra with slender transverse, undulated, interrupted, and tolerably

regular, brown lines; those of the base of the clavus straighter and almost obliterated, leaving a bare spot at base; the epipleura white, with the transverse nervure, the apical margin, and tip infuscated. Some of the basal and apical lines of the corium are often forked. Tergum black in the male; blackish, infuscated, margined with fuscous, or with only a fuscous tip, in the female. Venter either black, infuscated, or with only a fuscous tip. Facial fovea of the male broad and long, extending above the line of the eyes, densely clothed with long silvery hairs.

Length, 5–6 millimeters; width across the humeri, $1\frac{1}{2}$ –2 millimeters.

Brought from Owen's Valley, California (F. Bischoff). Specimens have also been collected near Virginia City, Nev., and in Texas.

The membrane usually has a dark spot at base on the outer margin, another on the inner margin, and sometimes one on the disk.

CORISA INTERRUPTA, Say.

2. *Corisa interrupta*, SAY, Jour. Acad. Nat. Sci. Phila., iv, 328.

Collected in Owen's Valley by F. Bischoff, and at the Lower Rio Grande in October.

TETTIGONIDAE.

PROCONIA, Amyot & Serv.

PROCONIA COSTALIS, Fab.

Proconia costalis, FAB., Syst. Rhyng., 96, No. 44.—SIGNORET, Ann. Soc. Ent. de France, 1854, 359, No. 210. pl. xii, f. 8.

Two damaged specimens of *Jassina* are in the bottle from Owen's Valley, but they are not in a recognizable condition.

It may be mentioned that this collection numbers many hundred specimens of the different species enumerated and described.

NOTE.—It is greatly to be regretted that the entire collection made by the expedition in 1872 was lost in transit from the National Museum to Prof Uhler.

CHAPTER XIII.

REPORT
UPON
THE COLLECTIONS OF ORTHOPTERA
MADE IN PORTIONS OF
NEVADA, UTAH, CALIFORNIA, COLORADO, NEW MEXICO, AND ARIZONA,
DURING
THE YEARS 1871, 1872, 1873, AND 1874.
BY
Prof. CYRUS THOMAS.

CHAPTER XIII.

Lieut. GEO. M. WHEELER, *Corps of Engineers, U. S. A.* :

DEAR SIR: The *Orthoptera* which you have submitted to me for examination includes your collections made during the explorations of 1871, 1872, 1873, and 1874. Those of first two years are comparatively small, but those of 1873 and 1874 are the most extensive I have seen from the West, and contain much of value and interest to foreign as well as our own orthopterists. Although the first is small, yet it contains several new species and also one new genus. This genus presents some very interesting features and peculiarities. In fact, so important was this deemed, that with your permission a description of it, as well as a few other new species of *Acrididæ*, was published in the Proceedings of the Philadelphia Academy of Sciences, in order that I might avail myself of this new material for publication in my "Synopsis of the Acrididæ of North America", which I desired to have as complete as possible for the use of our entomologists. You will see by an examination of my work that I have availed myself of your kind permission in this respect; nevertheless, as this material was obtained by your expedition, I have not only inserted the descriptions here in full, but have also added such remarks as I deemed of scientific interest.

This collection is of peculiar interest to me besides, for the following reasons: it contains a specimen in color, and a female of *Locusta fuliginosa*, Thos., which I described from a single male furnished by Dr. Palmer. As this was the first specimen of *Locusta* observed in the United States, I was very anxious to obtain the female, and, if possible, a specimen in color. This wish has been gratified by the receipt of your collection. Although some doubt was expressed at the time as to the correctness of my opinion as to

this being a different species from a specimen obtained in California, I am now able to set all doubts at rest, and state positively that the two are quite different and distinct species.

The collections of 1873 and 1874, as will be seen, contain a number of new and interesting species, especially of *Calopteni* and *Ædipodæ*, but it is somewhat singular that so few specimens of *Caloptenus spretus*, the destructive grasshopper of Utah and the West, are found in them. This certainly indicates that the line of your survey was along the southwestern border of its district. In fact, the collection of 1871 did not contain a single specimen, which was somewhat surprising to me, as I am aware from personal knowledge that its migrations extend along the line of the Central Pacific Railroad some distance west of Salt Lake.

The absence from the earlier collections of *Ædipoda atrox*, Scudd., which corresponds exactly with the fact presented by my own collections from Salt Lake north to Montana, is somewhat puzzling when connected with the additional fact that specimens of this species have been found on the mountains about Yellowstone Lake, and also on the mountains in Central Colorado. This species is found in abundance in California, where it is not only destructive, but to a certain extent migratory. It is therefore quite strange that it should be absent from the intermontane plains and valleys of Utah, Idaho, and Nevada, and yet be found in the higher mountain regions of Colorado and Wyoming. The same thing also appears to be true in regard to some other Californian forms, which reappear in the mountains of Colorado.

Your collection also corresponds in another somewhat singular respect with the collection I made in 1871 in Northern Utah and Southeastern Idaho. While the Rocky Mountain range appears to form a boundary to the range of the species of *Locustidæ*, on the other hand, the distribution of the *Acrididæ* appears to be but little affected by it; for example, *Stenobothrus coloradus*, which I supposed was confined to the eastern slope and eastern plains, I find in this collection. *Ædipoda neglecta*, which, although a western species, is found as far east as Illinois, is contained in your collection, as is also *Æ. cincta*, which reaches eastward to the Mississippi River.

Pedioscertetes nevadensis, which is very closely allied to *Acrolophitus*

hirtipes (the *Gryllus hirtipes* of Say), I judge is a southwestern form, which ranges chiefly south and west of the line of your survey, as I have seen it in no other collection. It is possible that Major Powell's collection, which I have not seen, may contain specimens of this interesting species.

Having pinned a number of your specimens by the side of a small collection from Southern California, I observed a somewhat singular contrast in color; the prevailing color of the *Calopteni* and *Ædipodæ* from California being a bright yellow, while the corresponding species of your collection were largely rufous. I have been inclined to believe, though not fully satisfied on the point, that, in the West, the general or ground color of species which inhabit barren spots, is, to a certain extent, dependent on the color of the surface soil.

I find also a specimen of *Ædipoda undulata*, Thos., which I supposed was confined to the section east of the Rocky Mountain range; but this collection shows that it also belongs to the middle or intermontane area. I find in the collections of both years a fine large *Acridium*, which is new, a description of which, by your permission, has been published, and is contained in my synopsis. But the most interesting object of the collection is a specimen of *Ephippigera tschivavensis*, Hald. I have expressed the opinion, in my synopsis, that Haldeman's specimen was the pupa of some species of *Ædipoda*; but a slight examination of this specimen is sufficient to show any entomologist that it is an imago, and that Haldeman was right in describing it as new. Other notes in regard to the collection will be found under the proper heading.

Since the publication of my Synopsis, I have received from Dr. C. Stål, of Sweden, a copy of his *Recensio Orthopterorum*, published about the same time, which introduces quite a number of changes in the arrangement of the groups of this order. As this author is the leading orthopterologist in Europe, I have thought it proper to call attention to such changes as relate to our Orthopteral fauna.

I have also received from Mr. Otto Hermann a copy of his paper on the *Decticidæ*, recently published in the *Verhandlungen der kaiserlich-königlichen zoologisch-botanischen Gesellschaft* in Wien, which contains a friendly criticism on my provisional arrangement of this group of the *Locustidæ*. As the

author had sufficient material before him (obtained chiefly from the collection of Dr. Brunner de Wattenwyl) to properly systematize this group, and clear up the confusion into which it had fallen, I have thought it proper to give here his arrangement for the benefit of our entomologists.

Allow me to state that your collection has been of much value to me in my investigations of this order, and that I trust the following brief report may be accepted as a partial attempt on my part to repay you for your kindness in submitting it to me.

I remain yours, very respectfully,

CYRUS THOMAS.

LIST AND DESCRIPTIONS.

The specimens of 1871, as I learn from the letters of Lieutenant Wheeler and Dr. W. J. Hoffman, as well as by personal communication of Dr. H. C. Yarrow, were collected chiefly along the route of the expedition, from Carlin, on the Central Pacific Railroad, to Cottonwood, in the southern part of Nevada; a small portion only of the collection being obtained in Northwestern Arizona. A portion of this collection is preserved in alcohol; others are dried specimens, which retain their colors.

The collections of 1872, 1873, and 1874 were made in Utah, Nevada, Colorado, New Mexico, and Arizona, by Dr. H. C. Yarrow, Dr. J. T. Rothrock, Dr. C. G. Newberry, Lieut. W. L. Marshall, Mr. H. W. Henshaw, and others of the expedition.

BLATTIDAE.

The absence of this family from western collections would seem to indicate at least that it was not well represented in that section. This also corresponds with my observations in the sections I have visited. I do not think I have seen a dozen specimens in all the collections I have examined. I do not find a single specimen in this collection.

MANTIDAE.

There are three specimens belonging to this family in the collection, one of which is new, and is named in honor of Lieutenant Wheeler, in charge of the expedition.

MANTIS, Linn.

MANTIS WHEELERII, *sp. nov.*

The specimen is dry, and is so badly damaged that it is impossible to determine positively the genus to which it belongs, or to do more than indicate some of its leading specific characters.

Female.—Head flat, transverse, triangular in front. Occiput short, reduced to a transverse ridge. Vertex transverse, directed downward and backward toward the face, with four slight longitudinal depressions. Ocelli distinct and prominent. The face transversely quadrilateral; the upper carinate margin bent upward between the antennæ. The antennæ wanting. Prothorax about twice the length of the rest of the thorax; the margins minutely serrate, slightly emarginate, scarcely expanding posteriorly, expanding near the transverse incision. Anterior femora denticulate on the exterior carina. Abdomen enlarged, fusiform. Middle and posterior legs wanting, and but a remnant of the wings remaining.

Color.—Yellow, probably faded from a pale green. The abdominal segments with a piceous black fascia or ring on the posterior margin of each. The remnants of the wings carneous-red.

It is probably a species of *Stagmatoptera*; but it certainly approaches very near to *Hierodula*, notwithstanding Saussure's assertion that those belonging to the genus are "*Insectes asiatiques et africains*".*

The specimen is too much injured to give any very accurate measurements; but the following approximations will indicate the size:—Length, 2.2 inches; prothorax, 1.0 inch; anterior femora, 0.5 inch; anterior tibiæ, 0.6 inch.

Stål (*Ofver. k. Vetensk.-Akad.*, 1871) gives a new arrangement of the *Mantidæ* in the form of a synoptical table. Although this possesses some advantages in tracing species, yet I prefer that of Saussure, as given in his *Mélanges orthopterologiques* (3^{me} fas., 1870).

He divides the family into two divisions, which he terms *groups*, but which might very properly be called subfamilies. The first, *Nudipedes*, is distinguished by setaceous antennæ in the two sexes; head triangular, simple, without prolongations; feet and body simple, without membranous

* *Mélanges Orthopterologiques* III, Fascic. 214.

appendages; elytra oval or lanceolate with entire borders. The second, *Lobipedes*, is distinguished chiefly by the appendages found on some part of the body or feet.

The former group is divided into two tribes, *Orthoderii* and *Mantii*; the former having the prothorax straight, the sides parallel, and the front not attenuate, while the latter has that portion of the prothorax over the anterior coxæ more or less expanded, and the front attenuate or convergent. The three species here mentioned belong to the latter tribe.

This tribe is separable into two divisions distinguished by the form of the super-anal plate; in the first (*Mantites*, Sauss.), it is transverse, or in the form of a short triangle; in the second (*Thespites*, Sauss.), it is elongate-triangular or lanceolate.

Saussure, in his synoptical table of the genera of the *Mantii*, groups the genera under the following headings:—

- I. Super-anal plate transverse, or a short triangle *Mantites*.
 - a. The discoidal vein of the wing of the ♂ ♀ undivided or furcate.
 - aa. The discoidal vein of the wing of ♂ ramose:
 - b. Species small; pronotum short.
 - bb. Species large; pronotum more or less elongate; body robust; abdomen rhomboidal or fusiform or narrow:
 - c. Elytra of the ♀ squæmiform.
 - cc. Elytra and wings of the ♀ complete.

It is to this last subdivision, embracing some six or seven genera, that the species in this collection belong.

MANTIS ——— (?).

It is possible this is new; but as it bears a strong resemblance in some respects to *M. carolina*, I have not ventured to describe it as a new species from the single alcoholic specimen before me.

Female.—Elytra greenish-yellow, unspotted; stigma small, oblong, same color; extending to the margin of the penultimate segment of the abdomen. Wings similarly colored, with yellow interneural fasciæ; discoidal vein furcate. Stature that of *M. carolina*. These characters would appear to place it between *Cardioptera* and *Stagmatoptera*; it may belong to the southern form of *Stagmomantis carolina* which Saussure has separated as a distinct species, it is therefore impossible to determine accurately its position without the male.

MANTIS ——— (?).

This specimen is very much mutilated; the greater portion of the abdomen is wanting. It is possible that it is but the pupa of the previous species, to which it is evidently closely allied.

PHASMIDAE.

Two specimens of this family are contained in the collection, and, although not in a condition to be specifically determined, yet it is evident that they are quite distinct.

ACRIDIDAE.

INTRODUCTORY REMARKS.

Most of the specimens collected belong to this family, and are the most interesting on account of the new forms brought to light. I find in the collection no representatives of the group *Tryxalini*, as this group is limited in my Synopsis, nor have I seen any representative of it west of the Rocky Mountain range, except two or three larvæ of what I supposed to be a species of *Opomala*. So far as the number of species is concerned, the *Ædipodæ* appear to be more abundant than the *Acridiæ*.

As Stål's "*Recensio Orthopterorum*", heretofore mentioned, relates wholly to this family, I have concluded to introduce what I have to say in regard to it at this point. And first I may state that I am as yet unable to ascertain positively which has priority in date of publication, the "*Recensio*" or my *Synopsis*. The title page of the former bears date 1873, which is also the date of the latter. The author quotes his own paper published in *Öfv. Kongl. Vet. Akad.-Förhandl.*, No. 4, 1873. By reference to this paper, which, with the "*Recensio*" has been kindly communicated to me by the author, I find that it was presented April 16, 1873. As it is probable it was not published for a month or so after it was presented, I infer that the "*Recensio*", in which it is quoted, did not make its appearance until in the latter part of the year. My *Synopsis* was actually published (distributed) about the first of October, 1873. It is therefore a matter of doubt as to which has precedence in date of publication; and until this is settled by ascertaining the exact date of the publication of the "*Recensio*", I shall retain

the names I have adopted in that work where they relate to the same division, genus, or species, except where I find that I am in error.

It is proper to remark here that this work relates almost exclusively to the species named by Linné, De Geer, and Thunberg, yet the author seizes the occasion to present a somewhat detailed synopsis of his arrangement of the family. While I cannot agree in every respect with this arrangement, yet I think it must be admitted that he has made a marked advance in systematizing this troublesome family, and that entomologists must adopt much that he has presented.

Although I am inclined to think my own arrangement should be somewhat modified, I cannot adopt his division into eleven subfamilies, if they are intended to stand as divisions of equal value, or as representing corresponding variations. The grouping does not differ very materially from that of most recent authorities, although the characters used as his chief guides are somewhat different. This would indicate that the larger groups, as now established, are natural, as the same result is reached, no matter from what stand-point our investigations are made.

In my synopsis, I have divided the family into two primary divisions, which I call, and I think correctly, subfamilies, while the next divisions, corresponding, in part, with Stål's, I have termed groups. This method, I think, corresponds more closely with the nature of the characters that separate these divisions, and renders the arrangement more systematic than either that of Walker or Stål.

The subfamilies given by Dr. Stål are as follows:—

Phymatidæ;
Pamphagidæ;
Acridiidae;
Truxalidæ;
Edipodidæ;
Pneumoridæ;
Cælopternidæ;
Tittigidæ;

arranged in the order here given; also *Proscopidæ*, *Mastacidæ*, and *Chorætypidæ*, whose position in his system the author does not give.

Although the author, in his diagnoses of these groups, reveals the fact that the distinctions in one case are greater than those in another, yet so far as the arrangement and naming is concerned they stand as equivalents. No one will contend for a moment that the difference between *Acridium* and *Ædipoda* is as great as between either of these and *Proscopia* or *Tettix*. Yet Dr. Stål's system does not indicate this fact, as his groups stand as equivalents.

If we compare the true *Acridians*, as *Acridium*, *Ædipoda*, &c., with the *Tettigi*, we find the following differences:—

ACRIDII.—Of various sizes, from half an inch to four inches in length; wholly terrestrial in their habits.

Tarsi furnished with a pulvillus, or pad, between the claws; although sometimes minute, yet it is seldom, if ever, absent.

Pronotum consisting of a kind of shield, covering the prothorax and extending backward at farthest only upon the base of the elytra.

Prosternum drawn up; that is, it is not in the same plane as the rest of the sternum; spined, tuberculate or smooth, but never advanced upon the mouth.

Mouth free, not covered by the prosternum.

Elytra and *wings* generally present, but sometimes aborted or entirely wanting; but, when present, the latter never exceed the former in length.

But an examination of the *Tettigi* reveals an entirely different set of characters in all these respects, as may be seen from the following statement of them:—

TETTIGI.—Generally of small size, many being less than half an inch in length, and seldom exceeding an inch, preferring moist damp situations, and in some cases even subaquatic.

Pronotum forming a shield over the entire body, extending backward nearly or quite to, and often beyond, the tip of the abdomen; sometimes flat, sometimes keeled and arched, and in some species elevated into a sharp foliaceous crest.

Tarsi without pulvilli, or pads, between the claws.

Prosternum depressed to the same plane as the rest of the sternum; advanced upon the mouth, and usually furnished with a kind of semicircu-

lar ridge, which forms a sort of muffler, into which the mouth is drawn when at rest.

Mouth covered by the advanced portion of the prosternum.

Elytra and *wings*, when present, generally placed upon the sides of the body, the latter exceeding the former in length; these organs being apparently pushed upon the sides by the extended pronotal shield.

These differences in the external structure, which all must admit are important, are accompanied by certain modifications of the internal structure, and certainly indicate important variations in habits.

Now, if we compare the species of Stål's subfamily *Acridiidae* with those of his *Ædipodidae*, or any other true Acridians, we shall find the tarsi in each case furnished with a pad between the claws; the shortened, shield-like pronotum; the prosternum drawn up; the mouth free; the elytra, when present, always equal to or exceeding the wings in length, and generally meeting or overlapping each other above the abdomen.

It is therefore clear that the true Acridians and the Tettigi are more widely separated from each other than the groups of the former; and a true arrangement ought to indicate this difference. For these reasons, I still hold that the Tettigi should be separated as a subfamily, and that the other groups of the true Acridians should be considered as subordinate divisions.

It will be observed that I have admitted that my arrangement should probably be somewhat modified; also, that, in speaking of certain groups, I have used the expression "True Acridians". My reason for this is that a more thorough examination of exotic forms has convinced me that the *Proscopia* constitute a distinct subfamily, equivalent to the Tettigi. Whether the *Mastacidae* should be embraced in the same division as Stål in effect does in his *Conspectus* of his subfamilies, I am unable to say; but I have considerable doubt as to the propriety of this course.

A single glance at a typical species of *Proscopia* is sufficient to reveal even to a superficial observer important variations from the true Acridian type. Their elongate, cylindrical bodies, long, slender legs, and general appearance would lead us, at the first glance, as it did Stoll, to place them among the apterous *Phasmæ*. In fact, *Cephalocæma subaptera*, West (Arcan. Ent., ii, 55, pl. 63, fig. 2), might easily be taken by the unscientific

observer for our common *Diapheromera Sayi*. Not only is the body elongate, slender, and somewhat cylindrical, but is generally almost uniform in size throughout its length, and usually wingless. The head is elongate-conical, and either ascending obliquely (*Proscopia*), or extending forward horizontally (*Cephalocæma*); antennæ very short, often falling short of the tip of the vertex, and composed of but few joints (six to nine). The legs are quite slender; the posterior pair being scarcely fitted for leaping. The prothorax is very long, slender, and subcylindrical, having no pronotum in the sense of a shield, as seen in the true Acridians; the pronotum here being simply the dorsal portion of the prothorax as in the *Phasmæ*; the anterior legs (in *Proscopiæ*) are attached to the sides near the middle. The mesothorax and metathorax are very short; their combined length seldom equaling one-half the length of the prothorax.

It is evident from these characters, and others which might be named, that the distinctions between this group and the true *Acridii* are much greater than those which separate the groups into which the latter have been divided. I am therefore inclined to think this group should be considered as a subfamily, and as equivalent to the *Tettigi*. We should, then, have three subfamilies, as follows:—

PROSCOPINÆ, ACRIDINÆ, and TETTIGINÆ.

Therefore, while I think the arrangement given in my synopsis should be thus modified, on the other hand, the reasons which lead me to this conclusion would also lead me to reject the plan suggested by Dr. Stål, if his larger groups are to be considered as subfamilies.

Raising his *Proscopidæ* and *Tettigidæ* to subfamilies, and considering the rest of the family as a third subfamily, I am prepared to accept, in great part, his other groups, if considered as inferior divisions.

I most heartily agree with him in suppressing Walker's *Trigonopterygidæ*, and in raising *Pneumoræ* to a distinct group, as equivalent to *Acridini* and *Ædipodini*. And, to show that I had arrived at this conclusion before the receipt of the "*Recensio*", I quote the following from my notes prepared during the winter of 1873-'74:—

"This singular group (*Pneumoræ*) presents some very singular features,

&c. Although these divarications from the typical form are considerable, and possibly may require their separation into a distinct group, as I have used the term in my classification, yet I do not think they will justify raising the division to the dignity of a subfamily."

In regard to the *Trigonopterygi*, I quote the following from the same notes:—

"*Trigonopteryx* has a conical, somewhat ascending head; an oblique but incurved face, and ensiform antennæ, and if the wings were of the usual form would doubtless be placed in this group (*Tryxalini*) by all entomologists. The same remark may be made in regard to *Hyalopteryx*, Charp. If we place the former in a separate group, or limited family, as has been done by Walker, and in which I have followed him improperly in my Synopsis, on account of the unusual elytra, how shall we avoid the necessity of forming a separate group for *Sphenarium*, which has but figments of elytra, unusual in form and neuration, attached to the sides of the thorax? *Trigonopteryx* is essentially tryxalidian in form and features, and should be included in this group (*Tryxalini*); therefore I feel compelled to correct my former work in this respect."

Notwithstanding Dr. Brunner Wattenwyl approves of the character chosen, which forms the chief ground for separating the *Phymatidæ* from *Pamphagidæ*, yet I doubt the propriety of forming two divisions. Placing *Mastax* in a separate group or division is certainly correct. I know nothing in regard to the species on which he bases his subfamilies *Cælopternidæ* and *Chorætypidæ*.

Before speaking of the genera which the author embraces in his subfamilies, I desire to call attention to the order in which he arranges these subfamilies, which has been given on a previous page. The author does not state positively that this is the order in which they should stand; but it is the order in which they are placed in the body of his work.

In his Conspectus, they stand in the same order, *Proscopidæ* standing at the head; *Mastacidæ* second; and, then, as given, down to *Pneumoridæ*; then follows *Chorætypidæ*; after that the other two as given. As the order in the body of the work, so far as given, corresponds with that in the Conspectus, it is probable that this forms a correct outline of his arrangement.

It is evident that by this arrangement the groups, with perhaps two exceptions, form as close connections on each side as is possible; for example, the connection of *Acrididæ* with *Tryxalidæ* is natural, as is that of the latter with *Ædipodidæ*.

By reference to my Synopsis (page 144), it will be seen that I also maintain this bilateral connection of the *Tryxalides*, placing *Xiphocera* on the side next the *Acridii* as the connecting link. But I there place the *Tryxalides* at the head, and the others as the parallel links of two descending or ascending lines.

If Stål intends *Proscopidæ* to stand before *Phymatidæ* as the connecting link between this family and *Phasmidæ*, and he can scarcely do otherwise, then his arrangement will be somewhat in the form of a recurring series: beginning with the elongate conical head and slender form in *Proscopia*, he passes through the gradually shortening and swelling forms of the *Phymatidæ*, to the large lubberly *Pamphagus elephas*, which, by its size and unwieldy appearance, reminds us strongly of the *Brachypeplus magnus* of our western plains. When he reaches his *Tryxalidæ*, he again has the conical head and slender body, which again recedes from view when he enters the *Ædipodidæ*. It is evident therefore that this linear arrangement depending on one or two characters, no matter how permanent, is not in accordance with nature. There are evidently diverging lines, and Dr. Stål's work has rendered it quite probable that there are three of these lines instead of two, as I have given; and this also increases the evidence in favor of Dr. Scudder's idea as to the ascending order of the families, as it indicates the conic head and slender form as the more generalized, as it is the converging point of three different lines. While I am compelled to admit these facts as against my view as to the position in the scale of being, yet it but increases the difficulty at the other extremity of the family.

I am satisfied that no arrangement can stand the test of future investigations which separates the *Proscopiæ* and *Tryxalidæ* so widely as Dr. Stål has done, no matter how satisfactory it may be in other respects. While I am fully conscious of the difficulties experienced in attempting to arrange the subdivisions in a continuous line, at the same time I consider it very doubtful whether success in this respect is advantageous or in accord-

ance with nature, if, while harmonizing the parts of a group with each other, we tear asunder the links which bind it as a whole to other adjacent groups. Moreover, I believe it is now generally conceded that, in ascending the scale of being, we pass, as a general rule, from the generalized to the specialized, and find the lines we are tracing repeatedly branching and forming other lines.

Without attempting at present a further review of the author's general arrangement, I will call attention to such changes in his work as relate to our North American orthopteral fauna.

Sphenarium, *Ichthydion*, and *Pyrgomorpha* are transferred to *Phymatidæ*.

The last named genus as he has limited it, and in fact the characters of this subfamily as he has given them, excludes our *P. brevicornis*, which, as will hereafter be seen, has been retained in *Truxalis*.*

His subfamily *Acridiidæ* includes the following genera, which have usually been placed in other divisions:—*Xiphocera*, *Tropinotus*, *Dictyophorus*, *Rhomalea*, *Mesops*, and *Opsomala*.

Our *Rhomalea centurio* (*microptera*) is retained in the *Dictyophorus* of Thunberg as *D. reticulatus*, the name given to it by that author in 1815. This genus, as now limited, is distinguished by the following characters:—The vertex and fastigium lying in the same plane and slightly declined, and seen from the side forming a right angle with the frontal costa; pronotum obtusely carinated; anterior margin forming an obtuse angle or rounded.

Rhomalea is limited to the species possessing the following characters:—The transverse impressions of the pronotum distinct; anterior lobe destitute of a carina; posterior lobe depressed, but ascending posteriorly; frontal costa suddenly flattened below the ocellus. In this, he places *R. miles*, Burm., but restores the specific name *speciosa* of Thunberg; *Acridium coloratum*, Serv. (*Chromacris colorata*, Walk.), is also included. His specimen of the latter species is from Mexico; it is therefore probable that the locality (Carolina) given by Serville for his specimen is a mistake.

The author also introduces a new genus (*Tæniopoda*) into this rhomalean group, which has the following as its distinguishing characters:—Fastigium strongly deflexed, forming with the frontal costa as seen from the side

* The reader will notice that, in speaking of Stål's genera and subfamilies, I retain his method of spelling.

an obtuse, somewhat rounded, angle; pronotum cristate, the crista on each lobe near the posterior sulcus depressed.

This includes the *R. equita*, Burm., *Monachidium superbum*, Stål, and *R. pecticornis*, Walk. Stål describes the last named species as new under the name *T. picticornis*. This collection contains several specimens of this fine species, which will be noticed at the proper place.

Stål's division of this heterogeneous group into different genera is eminently proper; for a single glance at *R. microptera* and *R. miles* is sufficient to convince any entomologist that they are generically distinct. As the *Dictyophorus* of Thunberg has precedence in date, its restoration must be acquiesced in.

The *Lophacris* of Scudder is included under his *Titanacris*, which the author distinguishes from *Tropidacris* chiefly by the venation of the elytra and form of the genital plate of the male; being entire in the former and emarginate in the latter.

At this point, a new genus (*Hermistria*) is introduced, founded on a species from Mexico. This and the other new North American species mentioned will be noticed in this paper at the proper places.

The change which, if followed, will produce greatest confusion in our American nomenclature is that in reference to the caloptenoid species. He holds, as I learn by letter from Dr. Brunner de Wattenwyl, that we have no *Calopteni* in North America; all our species being referable to *Pezotettix*. Serville's name (*Calliptamus*) is amended and retained as *Calliptenus*. The chief distinctions given by the author between this genus and *Pezotettix* are as follows:—

In *Calliptenus*, the elytra destitute of the intercalate vein; the posterior femora broad and distinctly serrate above; the posterior sulcus of the pronotum in the middle or before the middle.

In *Pezotettix*, the elytra abbreviated or rudimentary, and furnished with an intercalate vein; posterior femora having the upper margin entire and unarmed; posterior sulcus of the pronotum sometimes situated behind the middle.

His numerous divisions of these restricted genera into subgenera show clearly the difficulty experienced in attempting to obtain a satisfactory

arrangement. It is clear that if we follow the diagnoses of these genera as given by him, all of our *Calopteni* will have to be removed to other genera. *C. femur-rubrum* is placed in *Pezotettix* under the subgenus *Melanoplus*, and, as a matter of course, must carry with it *C. spretus*, and other closely allied and congeneric species. Stål is undoubtedly correct in subdividing Serville's genus, as that author, in his *Histoire des orthoptères*, recognizes two quite distinct groups. But the question arises here as to which subdivision the name should be applied. The genus was formed by the author, and first used by him in his *Revue méthodique des orthoptères* (1831) for the reception of three species, *C. italicus*, *morio*, and *sanguinipes*. It is true that afterward (1839), in his *Histoire des orthoptères*, Serville removed *C. morio* to *Ædipoda*, as it was in fact no Acridian, and had been previously named by Creutz (Entom. Versch.); also that he returned *C. sanguinipes* to *Acridium*, thus leaving *C. italicus* as the only original representative of his genus. But, in the mean time, Burmeister* changes the name to *Caloptenus*, and includes in the genus, as limited and understood by him, not only *italicus*, but also the American species *femur-rubrum*, *femoratus*, and *bivittatus*, besides a number of other exotic species. If Serville's name was erroneous, then Burmeister was as fully authorized to correct it as Dr. Stål, and it comes from the hand of either really a new genus. But not only this: Serville includes three species which are incongruous, each of which had been previously named, and two of which he afterward, in his *Histoire des orthoptères*, removes. Stål speaks of this contention in regard to priority as puerile and derogatory to science; yet he clings to the name given by Serville, although it is erroneous and has to be emended, making *C. italicus* the type.

Under these circumstances, and following out the spirit of his own advice, as given in his introductory remarks, I shall not follow him in this respect, because I do not think even the strictest construction of the law of priority requires it, and because to do so would inflict upon our nomenclature a host of synonyms which can be avoided by retaining the name *Caloptenus*, as given by Burmeister. Some of the species may have to be removed to other genera. It is true that the peculiar characters selected

* I am aware that some doubt as to priority in date of the *Handbuch der Entomologie* and *Histoire des orthoptères* has recently been expressed; but so long as it is generally conceded to the former, our conclusions in regard to nomenclature must be based upon that assumption.

by Dr. Stål may map the ground into areas whose lines fall wide of those heretofore given; but before we follow this, we must be convinced that his characters group according to nature. Dr. Gill, if I recollect rightly, remarks, in the introduction to his arrangement of the Fishes, that a character or series of characters which may be used in one group or even part of it as a correct guide may fail to indicate the true relation of species at another point. Dr. Stål is doubtless fully aware of this fact; but it appears to me he has neglected at some points to act upon it, and has maintained his plan somewhat arbitrarily. Still I do not feel authorized to take direct issue with him without further opportunity for examination, but simply wish to be understood as saying that the change his arrangement requires in the group now under consideration is too great to be made without better reasons shown than those presented in his work.

Opsomala, Serv. (*Opomala*, Scudd.), is torn into fragments, and scattered hither and yonder. *O. filiformis* and *O. marginicollis*, Serv., are placed in a new genus, *Leptysma*, belonging to *Acridiidae*, which has no marked or prominent character to distinguish it; that of the head being longer than the pronotum forming one of the principal features. But those who have paid any attention to this group know how unsatisfactory this character is.

A new genus, *Arnilia*, is established by the author for the reception of his *O. cylindroides*, with which he places two specimens from Carolina. The latter, I presume, belong to *Stenacris chlorizans*, Walk. (*Mesops chlorizans*, Thos.).

O. bivittata, as Dr. Stål informs me by letter, is probably his *Mermiria Belfragii*, a new genus belonging to his *Truxalidae*, and a species from Texas, which he has described as new; but his description leaves it doubtful whether he is correct in this opinion.

The following changes occur in *Truxalidae*:—*Oxycoryphus*, *Gomphocerus*, *Stetheophyma*, *Stauronotus*, and *Epacromia* are transferred to this division. So far as this change relates to *Oxycoryphus*, *Gomphocerus*, and *Epacromia*, I can heartily approve of it, and I find, by reference to my notes heretofore mentioned, that I have already transferred *Oxycoryphus*, *Pedioscertetes*, and *Chrysoschraon* to *Tryxalini*.

The old name *Acrida* of Linnæus is restored for the typical *Truxalides*

and *Truxalis* is retained in the Fabrician sense with *T. brevicornis* (our *Pyrgomorpha brevicornis*) as its type. If these old names, which have been so long ignored, are now to be restored, then Stål is correct in replacing *Acrida*; and, although I doubt the expediency of such a course, yet, as the law of priority justifies him, entomologists will probably accept the change. But if this rule is to be rigidly enforced, what excuse has he to render for utterly ignoring Walker's new genera and species where he is correct?

Stål describes as new Scudder's *Chloëaltis viridis* under the name *Truxalis angusticornis*. He describes a new species of *Achurum* from Mexico, and informs me that he thinks my *Tryxalis brevipennis* belongs to the same genus. I think it very probable he is correct in this. Saussure's *Oxycoryphus montezuma* is transferred to a new genus, *Syrbula*, in which is also placed a new Texan species. *Stenobothrus* is wholly ignored, and *Gomphocerus*, which he appears to have used in *Freg. Eug. Resa*, in the sense in which it is used by Borck, is here scattered among a number of new genera. He gives *Stetheophyma*, Fisch., *Arcyptera*, Serv., *Chrysochraon*, Fisch., and *Gomphocerus*, Thunb., as synonyms.

Stenobothrus viatorius, Sauss., is removed to a new genus, *Scyllina*, which has for its chief character the inequality in length of the spines of the posterior tibiæ.

In *Ædipodidæ*, the following changes are worthy of notice, and are of interest to American entomologists. *Tragocephala* of Harris is retained with *T. viridi-fasciata* as the type; and *Æ. sordida*, Burm., and *Æ. costalis*, Scudd., are transferred to it. *Tomonotus* of Saussure is ignored, and a new genus, *Arphia*, established for the reception of the following species found in the United States:—*T. sulphureus* and *T. tenebrosus*; the latter being described as a new species under the name *A. sanguinaria*. I can see no possible excuse for this new genus, which corresponds very closely in its characters with those given by Saussure, and especially as given in my Synopsis. If the *Acrida* of Linnæus and *Calliptenus* of Serville are to be retained at every sacrifice of convenience, why is it that the genera established by living authors are treated so cavalierly? There is no more reason why a Linnæan or Thunbergian genus should be retained than one established by a living author. In this case, I think Stål's apparent desire to furnish new names to

science has carried him a step too far, and, as I think he is wrong here, I cannot follow him.

A new genus, *Camnula*, is established for the reception of a species from Vancouver's Island. This species, which the author says is very similar to *Tragocephala sordida*, I am inclined to believe is my *Tr. pacifica*.

Æ. discoidea, Serv., is removed to *Hippiscus*. This change I can readily concur in.

Ædipoda is very properly restricted to but a small portion of the heterogeneous mass which has been thrown into it, for which entomologists have reason to thank the author. Our *Æ. Carolina* is retained, and appears to be his typical genus; this retains *Æ. trifasciata*, Say, and *Æ. undulata*, Thos. A new species from Illinois is described under the name *Æ. Belfragii*, which is probably my *Æ. cincta*. A new species from Mexico, *Æ. punctata*, is also described. *Æ. fenestralis*, Serv., is removed to a new genus, *Psinidia*, in which also two new species from Texas are placed.

Æ. maratima, Harr., is removed to *Tremerotropus*, also a new genus.

No important change appears to have been made in the *Tettigidæ*.

Although the author of this work has made a number of changes which I do not think entomologists can accept, as well as some which appear to be unnecessary, yet it must be admitted that he has rendered an important service to science in splitting up some of the heterogeneous and unwieldy genera as *Ædipoda*, &c., and especially in properly determining and locating the Linnæan, De Geerian, and Thunbergian species from an examination of the specimens. It is to be regretted that, while he has such scrupulous regard for the generic names of Linné, De Geer, and Thunberg, he should occasionally fail to give the proper credit to modern authors, wholly ignoring, as he states to me in a letter, the work of Walker, as this will necessitate a change by some future orthopterologist. It is true the catalogue of Walker is of but little value; yet, so far as it is correct, it should be accepted, no matter how much chaff surrounds the wheat.

Accepting this author's changes in the larger groups so far as I consider them correct, and making the modifications I have suggested, my arrangement of the divisions of the family would then be as follows:—

I. Subfamily PROSCOPINÆ.

1. Group *Proscopini*.2. Group (*Mastacini*).

II. Subfamily ACRIDINÆ.

Division 1.—CONOCEPHALIDES.

3. Group *Tryxalini*.

Division 2.—ORTHOCERIDES.

4. Group *Ædipodini*.5. Group *Acridini*.

Division 3.—XIPHOCERIDES.

6. Group *Phymatini*.7. Group *Pamphagini*.

Division 4. (———?).

8. Group *Pneumorini*.9. Group (*Chorætypini*).10. Group (*Cælopternini*).

III. Subfamily TETTIGINÆ.

11. Group *Tettigini*.

Those included in parentheses are introduced provisionally, as I am unacquainted with the species forming them. So far as I am aware, only the third, fourth, fifth, sixth, and eleventh groups are represented in the North American fauna.

In connection with the list of the species found in the collection under examination, I will give short descriptions of the new North American genera and species described by Stål, and also give the new positions of some of the hitherto described species, under the foregoing modifications.

Subfamily ACRIDINÆ.

TRYXALINI.

I cannot, with my present knowledge of the genera, accept Stål's removal of *Mesops* and *Opomala* from this group. It is probable that the species I have placed in *Mesops* may have to be removed to other genera, and the name retained for other species which belong elsewhere. I shall also transfer to this group *Oxycoryphus*, *Acrolophitus*, *Pedioscertetes*, *Chrysochraon*, *Stenobothrus*, and *Gomphocerus* (the two latter should probably be united into one genus).

TRYXALIS.

TRYXALIS BREVIPENNIS, THOS.

Tryxalis brevipennis, THOS., Synop., 58.

This, I presume, will have to be removed to *Achurum*, and will then become *Achurum brevipenne*.

TRYXALIS BREVICORNIS, Linn.

Grillus brevicornis, LINN., Cent. Ins., 1763, 15, 37.

Acrydium ensicornu, DE GEER, Mém., 1773, iii, 499, 16, pl. 42, f. 7.

Tryxalis brevicornis, BURM., Handb. Ent., 1838, ii, ii, 607, 3.

Pyrgomorpha brevicornis, WALK., Cat. Dermap. Salt., 1870, iii, 500.

Stål's restoration of *Acrida* for the typical *Tryxalidæ*, and retention of *Tryxalis* for its earliest signification, will restore this species to the position assigned it by Fabricius. He has also identified De Geer's *A. ensicornu* with this species by an examination of the original specimen. I have determined, beyond any reasonable doubt, that the *Tr. notochlorus*, of Pal. Beauv. is the male of this species.

My *P. punctipennis* (Synop., 68) is but the female of this species; consequently this name will have to be suppressed.

ACHURUM.

This genus should now precede *Tryxalis* in a linear arrangement.

The following new species from Mexico is described by Stål:

ACHURUM ACRIDODES, Stål.

Achurum acridodes, STÅL., Recens. Orthop., 1873, 101.

Truxalis acridodes, STÅL., Öfv. Vet. Ak. Förh., 1873, xxx, 4, 52, 1.

Fusco-testaceous; vertex, dorsum of the pronotum, and anal area of the elytra greenish; cheeks and lateral lobes of the pronotum near the dorsum obscure; elytra griseo-hyaline, except the anal area, which is veined with fuscous; wings dusky. ♂, length, 27 millimeters.

Closely allied to *A. Sumichrasti*, Sauss., but differs in the color of the dorsum of the pronotum, and in the dorsum not being alutaceo-rugose, but on the front and posterior lobe is obsoletely punctate, and the lateral lobes being obsoletely variolose. Elytra a little shorter than the body, more than twice the length of the posterior femora; anal and axillary veins free.

Posterior femora not extending to the tip of the abdomen. Antennæ slightly narrowed at the apex, extending beyond the tip of the pronotum. Genital segment of the male elongate and acuminate.

MERMIRIA, Stål.

This new genus is introduced here, and the description copied from the *Recensio*, as the single species described under it is the one to which Stål is disposed to refer *Opomala bivittata*.

GENERIC CHARACTERS.—Posterior tibiæ armed with numerous spines; those on the exterior margin numbering from eighteen to twenty-two. Head equal to, or but little shorter than, the pronotum; fastigium prominent; the frontal tempora (lateral foveolæ, or spaces of the vertex) not or but obsoletely separated. Base of the very obtuse (subtruncate) anterior lobe not shorter than the posterior. Elytra and wings not so long, or but slightly passing the apex of the abdomen; apex rounded. Frontal costa flat; margins sometimes subcallous. Antennæ ensiform; prosternal tubercle obtuse, distinct, strongly elevated in the middle; eyes shorter than the portion of the cheeks below them.

MERMIRIA BELFRAGII, Stål.

Mermiria Belfragii, STÅL, Recens. Orthop., 1873, 102.

Pale olive-green. Head greenish-white; median carina of the pronotum and an interior vitta of the lateral lobes fuscous; the lateral carinæ pale. Elytra griseo-hyaline, greenish externally and yellow-veined internally; anal and axillary veins pale. Wings near the base pale greenish-yellow, near the apex fuscous-veined. Spines of the posterior tibiæ black at the tips.

♂.—Length, 44 millimeters. Texas.

A vitta on the cheeks behind the eyes pale fuscous; two olive-green lines on the vertex; fastigium narrow in front, rounded at the apex, slightly impressed near the margins, shorter than the eyes. The portion of the cheeks below the eyes somewhat longer than the eyes. Face obsoletely and frontal costa distinctly punctate. Antennæ broadly ensiform, somewhat narrowed at the apex, as long as the head and pronotum. Pronotum, or the dorsum, slightly convex transversely; lateral margins parallel; the

front and the posterior lobe punctulate; this lobe shorter than the front lobe; lateral lobes anteriorly and posteriorly punctate. Elytra extending to the apex of the posterior femora; apex very slightly narrowed and subrotund; the anal and axillary veins connect not far from the base. Posterior femora extend somewhat beyond the apex of the abdomen.

PEDIOSCERTETES, nov. gen.

Pedioscertetes, published in Proc. Acad. Nat. Sci. Phila., 1873, by permission.

Occiput somewhat ascending; vertex rises obliquely in front of the eyes in the form of a triangular pyramid. The dorsum of the pronotum and head as seen from the side taken together form a regular curve from the posterior extremity of the one to the tip of the other, the concave side being upward. The vertex as seen from above is triangular, convex above; no median or lateral foveolæ; the tempora represented only by a slight depression on the deflexed margin. Frontal costa distinct above the ocellus, fading below; face suboblique and slightly incurved. Pronotum regularly expanding posteriorly, subtricarinate, the front lobes being rounded so as to render the lateral carinæ nearly obsolete; median carina absent or but a minute line; front margin truncate; hind margin rounded; the three transverse impressions distinct, close together, and occupying the second fourth, the posterior sulcus being about the middle. Elytra and wings normal, extending a little beyond the tip of the abdomen. Posterior femora slender, but slightly enlarged at the base; upper and lower carinæ slight, entire, unarmed, not quite reaching the tip of the abdomen in the female; tibiæ fully as long as the femora; spines not very numerous; first joint of the posterior tarsi as long as the other two. Metasternum broad; prosternum narrow, unspined.

PEDIOSCERTETES NEVADENSIS, sp. nov.

PLATE XLIII, FIG. 4.

Pedioscertetes nevadensis, Ext. Pub. in Proc. Acad. Nat. Sci. Phila., by permission.

The tip of the vertex is separated from the portion between the eyes by a shallow, curved, transverse sulcus, which runs from the upper canthus of one eye to that of the other; the portion in front of the eye not quite as

long as the eye, acute-angled, flat or very slightly convex above. Frontal costa prominent and narrow between the eyes and slightly sulcate, fading suddenly below the ocellus or broadly expanding and becoming obsolete; lateral carinæ indistinct and subparallel.

Eyes oblong-ovate, subreniform, oblique. Antennæ large, filiform, slightly depressed, and extending to the second abdominal segment (♀). Pronotum subselliform; front lobes rounded and subcylindrical; the posterior lobe distinctly tricarinate; sides flat and slightly expanding posteriorly; posterior portion of the dorsum slightly elevated; the intercostal spaces flat, but slightly raised at the median carina; the median carina is but an indistinct line; the three transverse impressions distinct, but not profound, the posterior one placed slightly behind the middle; the posterior margin regularly rounded, nearly semi-circular; the posterior lateral margin curves inward at the humerus, but makes no angle; the posterior lobe is distinctly broader than the head. Elytra of moderate width; lower (anterior) margin slightly arcuate; wings rather narrow; both extend slightly beyond the abdomen. The abdomen comparatively enlarged and rather deep at the base; the valves of the ovipositor slender and acute. The body and legs hairy.

Color (after immersion in alcohol).—Dull greenish-yellow, showing clearly that the original color was green, probably light pea-green, as the closely allied species *Acrolophitus hirtipes*. This appears to have been the uniform color of the insect, the elytra being unspotted; there is a slight rufous tinge on the posterior part of the pronotum and base of the elytra; the apical portion of the latter is translucent. Wings pale yellow at the base, probably a transparent greenish-yellow when living; a moderately broad fuscous band across the disk; apex transparent, with dark nerves. Spines of the posterior tibiæ very slightly or not at all tipped with black.

♀.—Length, 1.25 inches; elytra, 0.80 inch; posterior femora, 0.60 inch; posterior tibiæ, 0.63 inch; pronotum, 0.25 inch.

REMARKS.—This very interesting species, so far as I am aware, has been found in no collections except those made by this expedition. I find it marked as from Nevada, and, as it has been seen by no other collectors, I presume it must have been taken in the extreme southwestern limit of the

second expedition. It is evidently closely allied to the *Acrolophitus hirtipes*, Say, although the elevated pronotal crest and acute posterior pronotal margin of the latter place the two in different genera.

Professor Cope has somewhere remarked that specific characters may be carried over from one genus to another. If he is correct in this opinion, this would appear to be a case in point, for the similarity in the specific characters of this species and *A. hirtipes* is apparent to the most superficial observer. The figure of this species is copied from one engraved by Professor Glover.

By permission of Lieutenant Wheeler, a description of this new genus and species was published in the Proceedings of the Academy of Natural Sciences of Philadelphia, from which it was copied into my Synopsis. As it was given there really as an extract from this paper, it is given here as new.

SYRBULA.

This is another of Stål's new genera in which he places a new North American species. I insert his short description of the genus.

Similar to *Mermiria*, except as follows:—Antennæ slender, filiform, slightly dilated toward the apex; eyes longer than the portion of the cheeks below them; prosternum destitute of a spine; posterior lobe of the pronotum strongly punctate, rugulose.

SYRBULA MONTEZUMA, Sauss.

This is the *Oxycoryphus montezuma* of Sauss. transferred.

SYRBULA LEUCOCERA, Stål.

Syrbula leucocera, STÅL, Recens., 1873, 102.

Very similar to the *S. montezuma*, green changing into testaceous gray; the cheeks and lateral lobes of the pronotum obscure fuscous; an oblique vitta of the cheeks, margin of the mandibles, the entire broad exterior margin, and a narrow abbreviated interior margin and two abbreviated longitudinal lines of the lateral lobes of the pronotum pale. Elytra griseo-hyaline, sprinkled with fuscous; veins reddish or fusco-ferruginous; an anterior intercostal, ferruginous, opaque vitta. Posterior femora with three exterior fuscous spots; posterior tibiæ fuscous at the base, with a broad

pale ring near the base. Wings very slightly fuscous. Genital segment elongate, acuminate; cerci slender, but not acute.

♂.—Length 25 millimeters. Texas.

Posterior lobe of the pronotum very distinctly punctate and rugulose.

SYRBULA FUSCO-VITTATA, *sp. nov.*

PLATE XLIII, FIG. 5.

Male.—Antennæ a little longer than the head and thorax, filiform; apical half somewhat enlarged, acuminate at the apex. Top of the head about as long as the pronotum, slightly ascending, tricarinate. Vertex short, horizontal; margins slightly elevated, rounded somewhat acutely at the front; tempora almost or quite obsolete, submarginal (if present). Face quite oblique, straight, quadricarinate, the middle pair subparallel. Pronotum slightly constricted in the middle, tricarinate, the lateral carinæ slightly and regularly curving inward at the middle, a little wider apart at posterior extremity than at the anterior; posterior sulcus subdistinct, situated a little behind the middle; anterior margin subtruncate; posterior margin obtusely rounded. Elytra narrow, extending slightly beyond the abdomen, semi-transparent; the lower (anterior) field without veinlets on the basal half; the apical half with regularly transverse veinlets; the middle portion of the upper (posterior) part of the disk with similar transverse veinlets. Wings narrow, as long as the elytra. Abdomen slender; subanal plate with a slight tubercle on its upper margin; apex acuminate; cerci slender, cylindrical. Posterior femora slender, elongate, extending beyond the abdomen. Posterior tibiæ with numerous minute spines,—seventeen or eighteen in the outer row. Prosternum unarmed.

Color (alcoholic).—Ferruginous or rufous, varied with fuscous and yellowish stripes. Face rufous; cheeks and occiput ferruginous-brown, with two narrow, dim, paler, longitudinal lines each side. Pronotum ferruginous, with a broad fuscous stripe on each side; the lower margin striped with yellowish. Upper (posterior) margin of the elytra yellowish, forming a dorsal stripe when closed; a narrow, submarginal, yellow stripe along the costal (lower) submarginal space, extending from the base about half the length of the elytra; remainder dark fuscous, forming a broad middle stripe

on each elytron, extending from the base to the apex, widening toward the apex. Wings black, or very dark fuscous; this color being almost uniform throughout. Posterior femora ferruginous, except the disk, which is occupied by a dark-fuscous or black stripe. Venter yellowish; sternum rufous.

♂.—Length to tip of abdomen, 1.10 inches; elytra, 0.75 inch; posterior femora, 0.62 inch; posterior tibiæ, 0.62 inch.

Lower Arizona; from the collection of 1874; H. W. Henshaw, collector.

The present species is evidently closely allied to *S. leucocerca*, as is indicated by the color of the wings, and form of the subgenital plate of the male; but *leucocerca* has the posterior lobe of the pronotum roughly punctate, which clearly distinguishes it from our species. The want of this last character would possibly exclude it from Stål's genus as now restricted, yet the other characters are so clearly and distinctly marked that I have no hesitancy in placing it here, although this may necessitate the dropping of this character from the generic distinctions.

CHRYSOCHRAON.

CHRYSOCHRAON VIRIDIS, Scud.

Chrysochraon viridis, SCUD., Bost. Jour. Nat. Hist., 1862, vii, 455.

Stål has described this under the name *Truxalis angusticornis* (*Recensio*, 105) as a new species. His specimen was from Carolina.

GOMPHOCERUS.

GOMPHOCERUS CARPENTERII, Thos.

PLATE XLIV, FIG. 5.

Gomphocerus Carpenterii, THOS., Bul. No. 2 U. S. Geol. Surv. Terr., 1874, 65.

I find a few specimens of this singular species in the last collection. Although there is nothing accompanying the collection to indicate the exact locality where, or altitude at which, it was found, yet, as it is a true montane species, I presume it was obtained in the mountains of Northern New Mexico or more probably of Southern Colorado. I have also received a large number of specimens from Mr. Putnam, of Iowa, chiefly males. In this collection I find not only the male, but also some specimens which I feel quite well satisfied are the females of this species; but as they vary somewhat I will give a short description of one of the best specimens

before me so far as it differs from the description of the male heretofore published.

The margins of the vertex meeting in a somewhat obtuse angle; the club of the antennæ distinct, but not so broad as in the male. The pronotum scarcely gibbous, as in the male; slightly constricted in advance of the middle; the lateral carinæ forming a distinct angular convergence in advance of the middle, and diverging anteriorly and posteriorly; median carina (also in the male) distinct; posterior margin obtusely rounded, almost truncate. Elytra and wings abbreviated, the former extending over but three or four abdominal segments, lanceolate, with longitudinal nerves (also in the male) prominent. Posterior femora a little shorter than the abdomen.

Color (after long immersion in alcohol).—As the male, except as follows:—face brown; pronotum dark-yellowish on the sides, with elongate dashes and scattered spots and dots of dark fuscous; the upper portion of the sides in the exterior angle of the lateral carinæ black; dorsum yellowish, with a triangular black spot on the posterior lobe each side of the median carina; elytra brown; posterior femora reddish-brown, with two or three very oblique, somewhat irregular, dusky stripes across the external face.

Length about 1 inch; elytra, 0.12 to 0.15 inch.

STENOBOTHRUS.

STENOBOTHRUS OCCIPITALIS, Thos.

Stenobothrus occipitalis, THOS., Synop., 1873, 81.

Dr. Brunner de Wattenwyl, to whom a specimen of this species was forwarded, gives it as his opinion that it will have to be transferred to *Oxycoryphus*. As it does not belong here, and closely approaches the latter genus, he is probably correct in this opinion.

STENOBOTHRUS CURTIPENNIS, Scud.

Stenobothrus curtipennis, SCUD., Bost. Jour. Nat. Hist., 1862, vii, 456.

Stenobothrus longipennis, SCUD., Bost. Jour. Nat. Hist., 1862, vii, 457.

Locusta curtipennis, HARR., Cat. Ins. Mass., 56.

Chloëaltis curtipennis, HARR., Rep., 3d ed., 184, pl. 3, f. 1.

Several specimens of the long-winged variety are contained in the collections of 1872 and 1873.

STENOBOTHRUS COLORADUS, THOS.

Stenobothrus coloradus, THOS., Syn. Acrid., 82.

Stenobothrus bicolor, THOS., U. S. Geol. Surv. Terr., 1871, 465.

A single specimen of this species is contained in the collection, and is the first I have seen from the west side of the mountains, showing its range to be much greater than I had supposed.

OEDIPODINI.

This group, as heretofore stated, I am disposed to limit by removing from it the following genera, and transferring them to *Tryxalini*, viz :—*Oxy-coryphus*, *Acrolophitus*, *Pedioscertetis*, *Chrysocraon*, *Stenobothrus*, and *Gomphocerus*.

As might have been expected, it is better represented than any other group, as the barren plains and dry mountain regions of the West appear to be peculiarly adapted to these orthopteral forms.

TRAGOCEPHALA.

Modifying the group to which this belongs, as above stated, and retaining the arrangement of the groups as given in my Synopsis, this genus will, so far as North American genera are concerned, form the connecting link with *Tryxalini*.

Æ. sordida, Burm., and *Æ. costalis*, Scud., have been transferred by Stål to this genus, a change which I think is justifiable and in which I concur.

TOMONOTUS, Sauss, (ARPHIA, Stål).

As before stated, Stål has wholly ignored *Tomonotus*, and established *Arphia* for the reception of *T. sulphureus* (*Æ. sulphurea*) and congeneric species. Both the species which Stål admits into his new genus are represented in the collection.

TOMONOTUS SULPHUREUS, Fabr.

Gryllus sulphureus, FABR., Syst. Ent., ii, 59.

(*Locusta*) *sulphureus*, GMEL., Linn. Syst. Nat., i, 2079.

Acridium sulphureum, OLIV., Encyc. Méthod., vi, 227.

Locusta sulphurea, HARR., Rep., 177, pl. 1, f. 6.

Ædipoda sulphurea, BURM., Handb. Ent., ii, 643.

Tomonotus sulphureus, SAUSS., Rev. et Mag. Zoöl., xiii, 1861, 321.

Arphia sulphurea, STÅL, Recensio, 119.

The two or three specimens of this species found in the collection are

very dark, and indicate an approach to *T. tenebrosus*, with which it is evidently closely allied. As will be seen, I have in this case, for the reasons heretofore given, retained Saussure's generic name, rejecting Stål's as unnecessary. I am aware he considers Saussure's genus as improperly characterized, and as combining incongruous elements; but I have seen no evidence on this point, and I think the characters as given in my Synopsis are sufficiently limited and distinct to clearly define the group intended to be embraced, and, as I had the typical species before me while preparing the diagnosis, I am satisfied the rule that Stål has followed in other cases will certainly retain Saussure's generic name.

TOMONOTUS TENEBROSUS, Scud.

PLATE XLIII, FIG. 3.

Tomonotus pseudo-nietanus, THOS., Proc. Acad. Nat. Sci. Phila., 1870, 82.

Tomonotus tenebrosus, THOS., Synop., 107.

Ædipoda tenebrosa, SCUD., U. S. Geol. Surv. Neb., 251.

Arphia sanguinaria, STÅL, Recensio, 119.

The two varieties of this species are represented in the collection.

I give Stål's description of his *A. sanguinaria* for the benefit of American entomologists, and to show that I am correct in considering it as a synonym.

"Ferruginous-fuscous; posterior margin of the pronotum black-spotted; elytra opaque, paler near the apex; wings sanguineous, with the broad posterior external margin and a short anterior ray dark-fuscous.

♂, length, 20 millimeters. Vancouver's Island.

Very similar to *A. sulphurea* (Stål), but distinguished by the structure of the head, the lower crest of the pronotum, and the sanguineous wings. A very distinct (median?) carina running along the vertex, interrupted at the base of the vertex; apex of the vertex truncate, forming an obtuse angle with the frontal costa (as seen from the side); margins elevated, and converging posteriorly (?) then subparallel, becoming obsolete near the base of the head; frontal costa punctate, slightly narrowed at the base (Stål's specimen at this point was imperfect). Tempora smaller than in the preceding species. Crest of the pronotum equal throughout, not arcuate, incised (not notched) between the lobes. Posterior femora black internally,

pale bifasciate behind the middle. Posterior tibiæ fuscous, with a pale annulation near the base."

This is evidently the ash-brown variety common in Nebraska and Dakota, which has the fuscous dashes on the posterior lobe of the pronotum and the elytra sprinkled with fuscous dots. It is intermediate between the dark or black variety and that with the pale-colored pronotum.

Dr. Brunner de Wattenwyl remarks, in a letter to me, that he considers *T. tenebrosus* as but a variety of *sulphurea*, and that these and *T. xanthopterus* belong to the genus *Pachytylus*.

These are the first specimens I have seen from the west side of the Wahsatch range. Its range is now known to extend from the western border of Minnesota to the southeast border of Nevada, and from Northern Wyoming to New Mexico; and I am of the opinion it will be found as far south as Mexico. The sharp crackling note of the male and bright-red wings of this species, which are so plain during flight, easily distinguish this species from any other in the West with which I am acquainted.

CAMNULA, Stål.

This is a new genus established by Stål for the reception of the following species from Vancouver's Island.

CAMNULA TRICARINATA, Stål.

Camnula tricarinata, STÅL, Recensio, 120.

I give the following from the "*Recensio*", as the species is North American.

"Pale reddish-yellow; the front on each side of the base to the tempora or between the tempora and antennæ and a stripe on the cheeks behind the eyes black. Elytra next the base reddish-brown; costal area paler, spotted with fuscous; apical portion subhyaline, fuscous-veined; and obsoletely nebulous. Wings hyaline; veins dusky. Posterior femora obliquely fusco-bifasciate; apex fuscous; posterior tibiæ pale; spines, except at the base, black.

"♂ ♀.—Length, 19–25 millimeters.

"Similar to *Tragocephala sordida*."

OEDIPODA, Latr.

I would be glad if I could seize upon this opportunity to arrange our North American species under the genera which Stål has very properly carved out of this heterogeneous group, but am unable to do so, as my specimens are placed in the Agricultural Department at Washington. I can therefore only refer to such species as are contained in the collection now under consideration and those mentioned by Stål in his work.

OEDIPODA CAROLINA, Linn.

Acrydium carolinum, DE GEER, Mem., 1773, 3, 491.

Gryllus carolinus, THUNB., Mem. Acad. St. Pet., 1815, 5, 239.

Edipoda carolina, SERV., Hist. Orthop., 1839, 722.

This species, of which several specimens are in the collection, appears to be Stål's type of the genus. This widespread species is found on the plains of Nevada and Arizona without any marked variation from the eastern specimens. I may remark here, that during the past summer (1873) I saw it more abundant on one spot in the northwest part of Washington City than at any other spot in the limits of my observations.

OEDIPODA HOFFMANII, *sp. nov.*

Edipoda hoffmanii, (copied into Synopsis, 127).

Very closely allied to *Æ. trifasciata*, and possibly it may be but a variety of that species, yet there are some variations which appear to mark it as distinct. The only specimen which has been preserved dry is so badly damaged, that it is impossible to do more than indicate its characters; even the sex is unknown, as the apex of the abdomen has been broken off, and the antennæ and legs are wanting.

The occiput ascending and the top of the head somewhat elevated, more so than in *Æ. trifasciata*; eyes ovate, large, prominent; vertex slightly elongate and expanding slightly in front of the eyes; margins raised; a slight median carina apparent; frontal costa sulcate, very slightly contracted below the ocellus; lateral carinæ arcuate, but not angled, extending to the corners of the face. Pronotum as in *Æ. trifasciata*, except that at each posterior lateral angle there is a minute tooth pointing downward. Elytra of usual length; when closed, they present an unusually flat surface on the

dorsum, forming right angles with the deflected portion. The metasternum appears to be shorter than is usual in the other species, but I have no male specimens at hand at this time to determine this positively.

Color (siccus).—The color and markings very similar to *Æ. trifasciata*, except that the middle and outer bands are less distinct, and the middle and apical spaces have a few brown dots in them; the bands are also of a deeper reddish-brown than the other species.

I at first laid this aside as a specimen of *Æ. trifasciata*, but in looking at it again the peculiarly flat dorsal surface of the closed elytra attracted my attention; the tooth at the lateral angle and somewhat elevated occiput appear sufficient to distinguish it as a new species. I have therefore described it as new, naming it in honor of Dr. W. I. Hoffman, who collected it while accompanying the expedition in Arizona.

OEDIPODA TRIFASCIATA, Say.

Gryllus trifasciatus, SAY, Ent. ed. Lec., i, 78, pl. 34.

Edipoda pruinosa, THOS., Proc. Acad. Nat. Sci. Phila., 1870, 80.

A few specimens of this widely spread western species were obtained at different localities in Southeastern Nevada, Arizona, and New Mexico. Dr. Brunner de Wattenwyl places this in *Sphingonotus*, to which *Æ. Hoffmannii* will also have to be referred if he is correct.

OEDIPODA UNDULATA, Thos.

Edipoda undulata, THOS., U. S. Geol. Surv. Terr., 1871, 460.

This species is readily distinguished from closely allied forms by its broad papilioniform wings, which are very distinctly and regularly undulated along the posterior margin. Its general color is an ash-brown; the elytra being marked with minute dusky spots or dots. The wings in the alcoholic specimens are pale yellow at the base; the apical third being more or less dusky. The length of the body is a little more than one inch in the female; the elytra extend beyond the abdomen about one-third their length.

Dr. Brunner de Wattenwyl, of Vienna, to whom I sent a specimen of this species, says it is a true *Edipoda* as the genus is now restricted, but he thinks it is identical with *Æ. ochraceipennis*, Blanch., a South American

species. I have been unable to decide positively in regard to this, as the only copy of Gay's *Fis. Hist. Chili* to which I have had access wants the plate on which this species is figured. By a letter recently received from Dr. E. C. Reed, of the Museo Nacional, Santiago, I learn a package of Chilian *Acrididæ* has been forwarded to me. From this I may be able to determine this point. I have received the package since the above was written and in it find a specimen of the latter species, but it is so badly damaged that I am unable to decide with certainty as to the identity of the two, yet it is evident they are closely allied.

Although I collected this species along the eastern base of the Rocky Mountains, I did not have my attention called specially to it at the time my collection was made; nor was I aware it existed beyond the mountains until I found it in the collection of 1871.

OEDIPODA CINCTA, THOS.

Oedipoda cincta, THOS., Proc. Acad. Nat. Sci. Phila., 1870, 80.

There is but one rather small specimen of this species in the collection.

OEDIPODA BELFRAGII, Stål.

Oedipoda belfragii, STÅL., Recensio, 129.

This is a new species described by Stål as coming from Illinois. In order to call the attention of our western entomologists to it, I give the author's description in full.

"Fuscous-brown; the head variegated with cinereous; carina of the head and of the posterior femora, also the posterior margin of the pronotum, sprinkled with black; antennæ annulated with fuscous. Pronotum with the posterior margin acute-angled; crest somewhat prominent, profoundly incised between the lobes. Elytra pale grayish-brown, somewhat translucent toward the apex, where they are also clouded with fuscous. Wings pale-yellow at base, with a broad black band across the disk, arcuate, and narrowed internally; apex transparent, with fuscous veins. Anterior legs subannulated with fuscous; posterior femora with the fascia and apex black, the inferior margin and exterior side hairy; posterior tibiæ pale yellowish, fuscous at the base, spines tipped with black, hairy.

♀, length 25 millimeters. Illinois.

In the structure of the head and pronotum similar to *Æ. carolina*, but differs in being smaller, the elytra and wings less ample, and the former less densely reticulated; the pronotum behind the middle being subalutaceous; and in the color of the wings. The posterior angle of the lateral lobe of the pronotum rounded."

Although this description differs considerably from the description of my *Æ. cincta*, which is found in Illinois, I am rather inclined to believe they are identical; otherwise I am wholly unacquainted with it.

OEDIPODA PHÆNICOPTERA, Germ.

Ædipoda phænicoptera, BURM., Handb. Ent., ii, 643.

Locusta apiculata, SAY, MSS. (Harr. Cat. Ins. Mass., 56).

Locusta corallina, HARR., Rep., 176.

Ædipoda oblitterata (?), GERM., BURM., Handb. Ent., ii, 643.

Ædipoda corallina, ERICHs., Archiv. f. Nat., ix, 2, 229.

Acridium phænicopterum, DE HAAN, Bijdr. Kenn. Orthop., 144.

Stål places *Æ. discoidea* in Saussure's genus *Hippiscus*, and, as this is a very closely allied species, it should probably be placed in the same genus, though, in some respects, it appears to correspond more closely in generic characters, with his *Pycnodictya*.

Hippiscus phænicopterus, Burm., will therefore be its new name, thereby remanding another name to the list of synonyms.

There are four specimens in the collection of 1872.

OEDIPODA CORALLIPES, Hald.

This, in all probability, will have to follow *Æ. discoidea* to *Hippiscus*. I find but one specimen of this species in the collection, which was taken in Nevada. It would appear from this fact that it does not extend very far southward in the intermontane area.

OEDIPODA WHEELERII, *sp. nov.*

PLATE XLIV, FIG. 1.

Has much the appearance of *Æ. trifasciata*, but is quite distinct, and possibly is not congeneric as Stål has limited the genera. The upper portion of the head rounded and smooth; seen from the front, elliptical; eyes small,

elliptical, and not prominent, widely separated. Vertex broad, arcuately deflexed, and passing into the frontal costa without any mark of distinction; the subhexagonal margin faintly outlined; a very slight median elongate tubercle; frontal costa broad, flat, rounded on the margins, and scarcely distinct from the face, not sulcate. Pronotum similar in form to that of *Æ. trifasciata*, expanding posteriorly, very slightly constricted or indented at the posterior sulcus, covered throughout, except a small space on the middle of the lateral lobes, with small tubercles, giving it a coarsely granulated appearance, forming thereby a strong contrast with the smooth head; posterior sulcus quite distinct, situated about the middle, and extending upon the sides; the other transverse incisions obsolete on the dorsum; median carina obliterated; lateral carinae rounded and subobsolete; posterior margin rectangular. Elytra and wings extending but slightly beyond the abdomen; elytra rather narrow, minutely but densely reticulated, except about one-fifth at the apex, which is transparent, and has regular transverse veinlets; axillary vein connects with the anal vein. Posterior femora very broad; lower carina very prominent, but suddenly narrowed near the apex; shorter than the abdomen; anterior and middle femora small and slender.

Color (after immersion in alcohol).—Dullash-brown, varied with fuscous; head, thorax, and legs almost uniform; a black puncture at each side of the lower extremity of the frontal costa; a small black spot at the lower corner of the face; a few black points on the dorsum of the pronotum. The elytra with four broad transverse fuscous bands, one about the middle of the basal half rather narrow and of regular width, the other three on the apical half, between which are alternate yellow bands; the anterior of these fuscous bands quite broad and widening upward (posteriorly); apex transparent; a narrow yellowish stripe along the humeral angle. Base and disk of the wings yellow; a broad, black, arcuate band along the exterior (posterior) margin, having a small transparent space at the apex. This band should perhaps be called submarginal, as the front portion curves slightly inward, and leaves an apical space, which is traversed by fuscous veins. Posterior femora with a few black dots on the external face, and an indistinct paler ring near the apex; internal face fuscous on the basal half, crossed by a fuscous band on the apical half, rest yellow. Tibiæ and tarsi pale; spines

tipped with black. The portions described as fuscous are in fact pale fuscous-brown. Antennæ slender.

♀.—Length, 1.9 inches; elytra, 1.5 inches; posterior femora, 0.85 inch.

This fine, large species forms an interesting link between *Æ. trifasciata* and *Æ. corallipes*, and with my *Æ. montana* well nigh fills up the hiatus. It agrees in every respect with Stål's genus *Pycnodictya*, except that in that genus the posterior lobe of the pronotum is much longer than the anterior, while in this species the two are nearly equal. He gives as the type of this genus the *Gryllus obscurus* of Linné, with *Æ. rosacea* of Serville as a synonym. Serville (Hist. Orthop., 728–729) describes the two as distinct species; and as his *Æ. rosacea* has "a slightly elevated carina" on the pronotum, it appears difficult to reconcile this with Stål's diagnosis. As he had access to Linnæus's type, this was most assuredly his guide in forming his genus; and Serville's description accords very closely with the generic characters so far as he gives them. The wings of these species are red at base, and possibly this was the original color in the species before me, but I think it was yellow.

Named in honor of Lieut. G. M. Wheeler, in charge of the expedition.

This species is placed in *Ædipoda* provisionally, as it must be removed when this genus is restricted to its proper limits. I am strongly inclined to name it at once *Pycnodictya Wheelerii*; otherwise a new genus will have to be formed for its reception.

OEDIPODA GRACILIS, Thos.

Ædipoda gracilis, THOS., U. S. Geol. Surv. Terr., 1871, 461.—*Id.*, Synop., 121.

I find in the collection a specimen which probably belongs to this species; but the head and thorax are so badly damaged that it is impossible to determine this with any degree of certainty.

OEDIPODA NEGLECTA, Thos.

PLATE XLIV, FIG. 3.

Ædipoda neglecta, THOS., Proc. Acad. Nat. Sci. Phila., 1870, 81.

I find one specimen of this species in the collection of 1873, probably from Southern Colorado. I found it quite common in Northern Utah and

Southeastern Idaho; but I have unintentionally omitted to mention this locality in my Synopsis. I have also traced it east to Southern Illinois; and from this collection I find that it extends into the borders of Nevada and Arizona.

This is one of the most unvarying species in reference to its characteristics I have ever had the pleasure of naming. The unvarying markings and carvings of the vertex confirm the propriety of selecting these as specific characters.

It approaches very near to Stål's *Trilophidia*, and probably belongs to that genus; otherwise it also will require the formation of a new genus, as it evidently does not belong to *Ædipoda* as restricted. Dr. Brunner de Wattenwyl thinks this and also *Æ. montana* and *Æ. corallipes* should be placed in *Leprus*.

OEDIPODA HAYDENII, Thos.

Ædipoda haydenii, THOS., U. S. Geol. Surv. Terr., 1871, 460.—*Id.*, Synop., 120.

I find no specimens in the collection, but mention it here to state that it will have to be transferred to Stål's new genus *Cosmorhyssa*, which is distinguished by the numerous elongate tubercles or short carinæ on the posterior lobe of the pronotum, and by the character of the vertex and frontal costa, as given in my Synopsis (p. 120). This species should, therefore, hereafter be known as *Cosmorhyssa haydenii*, Thos.

OEDIPODA FENESTRALIS, Serv.

This has been transferred to *Psinidia*, Stål, in which he also places two new species—*P. capito* and *P. fuscifrons*—from Texas. It is probable that my *Æ. kiowa* will also fall in this genus.

OEDIPODA MARATIMA, Harr.

This is now, according to Stål, *Trimerotropus maratima*. It is not found in the collection, but is mentioned here to show in what genus it belongs. Where no remark is made to the contrary in speaking of other species which Stål's arrangement affects I accept the change, and shall hereafter adopt the new generic name.

OEDIPODA UTAHENSIS, *sp. nov.*

PLATE XLIV, FIG. 2.

Female.—Very similar to *Æ. carolina* in general color and appearance, but differs in size and in the color of the wings. Vertex slightly deflexed, subhexagonal or subelliptical, with two slight depressions at the tip; frontal costa sulcate below the ocellus. The crest of the pronotum a little more elevated than in *Æ. carolina*; the notch distinct. Elytra and wings much longer than the abdomen. Posterior femora passing the abdomen; upper carina and rather broader than in *Æ. carolina*.

Color (alcoholic).—Dull-brown, dotted with fuscous; the brownish is uniform except on the elytra and posterior femora, the former being sprinkled on the upper portion of the basal half and on the apical portion with very small fuscous spots or dots; the latter marked with a few fuscous dots along the upper half. Wings pale-yellow at the base and crossed by a very broad, black, arcuate band just beyond the middle; apex pellucid, with dark veins. The black band of the wing, which is quite broad, occupying nearly one-third of the wing, is one of its distinguishing characters; the marginal ray is much abbreviated and broad. Apex of the elytra transparent.

Dimensions.—Length of body, 1.15 inches; to tip of elytra, 2 inches; elytra, 1.2 inches; posterior femora, 0.75 inch.

I have heretofore seen a specimen of this species, which was given to me by the curator of the Salt Lake City Museum, but, being doubtful as to its being a distinct species, marked it provisionally with the name here given, but did not publish a description, waiting an opportunity to examine other specimens.

OEDIPODA SPARSA, *sp. nov.*

Male.—Of moderate size, and with closed wings, strongly resembling, in color, the paler specimens of *Tomonotus tenebrosus*.

Eyes large and more than usually prominent. Occiput very short. Vertex elongate, slightly deflexed; the central foveola rather distinct, with sharply and prominently raised margins, and at the anterior margin, on the fastigium, is an angular depression or pit, which sends back an acute angular projection into the front margin of this foveola; the tempora scarcely

foveolate, being simply flat triangular spaces. Frontal costa rather narrow; sides parallel, distinctly channeled, scarcely or not expanding at the ocellus; ocelli immediately below the external angle of the tempora and close against the front margin of the eyes at the middle.

Pronotum rather narrow; median carina distinct, though but slightly raised on the posterior lobe, more prominent on the anterior lobes, severed twice by the transverse incisions. The posterior sulcus about or slightly in front of the middle; the middle lobe shorter than the anterior one; lateral carinae subdistinct; anterior margin distinctly obtuse-angled, posterior margin about a right angle or very slightly acute. Elytra and wings passing the abdomen fully one-third their length. The wings are broad and somewhat papilioniform, reminding us very much of *Æ. undulata*, to which, in fact, this species appears in several respects to be closely allied.

Color (alcoholic).—Dull ashen-brown throughout, sprinkled with fuscous dots. The elytra are somewhat darker brown on the basal third, which is the extent of the densely veined portion; the other two-thirds being less densely veined, semi-transparent, and sparsely sprinkled with fuscous dots. Wings transparent; the veins and veinlets of the apical half dark; the veins prominent and strong; it is possible these were of a bluish tint when living, yet they may have been tinged with greenish-yellow.

Length of body, 0.85 inch; elytra, 1.00 inch; posterior femora, 0.50 inch. New Mexico.

The female has a very distinct longitudinal carina through the central foveola of the vertex. The interior of the posterior femora marked with black or dark-brown, and slightly sprinkled externally.

Length to tip of elytra, 1.25 inches.

It is possible this belongs to *Æ. undulata*, but if so the venation of the wings is very different, the *undulata* having the transverse veinlets very regularly scalariform and close, while in this there is no such marked arrangement. This single character I think is entirely sufficient to show the two are quite distinct. The two species are true *Ædipodæ* as the genus is now restricted.

PSINIDIA, Stål

As I find in the collection two specimens of my *Æ. kiowa*, which I am

satisfied belong to this genus, I give briefly its characters from the "*Recensio*."

Median carina of the pronotum somewhat prominent and twice notched; posterior margin distinctly angulate, generally rectangular; posterior lobe much longer than the anterior. Eyes never longer than the infraocular part of the cheeks, but generally much shorter. Axillary vein confluent with the anal vein.

I think, from the species mentioned, that the top of the head is generally elevated, and the median foveola of the vertex probably confluent with the sulcus of the frontal costa.

PSINIDIA FENESTRALIS, Serv.

Ædipoda fenestralis, SERV., Hist. Orthop., 726.

PSINIDIA KIOWA, Thos.

Ædipoda kiowa, THOS., U. S. Geol. Surv. Terr., 1871, 461.

Two specimens in the collection of 1872; locality not given.

By some oversight I described this species the second time in my Synopsis, 123, as new, under the name *Æ. plattei*, which must therefore be suppressed.

EPHIPPIGERA, Hald.

EPHIPPIGERA TSCHIVAVENSIS, Hald.

A single specimen of this singular species was contained in the collection, but I find on examination that it is now missing, so that I cannot state positively where it belongs, but an examination made when I first discovered it satisfies me that it should be placed near *Eremobia*. The figure given in Stansbury's report is correct. The specimen I examined was a perfect female, which has satisfied me that I was mistaken in supposing Haldeman's specimen was a pupa. If I should find it, I will determine its position, and report on it hereafter.

TROPIDOLOPHUS, Thos.

TROPIDOLOPHUS FORMOSUS, Say.

Gryllus formosus, SAY, Am. Ent. ed. Lec., i, 78, pl. 34.

Tropidolophus formosus, THOS., Synop., 138.

Cyrtolopha formosa, STÅL., Recensio, 118 (note).

The collection of 1873 contains one very large specimen (♀) of this

species, being a little more than two inches in length; wings abbreviated, as I believe is usual in the females, yet I see I have not mentioned this fact in my description, although I recollect very distinctly that I had short-winged females in my collection at that time.

I do not find that Stål has anywhere given the characters of his genus except what is given in a note to page 118 of his "*Recensio*," where he states that "*Cyrtolopha* (typ. *Gryllus formosus*) appears to stand midway between the *Ædipodæ* and *Ommexacha*; eyes small; dorsum of the pronotum throughout its whole length elevated into a high serrulate and arcuate crest, posteriorly strongly produced, angulate anteriorly; legs long and slender; also slender in form (*statura*)."

Here the question of date in reference to the publication of my Synopsis and Stål's "*Recensio*" arises in determining which generic name shall stand. As a matter of course, I will retain that which I have given until it is shown that Stål's has precedence.

BRACHYPEPLUS, Charp.

BRACHYPEPLUS MAGNUS, Girard.

A number of specimens of this singular but well known species are found in the collections of both years.

B. verescens, Charp., I think, is but a variety of this species. In the collection made in Southeastern Nevada and Northern Arizona, some were obtained in color, which, although not agreeing exactly with Charpentier's figure and description, appear to form an intermediate link between the two both in size and color; in fact, rendering it doubtful to which they belong.

EREMOBIA.

EREMOBIA MAGNA, *sp. nov.*

PLATE XLV, FIG. 1.

Female.—Vertex deflexed, broad, quadrate, slightly enlarged in front of the eyes; margin slightly elevated; central portion nearly flat, with a distinct median carina; tempora vertical, subobliterated, in which the lateral ocelli are situated. Frontal costa expanded and prominent between the eyes, slightly sulcate, with two indistinct diverging lines of minute tubercles

above the ocellus, constricted and subobliterated below the ocellus. The face and cheeks rugose. Pronotum broad and rapidly expanding posteriorly to the middle legs, flat and rugose above; sides perpendicularly deflexed, forming distinct humeral angles; transverse incisions distinct, the posterior in front of the middle; median carina somewhat distinct on the posterior lobe, obliterated on the anterior lobes; lateral carinae distinct, not elevated; disk of the posterior lobe elongate-tuberculate; anterior margin truncate; the posterior extremity elongate, extending upon the second abdominal segment, giving the posterior lobe an elongate-ovate form; posterior lateral margins quite oblique, and slightly but regularly incurved. Abdomen very large, tapering rapidly posteriorly, not carinate above. Elytra squamose, extending only to the middle of the second abdominal segment; minutely reticulated; longitudinal veins inconspicuous; wings minute. Posterior femora shorter than the abdomen, robust, and convex on the disk; pinnæ not distinctly angulated on the disk but simply curved, and somewhat bifurcated above, giving the disk somewhat the appearance of being covered by imbricated scales; upper and lower carinae hairy. Posterior tibiae curved forward in the lower half, expanding below, with strong, somewhat distant, and slightly incurved spines nearly to the knee, hairy, especially between the rows of spines. Anterior and middle legs pilose. Meso- and meta-sternum very broad and flat; the posterior margin of the latter squarely truncate with no entering lobe or sinus. Prosternum about half the width of the meta-sternum; a somewhat prominent curved ridge extending across from one leg to the other. Antennæ of medium length, filiform.

Color (alcoholic).—Dull ochreous or yellowish-brown; a few black points on the anterior portion of the pronotum; elytra brown with paler reticulations; interior face of the posterior femora dark-brown or black; tips of the valves of the ovipositor and of the tibial spines black; sternum and venter yellow.

Dimensions.—♀, length, 1.90 inches; pronotum, 0.75 inch; width of pronotum at the broadest point, 0.50 inch; elytra, 0.25 inch; posterior femora, 0.70 inch; posterior tibiae, 0.65 inch; width of mesosternum, 0.56 inch. ♂ much smaller.

Lower Arizona. From the collection of 1874; H. W. Henshaw.

Stål has restored the generic name *Eremobia* of Serville in place of *Thrinacus* of Fischer, and I think properly; I have therefore followed him. The specific name *magna* is given because it is supposed to be the largest species of the genus known.

ACRIDINI.

This group corresponds almost exactly with Stål's subfamily *Acridiidae*. He places *Rhomalea* in it, and I think very correctly. The changes in the genera and transfer of species will be noticed in the appropriate places. I shall retain the arrangement of the genera as given in my Synopsis.

PEZOTETTIX, Burm.

As heretofore stated and for the reasons given, I shall not follow Stål in transferring our *Calopteni* to this genus, yet, at the same time, I admit that these groups need revision, and would gladly adopt any consistent arrangement which does not wholly revolutionize these genera. I may remark here that Dr. Brunner de Wattenwyl thinks my *P. picta* is the *Dactylotum bicolor* of Charpentier; but a single glance at a specimen in color would convince him of his error.

PEZOTETTIX UNICOLOR, Thos.

PLATE XLV, FIG. 5.

Pezotettix unicolor, THOS., Synop., 151.

I find some specimens which, although differing somewhat from the type, I think belong to this species. The frontal costa is not sulcate, and the wings are shorter. They are contained in the last collection, and were probably obtained in the mountains of Southern Colorado, although the exact locality is not given.

PEZOTETTIX OREGONENSIS, sp. nov.

PLATE XLV, FIGS. 2, 3.

Caloptenoid in the form of the head and thorax; wings abbreviated.

Male.—Small and slender. Vertex but moderately deflexed, and

slightly sulcate; frontal costa flat, punctured, scarcely sulcate. Pronotum compressed on the sides, which are parallel; lateral carinæ somewhat distinct though not sharp; tranverse impressions distinct; the two anterior distant from the posterior, which is situated behind the middle; posterior margin obtusely rounded; the posterior lateral margins ascending without any inward curve or angle. The thorax appears rather longer than usual, especially the prothorax; the middle coxæ falling behind the lower corner of the pronotum a little farther than usual. Elytra very short, extending only upon the second segment, ovate, not quite meeting on the back. The spines or processes of the last abdominal segment long and slender, extending upon the super-anal plate more than half its length; a small tubercle at the base of each; cerci very broad, somewhat narrowed at the apex, but not suddenly decreasing in width; sub-anal plate terminating in a rounded tooth-like point. Anterior femora somewhat strongly arcuate.

Color (after immersion in alcohol).—A yellowish-brown, except as follows:—antennæ pale; eyes brown; a shining, dark-brown, quadrate spot on the side of the pronotum, extending from the anterior submarginal indentation to the posterior sulcus; a spot of similar color extending from the middle of the posterior lateral margin of the pronotum to the insertion of the middle legs; elytra brown, unspotted; a dark-brown stripe on the side of each abdominal segment except the last; spines of the posterior tibiæ black.

Length, 0.80 inch; elytra, 0.14 inch.

Although found in this collection, it is marked as having been obtained in Oregon by J. Haldeman.

PEZOTETTIX MARSHALLII, *sp. nov.*

PLATE XLV, FIG. 4.

Male and female.—Vertex narrow between the eyes, which are more than usually approximate, expanding somewhat in front, slightly deflexed, distinctly sulcate; frontal costa flat slightly depressed at the ocellus. The immediate foveolæ in which the antennæ are inserted have a more than usually prominent margin. Pronotum flattened and compressed on the sides, which are straight in both sexes, parallel in the male and slightly

diverging in the female, tricarinate, each about equally distinct, though not prominent, yet forming sharply defined angles; the two sides (halves) of the dorsum flat, but ascending slightly to the median carina; posterior margin obtusely and regularly rounded; posterior sulcus behind the middle, distant from the other two, all distinct but not profound. Posterior femora of the female not reaching the tip of the abdomen, about equal to it in the male. Elytra not extending beyond the middle of the second segment, obovate, not meeting on the back; wings but mere figments. Sub-anal plate of the male pointed (cerci and super-anal plate damaged); cerci of the female broad, short; super-anal plate thick, oblong, and subsulcate. Antennæ not extending beyond the tip of the pronotum.

Color (after immersion in alcohol).—

Male.—Brown, varied with yellowish. Eyes, top of the head, dorsum of the pronotum, elytra, and abdomen brown; an irregular spot on the upper portion of the side of the pronotum shining brown. Posterior femora with the disk reddish-brown; upper and lower margins yellow; two broad spots on the inner face dark, rest yellow, except the apex, which is also black. The female has the general color, greenish yellow, but I am inclined to think that usually this is darker, perhaps even brown; spot on the side of the pronotum and disk of the femora reddish-brown. The abdomen in both sexes keeled above.

Length, ♀, 0.75 inch; ♂, 0.62 inch. Mountains of Southern Colorado.

It is possible that the specimens I have marked as *P. unicolor* belong to this species.

Named in honor of Lieut. W. L. Marshall, U. S. A., who has made valuable collections of *Orthoptera*.

PEZOTETTIX HUMPHREYSII, *sp. nov.*

Belongs to *Pezotettix* proper of Burmeister as limited by Stål, and is closely related to *P. mendax*, Fisch.

Female.—Large and fleshy; abdomen short and tapering rapidly, scarcely reaching the tip of the posterior femora. Head large and convex above; eyes large and approximate above; vertex somewhat broad and expanding in front of the eyes, slightly channeled, usually a round pit or

large deep puncture in the channel exactly between the upper corners of the eyes; frontal costa very broad and flat, fading below; sides parallel; lateral carinæ quite distinct, diverging slightly toward the corners of the face. Antennæ of medium length. Pronotum short, cylindrical, without any lateral carinæ; median carina scarcely apparent; expanding slightly, but regularly, posteriorly; posterior sulcus about two-thirds back from the front, leaving the posterior lobe very short; the posterior margin truncate on the back, or curved slightly forward; the anterior lobes smooth on the sides, marked with distinct shallow depressions on the disk; the posterior lobe distinctly and densely punctured; the posterior lateral margin slightly curving inward as it ascends. Elytra mere figments on the sides, not meeting on the back, extending across two segments, spatulate. Wings appear to be entirely wanting. Cerci minute and tapering to a point; the super-anal plate rather large, triangular, broadly rounded at the apex, marked transversely so as to give it the appearance of being a part of two segments. The prosternal spine stout, conical, and somewhat transverse.

The *male* differs in being much smaller and less robust; the abdomen is but moderately enlarged at the apex; the cerci are much longer than in the female, flat, and enlarged at the base and apex, the apical portion being somewhat broader than the basal portion; the anterior apical angle is rounded, while the posterior one is somewhat acute, dentiform; the super-anal plate is bicarinate longitudinally; sub-anal plate slightly elongate and cone-shaped.

Color (after immersion in alcohol).—Yellow, with black and brownish markings; male and female similar. The general color throughout is a bright yellow, therefore I will note only the markings on this yellow ground. A broad piceous black stripe on the sides of the pronotum, extending from the anterior margin to the posterior sulcus, with an oblique yellow stripe extending through it from the lower anterior angle to the middle of the upper margin, thus leaving a triangular black spot above in front immediately behind the eye; the sides of the meso- and meta-thorax striped obliquely with black; a black spot on each segment under the upper margin of the elytra. All of these black markings are margined by a brighter yellow than that which surrounds it. Dorsum of the anterior lobes

of the pronotum brownish-yellow (probably olive when living); the posterior lobe rufous; a distinct bright-yellow spot, of uniform width, runs along the whole length of the dorsum of the abdomen, margined with black; disk sometimes fuscous. The color of the alcohol specimens probably varies but little from that of the living specimens.

Dimensions.—♀, length, 1.25 inches; posterior femora, 0.74 inch; posterior tibiæ, 0.63 inch. ♂, length, 1 inch; elytra, 0.18 inch; posterior femora, 0.62 inch; posterior tibiæ, 0.50 inch.

From Southern Arizona; collected by the expedition of 1874, and named in honor of Gen. A. A. Humphreys, the chief of the Engineer Corps, under which these expeditions have been conducted. It is a fine, robust species, well marked, and quite distinct.

OMMATOLAMPIS, Burm.

OMMATOLAMPIS VIRIDIS, Thos.

Ommatolampis viridis, THOS., Synop. Acrid., 156.

Caloptenus viridis, THOS., U. S. Geol. Surv. Terr., 1871, 450, pl. ii, f. 3.—*Id.*, Glover Orth., pl. xi, f. 3.

There is an imperfect specimen of this species in the collection; it is the first, so far as I am aware, that has been obtained west of the range.

CALOPTENUS, Burm.

CALOPTENUS SPRETUS, Uhler.

A number of specimens of this destructive species are contained in the last collection, a few only in the first, indicating that as we move southwest into Arizona it ceases to be so abundant as in Utah and farther east and north; whether this inference be correct or not I am not aware. So far as I can learn, it has not yet been found in California; but as it is found immediately east of the Sierra Nevada it is quite probable that it reaches to the Pacific, though it may not be migratory on the west side of the range. It is a matter of some scientific interest to learn positively in regard to this, and it would be well for collectors in California to look carefully for it. From a remark by Dr. Packard in the American Naturalist, I presume he has received specimens from California.

It is somewhat strange that the first specimen ever examined and named

should have been found in Southern Illinois, by the writer, and sent to Professor Uhler, of Baltimore, about the year 1860, though previous to that time various scientific expeditions had penetrated the western plains; yet it is but seldom seen in the section where that specimen was obtained.

The great distress it has caused in the Western States by the destruction of the crops the past season renders it a matter of public interest to ascertain whether there is any remedy for the evil. I think it extremely doubtful whether they can be brought under control by any practical scheme; yet the question cannot be fully decided until it is ascertained positively from what point the hordes visiting Kansas, Nebraska, and Minnesota come, and where they originate. While their history on the western side of the plains is pretty well known, but little appears to have been ascertained that is reliable in regard to their passage across the plains.

So far as I have been able to learn from personal observations and from information received in the west, they move north, south, and east, but seldom migrate westward. May it not be that settlements along the eastern flank of the Rocky Mountain range are pushing them eastward? It would be well for some one connected with the expeditions the Government is sending west to gather all the data in regard to their operations last season possible, and this should be done the coming summer, while the facts are fresh in the memory of the people of the sections visited by them. While it is quite probable no adequate remedy can be found, yet every means possible should be tried; and it is evident no progress can be made in this direction until their habits and history have been thoroughly studied. Much has already been ascertained, but an important gap yet remains to be closed; the swarms which visit these States must be traced back, step by step, to their starting place. Much can be done in this direction the next season, and while dates are fresh in the memory of the numerous sufferers this should be done.

CALOPTENUS OCCIDENTALIS?, Thos.

Caloptenus occidentalis?, THOS., U. S. Geol. Surv. Terr., 1871, 453, pl. ii, f. 2.

I find in the collection a specimen which appears to belong to this species, although it varies somewhat from the type. It differs in the following

respects:—the anterior and middle femora are not more slender than is usual in this genus; the prosternal spine is not unusually broad at the base, but is blunt and transverse, as described; the oblique brownish bands on the posterior femora wanting. But the specimen is a male, and shows the unusually broad cerci of this species; there does not appear to be any blunt tooth at the tip of the last abdominal segment, which has the same form as in *C. femur-rubrum*. It is, therefore, quite probable I was mistaken in this respect in my original description; but if I am correct in regard to the former, then this is a new species. This species appears to be closely allied to *C. femur-rubrum* on the one side and to *C. keelerii* on the other.

CALOPTENUS BIVITTATUS, Say.

- Gryllus bivittatus*, Say, Jour. Acad. Nat. Sci. Phila., iv, 308.
Locusta leucostoma, KIRBY, Fann. Bor.-Am. Ins., 250.
Acridium sanguinipes, HARR., Hitch. Rep., 583.
Acridium flavovittatum, HARR., Treat. ed. 1862, 173.
Acridium bivittatum, THOS., Trans. Ill. Agl. Soc., v, 449.
Acridium leucostomum?, DE HAAN, Bidjr. Kenn. Orthop., 143.
Acridium femoratum?, DE HAAN, Bidjr. Kenn. Orthop., 144.
Caloptenus femoratus, BURM., Hand. Ent., ii, 368.
Caloptenus bivittatus, UHLER, Say's Ent. ed. Lec., ii, 238.

The specimens of this species in the collection, captured at various points of the routes explored, appear to be unusually large, and, although preserved in alcohol, retain sufficient of the coloring to show that they belong to the greenish-yellow or olive variety.

CALOPTENUS YARROWII, *sp. nov.*

PLATE XLV, FIG. 6.

Female.—Very similar in appearance and form to *C. bivittatus* Say, to which it is very closely allied.

Vertex scarcely sulcate; the frontal costa broad and slightly sulcate; antennæ scarcely reaching the tip of the pronotum; the joints distinct, each joint being somewhat enlarged at the tip. The transverse incisions of the pronotum distinct; the posterior one behind the middle; median carina distinct, though not elevated. Elytra and wings reaching the tip of the abdomen; the intercalate vein of the elytra present. Posterior femora not

reaching the tip of the abdomen. The inner angles of the mesosternal lobes rounded.

Color (after immersion in alcohol).—Brownish, varied with yellow. Face and cheeks yellow, tinged with brownish; two oblique brownish stripes on the cheeks extending from near the border of the pronotum downward and forward. The sides of the posterior and lower portions of the sides of the anterior lobes of the pronotum greenish-yellow; upper portions of the sides of the anterior lobes pale brown; a pale-yellow stripe extending from the vertex along each lateral carina to the anterior sulcus; the middle portion of the occiput and dorsum of the pronotum pale brown. The elytra brown, with four or five oblong yellow spots in a row along the disk; a pale-yellowish indistinct stripe running along the upper angle; nervules mostly yellow. Posterior femora yellow with three oblique reddish stripes across the external face, which cross the upper margin and extend upon the upper portion of the inner face; lower margin of the outer and inner face yellow. Tibiæ dull yellow (probably bluish when living); spines black. Tips of the valves of the ovipositor black.

Length, 1.3 inches; elytra, 0.87 inches; posterior femora, 0.62 inch.

Named in honor of Dr. H. C. Yarrow, the surgeon and zoölogist of the expedition.

One specimen only found in the collection, but this is in good order.

ACRIDIDIUM, Geoff.

ACRIDIDIUM SHOSHONE, *sp. nov.*

PLATE XLIII, FIG. 2.

Acridium shoshone (extract from this MSS. published in the Proc. Acad. Nat. Sci. Phila., 1873, 296).

By some oversight I neglected to state in my Synopsis that such was the case, which should have been done, as the description was published by permission of the officer in charge in order that I might copy it into my Synopsis, it being understood that it and the other species published at the same time should appear in this paper as new, a note to be made of the fact.

Large size; green; without any dorsal stripe.

Female.—Vertex nearly horizontal,; sides angularly expanding in front of the eyes; flat frontal costa prominent, sides parallel, sulcate from the ocellus downward, above the ocellus somewhat gibbous and punctured; lateral carinae very prominent, parallel. Pronotum slightly expanding posteriorly, coarsely and reticulately punctured; median carina distinct, severed by the three transverse impressions. Elytra and wings passing the abdomen. Cerci very short, broad at the base, narrowed and rounded at the apex. Posterior femora much enlarged at the base; posterior tibiae considerably enlarged at the apex. Prosternal spine robust, cylindrical, and nearly straight. Pectus punctured. Abdomen of the male somewhat elongated; cerci very broad and flat, very slightly and obtusely notched at the apex, which is bent upward and over the last segment; subanal plate elongate, turned upward, with a distinct square notch at the apex.

Color.—Dark olive-green. Ocelli bright transparent-umber; eyes brown; cheeks yellowish, with a dark-green stripe extending downward from the eyes. The pronotum has some pale spots on the sides, and sometimes the posterior lobe is tinged with brown. Elytra uniform green, somewhat transparent at the apex, and in some specimens faintly tinged with brown. Wings hyaline; nerves and nervules dark-brown. Posterior femora greenish above and below; pinnæ of the disk alternately white and green, the white occupying the flat interspaces; inner face greenish-yellow. Posterior tibiae bright-vermilion, the under surface being striped with yellow; spines yellow at the base, tipped with black. Venter and pectus dark-green, sometimes varied with dark-brown.

Dimensions.—♀. Length, 2 to 2.25 inches; elytra, 1.7 to 2 inches; posterior femora, 1.25 inches; posterior tibiae, 1.2 inches. ♂. Length, 1.6 to 1.75 inches.

Several specimens of this fine, large species are in the collection, having been obtained in Southeastern Nevada and Arizona. In some respects, it is closely allied to *A. obscurum*, Burm., but is evidently quite distinct, as it wants the stripe on the pronotum and black dots on the hind femora. It is one of the largest species known to the orthopteral fauna of the United States. This, with the other new and subtropical species found in the collection, shows clearly that the southern portion of the area visited by the

expedition embraces the northern boundary of the subtropical faunal district. The beautiful Rhomalean species hereafter mentioned is strongly confirmatory of this opinion.

ACRIDIDIUM ALBOLINEATUM, *sp. nov.*

PLATE XLIII, FIG. 1.

Very similar in form, size, and general color to *A. emarginatum*, Uhler, and may be described by the colors, which are very marked and distinct.

Female.—Face marked with perpendicular alternate stripes of black and white (or pale yellow, probably yellow when living, as the specimen before me has been immersed in alcohol); the frontal costa black, with a narrow yellow line on each margin and one in the middle, the latter not distinct except above the ocellus; a dark stripe extending downward from each antenna, and each bordered each side by broad, parallel, yellowish stripes. The yellow line above the ocellus is continued upon the vertex, occiput, and along the middle of the pronotum and the inner margins of the elytra, forming a dorsal stripe, widening posteriorly. Lower half of the sides of the anterior lobes of the pronotum yellow; a yellow stripe from the base of the elytra to the insertion of the middle legs; and another extending upward from the insertion of the posterior legs. The remaining portions of the pronotum and elytra uniform light brown. Wings transparent yellow. Anterior and middle legs yellow on the anterior (outer) face and brown on the posterior (inner) face. Posterior femora with the lower half of the disk white; upper half with a black stripe from the base to the middle, the outer end extending in the form of a short band over the upper carina; there is another broad black band midway between this and the apex, rest yellow; apex black with a yellow spot at the lower corner; inner face yellow, with two oblique dusky stripes.

Dimensions.—Length, 1.8 inches; elytra, 1.75 inches; posterior femora, 1 inch; posterior tibiae, 1 inch.

The colors show this species to be distinct from *A. emarginatum*, which it resembles most.

There is but one specimen in the collection of 1873; no locality given, but it is probably from Arizona.

DICTYOPHORUS Thunb.

Stål has restored this generic name of Thunberg with *R. microptera* as the type. In this he is undoubtedly correct, and should be followed. But when he separates from it those species which have the vertex slightly deflexed, and places them in a new genus, *Tæniopoda*, his desire to form new genera would seem to overcome his better judgment and accurate knowledge of this group. Although it is true that the vertex is somewhat sloped, yet it is but slightly so, and scarcely varies from the line of the anterior part of the pronotum and occiput. An examination of his *T. pecticornis*, a specimen of which is now before me, shows that it is congeneric with *R. microptera*, and if removed from association with that genus it must be arbitrarily done. Therefore, while I cheerfully follow Stål in separating the *miles* form from the *microptera* form, I cannot accept his new genus *Tæniopoda*.

DICTYOPHORUS PICTICORNIS, Stål.

Rhomalea pecticornis, WALK., Cat. Dermap. Salt., iii, 538.

Tæniopoda pecticornis, STÅL, Recensio, 51.

Walker's specific name would take precedence but for the fact that it is certainly incorrectly printed. For the benefit of American entomologists I give here a somewhat complete description from the specimens before me, as Walker's description is somewhat deficient (as given in my Synopsis), and Stål's not generally accessible.

Female.—Robust; similar in form and size to *R. centurio* (*microptera*) Head depressed; the top from the middle of the occiput to the tip of the vertex sloped slightly downward in a line with the top of the anterior lobe of the pronotum; seen from the side, it forms with the frontal costa an angle of about 110° . Vertex slightly produced in front of the eyes; the sides meeting in a right angle; surface flat; margins slightly elevated. Frontal costa narrow, slightly expanded at the ocellus, obliterated before reaching the clypeus, sharply sulcate. Antennæ somewhat elongate, extending slightly beyond the tip of the pronotum, acuminate; joints distinct. Pronotum slightly expanding posteriorly; the dorsal portion elevated, being arched from the lateral carinæ so that the portion above these equals in height two-thirds the portion below them; the crest forming an obtuse,

slightly elevated carina, arcuate from the middle sulcus forward; lateral carinae obliterated on the front lobes, distinct on the posterior lobe; transverse incisions distinct, each severing the median carina, the posterior one behind the middle; anterior margin subangulate; posterior margin produced and forming an angle a little less than a right angle; the posterior lateral margins extend almost in a direct (oblique) line from the lower corner to the tip. Elytra and wings in the female about as long as the abdomen, slightly passing it in the male; the former reticulately veined, the veinlets prominent; in the male, these are not only longer but also broader than in the female, and have the cells considerably larger in the apical two-thirds than at the base or in any part of those of the female. Posterior femora reaching the tip of the abdomen in the female, passing it in the male, rather slender as compared with the size of the insect. Upper valves of the ovipositor remarkably robust; apex of the subanal plate of the male strongly curved upward and tapering to a blunt point.

Color (after immersion in alcohol).—Head, thorax, abdomen, and legs shining black, varied with bright yellow; the yellow markings as follows,—a narrow stripe extending down the face on each side just in front of the eyes; face margined with yellow below; a narrow stripe extending from the tip of the vertex along the median carina of the pronotum its entire length; a stripe down each side of the head adjoining the pronotum; posterior lobe of the pronotum margined with yellow; a triangular spot on each side of each abdominal segment; posterior femora with two narrow lines above and two below the disk (carinae), and the basal half of the disk pinnate with yellow. Antennae with the two basal and eight or nine apical joints black, the rest yellow, but annulate with black or fuscous at the tips (or joints). Elytra greenish-yellow, the cells or meshes black or dark fuscous. When living the black portions are more or less greenish; the elytra are green or greenish, the meshes black; the wings a bright red; exterior border and the broad front interneural space to the base fuscous, with a red spot (usually) near the apex.

Dimensions.—♀. Length, 2.25 inches; elytra, 1.5 inches. ♂. Length, 1.9 inches; elytra, 1.75 inches.

Several specimens, male and female, are contained in the collection of

1873 obtained in Arizona by Dr. C. G. Newberry. The specimens described by Walker and Stål are from Mexico.

Before leaving this family, I will give a list of the species whose position is affected by Dr. Stål's work so far as I am able to do so at present; but before this can be completed it will be necessary to examine all the species, but, most of my types being now at the Agricultural Department in Washington, I can only give such as are mentioned by Stål and those of which I have specimens before me. I also add the names of the new North American species described by Stål, and in this paper and also those in other papers published since my Synopsis, so as to complete the list of species.

Names according to my Synopsis.

Tryxalis brevipennis.
 Mesops chlorizans.
 Opomala bivittata.
 Opomala marginicollis.
 Oxyorophus montezuma.
 { Pyrgomorpha brevicornis. }
 { Pyrgomorpha punctipennis. }
 Stenobothrus viatorius.
 Œdipoda sordida.
 Œdipoda costalis.
 Œdipoda discoidea.
 Œdipoda phœnicoptera.
 Œdipoda Haydenii.
 Œdipoda fenestralis.
 Œdipoda kiowa.
 Œdipoda gracilis.
 Œdipoda maritima.
 Stenobothrus occipitalis.
 Tomonotus sulphureus, &c.
 Chrysochraon viridis.
 Caloptenus (all).
 Acridium americanum.
 Rhomalia centurio.
 Rhomalia pecticornis.

 Chromacris colorata.
 Monachidium superbum.

Names according to Stål's new arrangement.

Achurum brevipenne.
 Arnilia (?) chlorizans.
 Mermiria (?) Belfragii. (Doubtful).
 Leptysma marginicollis.
 Syrbula montezuma.
 Tryxalis brevicornis.
 Scyllina viatoria.
 Tragöcephala sordida.
 Tragöcephala costalis.
 Hippiscus discoidea.
 Hippiscus phœnicopterus (?).
 Cosmorhyssa Haydenii.
 Psinidia fenestralis.
 Psinidia kiowa.
 Psinidia gracilis (?).
 Trimerotropis maritima.
 Oxyorophus occipitalis (Brun. Wat.).
 Arphia sulphurea, &c. (?).
 Tryxalis viridis (?).
 Pezotettix (?).
 Acridium (Schistocerca) americanum.
 Dictyophorus reticulatus.
 Dictyophorus picticornis (Thos.). Tæniopoda picticornis (Stål).
 Rhomalea colorata.
 Tæniopoda superba.

List of species to be added to those enumerated in my Synopsis, most of which have been described since its publication.

FROM STÅL'S RECENSIO.

<i>Zoniopoda emarginata</i>	Central America.
<i>Hermistria pulcheipes</i>	Mexico.
<i>Coscineuta virens</i>	West Indies.
<i>Acridium columbinum</i> (Thunb.)	West Indies.
<i>Acridium flavo-lineatum</i> (De G.)	Panama; Mexico.
<i>Achurum acridodes</i>	Mexico.
<i>Mermiria Belfragii</i> (?)	Texas.
<i>Syrbula leucocerca</i>	Texas.
<i>Tryxalis angusticornis</i> (?) <i>Chrysochraon viridis</i> (Scudd.)	Carolina.
<i>Arphia sanguinaria</i> (?) <i>Ædipoda tenebrosa</i> (Scudd.)	Vancouver's Island.
<i>Camnula tricarinata</i>	Vancouver's Island.
<i>Ædipoda Belfragii</i> (?)	Illinois.
<i>Ædipoda punctata</i>	Mexico.
<i>Psinidia capito</i>	Texas.
<i>Psinidia fuscifrons</i>	Texas.

FROM BULLETIN No. 2, U. S. GEOLOGICAL SURVEY OF TERRITORIES (SELF).

<i>Gomphocerus Carpenterii</i>	Colorado.
<i>Thrinacus californicus</i>	California.
<i>Ommatolampis brevipennis</i>	New Jersey.
<i>Caloptenus flavolineatus</i>	California.
<i>Caloptenus floridanus</i>	Florida.
<i>Caloptenus keelerii</i>	Florida.
<i>Machærocera sumichrasti</i>	Mexico.

NEW SPECIES DESCRIBED IN THIS PAPER.

<i>Pedioscertetes Nevadensis</i>	Nevada.
<i>Syrbula fusco-vittata</i>	Arizona.
<i>Ædipoda Hoffmannii</i>	Nevada.
<i>Ædipoda Wheelerii</i>	Arizona.
<i>Ædipoda Utahensis</i>	Utah.
<i>Ædipoda sparsa</i>	Arizona.
<i>Eremobia magna</i>	Arizona.
<i>Pezotettix oregonensis</i>	Oregon.
<i>Pezotettix Marshalli</i> ..	Colorado.
<i>Pezotettix Humphreysii</i>	Arizona.
<i>Caloptenus Yarrowii</i>	Arizona.
<i>Acridium shoshone</i>	Nevada.
<i>Acridium albo-lineatum</i>	Arizona.

LOCUSTIDAE.

There are several species of this family contained in the collection, some of which I am unable to determine at present for want of access to

some works which are necessary. These I have reserved to be described in a subsequent paper.

STENOPELMATUS.

STENOPELMATUS FASCIATUS, Thos.

Stenopelmatus fasciatus, THOS., U. S. Geol. Surv. Terr., 1871, 434.

This species is distinguished by the dark fascia or bands across the abdomen, each segment having one band on it. I have heretofore seen specimens from Texas, Colorado, Wyoming, Utah, and Southern Idaho, to which list of localities may now be added Nevada and Arizona, as shown by this collection.

CEUTHOPHILUS.

There is one specimen of this genus in the collection of 1872, but it is too badly damaged to determine what species it is.

UDEOPSYLLA.

UDEOPSYLLA NIGRA, Scud.

Udeopsylla nigra, SCUD., Jour. Bost. Soc. Nat. Hist., vii, 1862, 443.

There is one specimen of this species, a female, in the collection of 1872. This is the first time I have seen this species; but Dr. Scudder's description is so exact that I feel no doubt as to the correctness of my identification, although the reddish stripe on the back is wanting.

DECTICIDES.

This group is the subject of a paper by Otto Hermann (*Verhand. d. k.-k. zool.-bot. Ges.*, 1874), in which he reviews my arrangement as given in my paper published in Geol. Surv. Terr., 1871, 440.

Although differing from me on some points, yet this author's plan does not vary very materially, so far as the grouping is concerned, from that I have given. But a reference to my paper will show that I considered it as depending too much upon a minor character, and gave it more as a provisional arrangement than otherwise.

Mr. Hermann certainly deserves the thanks of entomologists for disentangling and properly limiting the genera of this group. He not only retains both *Rhacocleis* and *Pterolepis*, which I considered as synonyms, but also adds some new genera. Having access to the fine collection of Dr.

Brunner de Wattenwyl, he has been able to resolve all questions of doubt which I allude to in my paper.

I give the synopsis of his arrangement in his own language, as it is of much interest to our entomologists.

“ A. Prosternum mit zwei Stacheln :

* Stiele der lamina subgenitalis eingelenkt, ♂ ; Ovipositor am Ende der Schneide nicht gezähnt, ♀ :

b. Plantula ganz frei abstehend :

c. Vertex breit zugerundet :

1. Pronotum von der Seite mässig zusammengedrückt, Processus abgestutzt, abgeplattet *Gampsocleis*, Fieb.
2. Pronotum walzig, Processus ausgezogen, zugerundet, ohne Kiel. *Rhacocleis*, Fieb.

cc. Vertex zugespitzt :

3. Pronotum zusammengedrückt, ohne Processus .. *Metaballus*, Herm.
4. Pronotum zusammengedrückt, Processus lanzenförmig zugespitzt, *Rhachidorus*, Herm.

ccc. Vertex mässig erweitert *Thyreonotus*, Serv.

cccc. Vertex verschmälert, mit seichtem Eindruck *Arytropteris*, Herm.

bb. Plantula verkürzt, eingezogen :

c. Vertex verschmälert, mit seichtem Eindruck *Pterolepis*, Fisch.

cc. Vertex ohne Mitteleindruck, verschmälert *Drymadusa*, Stein.

AA. Prosternum ohne Stacheln :

* Stiele der lamina subgenitalis eingelenkt, ♂ ; Ovipositor am Ende der Schneide gezähnt :

b. Plantula ganz frei abstehend :

c. Vertex abgestumpft :

d. Mittelkiel des Pronotums entwickelt *Decticus*, Serv.

dd. Mittelkiel des Pronotums nur auf der hinteren Hälfte sichtbar, *Platycleis*, Fieb.

** Stiele der lamina subgenitalis nicht eingelenkt, ♂ *Steiroxys*, Herm.

*** Stiele der lamina subgenitalis eingelenkt, ♂ :

b. Pronotum mit Mittelkiel *Psorodonotus*, Brun.

bb. Pronotum ohne Mittelkiel :

c. Tibien des ersten Fusspaares vorne mit zwei Reihen Stacheln, *Anabrus*, Hald.

cc. Tibien des ersten Fusspaares vorne mit einer Reihe Stacheln, *Thamnotrizon*, Fisch.”

It will be seen by reference to this synopsis that it corresponds with my arrangement in making the presence or absence of the prosternal spines the chief character separating the two divisions of the group. The author also adopts my distinctions to separate *Anabrus* from *Thamnotrizon*.

My *Decticus trilineatus*, of which some specimens were forwarded to Dr. Brunner de Wattenwyl, is removed to a new genus, *Steiroxys*, established for its reception.

ANABRUS, Hald.

ANABRUS SIMPLEX, Hald.

I find but one specimen of this species in the collection made in Nevada; but from Dr. W. J. Hoffman's letter I presume they were seen in considerable numbers in Central Nevada.

This is the species that is eaten by the Indians. Not only do they eat them after roasting, but often without any other preparation than simply pulling off their legs and head.

ANABRUS PURPURASCENS, Uhler.

The collection contains three specimens, which I am quite confident belong to this species, but at what locality taken does not appear. I have never found or known of it being found west of the main Rocky Mountain range, therefore conclude they are from Colorado or Northern New Mexico.

STEIROXYS, Herm.

STEIROXYS HERMANNII, *sp. nov.*

PLATE XLIV, FIG. 4.

Male.—The dorsal portion of the pronotum, instead of having the margins subparallel as in *St. trilineata*, has them slightly curving inward just in advance of the middle, and then outward from there to the front; the middle dorsal line very minute and subobliterated in front; a slight transverse impression behind the front border; posterior margin truncate, and as given in Mr. Hermann's figure (pl. v, fig. 65); the lateral margins nearly straight, not curved inward at the humerus, and the slope upward more gradual than in *St. trilineata*. Elytra squamæform, extending only across the second segment, rounded to a blunt point at the apex; the two larger cells or areas subequal in the left or upper elytron; the outer area longest; the vein which separates them runs almost directly along the middle of the elytron toward the apex, making a slight sigmoid curve. Super-anal plate with a square notch in the middle, lobes obtusely rounded; cerci rather short, enlarged at the apex, forming a blunt point or angle externally at the tip, while the internal margin of the tip is prolonged into a long, very

sharp, and slightly curved spine equal in length to the cerci, thus **L**, somewhat in the form of an **L**, being different from any species in this respect that I am acquainted with; subgenital-plate triangularly but not very deeply notched at the extremity, similar in form to that of *St. trilineata*, the lobes carinated, obtusely pointed. Anterior tibiae with two spines in front; middle tibiae with two rows in front, inner row with four, outer two spines; posterior femora with a few minute denticulations along the inferior margin. Spine over the anterior coxae broad at base, prominent.

Color (after immersion in alcohol).—Purple and yellow. The face dull yellow; pronotum purplish, margined on the sides and posterior extremity with yellow, the purple deepest on the sides; abdomen purple, posterior margin of each segment yellow, forming narrow bands across the abdomen; genital parts yellow.

Dimensions.—Length, 1 inch; pronotum, 0.30 inch; posterior femora, 0.75 inch; elytra, 0.13 inch.

Locality not given. Contained in the collection of 1873.

In general appearance and size, this species is much like *Anabrus Stevensonii*, which will probably have to be referred to this genus, but is quite distinct. It is possible that on account of the abnormal character of the cerci a new genus will have to be formed for its reception; but I am doubtful whether variation in the cerci is sufficient ground for forming new genera. The stylets of the subgenital plate appear to have been broken off in the only specimen I find in the collection.

I have named the species in honor of Mr. Otto Hermann, of Vienna, author of the valuable revision of this group of genera.

STEIROXYS BILINEATA, *sp. nov.*

PLATE XLV, FIG. 7.

Female.—Pronotum very slightly emarginate in front, squarely truncate behind, without any distinguishable carinae; the dorsal area slightly constricted near the anterior margin, otherwise as in *St. trilineata*. Abdomen proportionally longer and larger than in the latter species, also enlarged in the middle, somewhat fusiform. Cerci short, slender. The posterior abdominal segment with a small, sharp, triangular notch; the lobes in the form of short teeth; the subanal plate with a small, blunt, triangular notch,

the lobes rounded; ovipositor nearly as long as the entire body, slightly curving upward at the apex, not enlarged in the apical portion. Antennæ wanting in the only specimen. Posterior femora slender, smooth, passing the abdomen about one-third of their length. Spines over the anterior coxæ slender. Prosternum unspined; and the meso- and meta-sternal plates small and obtuse.

Color (alcoholic).—Dorsal portions throughout pale olive, striped with yellowish lines. Two rather narrow yellowish lines (one from each eye) extend back along the entire length to the tip of the abdomen; each abdominal segment is margined posteriorly with a quite narrow yellowish line; the lateral margins are marked with a somewhat broader line of the same color. Face and entire ventral surface pale yellow. Legs purplish externally. The olive of the abdomen and pronotum is more or less slightly tinged with rufous near the margins of the spaces.

Dimensions.—Length of body, 1.30 inches; ovipositor, 1.20 inches; posterior femora, 1.25 inches; posterior tibiæ, 1.22 inches.

From the collection of 1874 (October 17). San Carlos; H. W. Henshaw.

The genus *Steiroxys* was established last year by Mr. Otto Hermann, of Vienna, Austria, from some specimens of my *Decticus trilineatus*, which I transmitted to Dr. Brunner Wattenwyl. The specimen now before me corresponds in several respects with the generic characters given by Mr. Hermann, yet the variation in the pronotum and the general appearance of the specimen render it exceedingly doubtful whether it should be placed here.

The tibial spines appear to be the same as in that genus; but as the specimen is somewhat imperfect I cannot speak positively in this respect I have therefore placed it here provisionally rather than establish a new genus on a single and somewhat imperfect specimen.

LOCUSTA.

LOCUSTA FULIGINOSA, Thos.

Locusta fuliginosa, THOS., U. S. Geol. Surv. Terr., 1871, 443.

I find among the dried specimens of the collection of 1872 a female of this species, which was established on a single somewhat imperfect male

specimen presented to me by Dr. Palmer, who obtained it in Arizona. From it I am enabled to set at rest all doubts in regard to the distinction between *L. fuliginosa* and *L. occidentalis*. The specimen before me shows very clearly and beyond dispute that the two are quite distinct; the long wings and elytra and the peculiar color of the wings being the same in the female as the male.

The general color is ashy-white. The occiput is striped longitudinally with white and cinereous; the pronotum is similarly striped on the dorsum, the lower portion of the sides being bordered with yellow. The numerous reticulate veinlets of the elytra are white, giving them the appearance of being sprinkled over with fine white powder. The wings in the female are similar in color and reticulation as described in the male, and as figured by Professor Glover in the report above referred to. The posterior legs (the only ones remaining) are of a pale ash color, with a purplish tinge. Ovipositor ash-brown, curving slightly downward at the apex.

Dimensions.—Length of body about 1.25 inches; length to tip of elytra, 2.25 inches; elytra, 2.0 inches; posterior femora, 1.4 inches; posterior tibiae, 1.4 inches; ovipositor, 1.25 inches.

As this was the first species of *Locusta* known to our fauna, and the first specimen, badly damaged and alcoholic, this specimen in color, although also somewhat imperfect, is one of the most interesting of the collection to me. It not only enables me to complete my description, but also confirms the view I took in regard to the distinction between this and the one from California.

There are some other specimens of *Locustidae*, chiefly *Xiphidium* and allied genera, which I am unable at present to determine with certainty; also a few *Gryllidae* in the same condition; in fact, it is almost impossible to arrive at any certainty in regard to the crickets until there is a revision of this family. I will try and determine them, and report next summer, when I trust I shall have materials for comparison and some works of reference, which I do not have access to at present.

The following specimens having been found in the collections of Orthoptera sent me, are here appended.

ARACHNIDA.

Although not embraced in my specialty, yet as I find one specimen of peculiar interest I desire to make a note of the fact.

TARANTULIDAE.

THELYPHONUS EXCUBITOR, Gir.

Thelyphonus excubitor, GIR., Marcy's Exp. Red Riv. Louis., 265, pl. xvii, f. 1.

The collection contains a fine, almost perfect specimen, of this singular species. The description and figures of Girard are so exact that nothing can be added.

SCORPIONIDAE.

SCORPIO (TELEGONUS) BOREUS, Gir.

Scorpio (Telegonus) boreus, GIR., Marcy's Exp. Red Riv. Louis., 267, pl. xvii, f. 5.

I find two specimens in the collection which appear to belong to this species, though rather smaller than the one described by Girard. The color of the alcoholic specimens is yellow, but doubtless the greenish cast has faded out.

CHAPTER XIV.

REPORT
UPON
THE COLLECTIONS
OF
NEUROPTERA AND PSEUDO-NEUROPTERA,
MADE IN PORTIONS OF
COLORADO, NEW MEXICO, AND ARIZONA,
DURING
THE YEARS 1872, 1873, AND 1874.
BY
Dr. H. A. HAGEN.

CHAPTER XIV.

The collection made by this expedition is somewhat interesting, although small, and in a much damaged condition, partially the result of preserving the specimens in alcohol, which should never be used for this purpose for these insects.

A large portion of the collection of 1874 was unfortunately destroyed by an accident on the Baltimore and Potomac road, which is much to be regretted. Some of the species which are new were collected at the same time by the United States Geological Survey of the Territories in Colorado; and as these specimens were received before those of this expedition they were described in its report for 1873.

FAM. PERLINA.

PTERONARCYS.

PTERONARCYS BADIA, Hagen.

Pteronarcys badia, U. S. Geol. Surv. Terr., 1873, 573-574.

Pale brown; head dull yellowish, with a large square black spot around the ocelli; antennæ brown, paler beneath. Prothorax square, the anterior margin rather rounded, the angles right, pale brown, with darker shading on each on the elevated marks. Abdomen pale above, darker in the middle, pale brown beneath; the apical margin of the penultimate ventral segment largely excised; the dark-brown middle part of the segment somewhat produced, without reaching the last segment; setæ pale-brown; feet darker brown; wings yellowish-hyaline, with a dull-yellow stigma; veins brown.

Length, 17-19 millimeters; alar expansion, 31-33 millimeters.

HAB.—Bridger basin, Wyoming (Garman); Cache Valley, Utah (C. Thomas); Colorado Mountains, August (Lieut. W. L. Carpenter).

The species above described is the dwarf of this genus; the smallest species known, *Pt. proteus*, having twice the length of *Pt. regularis* and *Pt. badia*. The gills are well visible in the alcoholic specimens of *Pt. badia*, twenty-six pairs in number, to wit,—six between the head and the prothorax; six between the prothorax and the mesothorax; six between the mesothorax and the metathorax; two between the posterior feet; and six on the basal segments of the abdomen. The maxillary palpi are longer than the mouth, the basal joint short, the other long, thicker at the tip; the labial palpi are similar. The palpi show a similar formation as the apical joint in the phryganideous genus *Hydropsyche*. The external membrane is cut or split in a somewhat spiral manner, so as to give to every joint the appearance of a large number of small joints imperfectly soldered together. This formation of the palpi belongs to all the species of *Pteronarcys*, and is exceptional for this genus only in the whole family of *Perlina*.

These two small species agree in all characters with the larger species, at least so far as the females are concerned, as the males are still unknown. The wings are divided into quadrangular cells, perhaps a little more regular than in the larger species. The venation of *Pteronarcys* seems to resemble the most the remarkable fossil genus *Miamia*.

Secured at Fairplay and Twin Lakes, Colo., by Dr. J. T. Rothrock.

PTERONARCYS CALIFORNICA, Hagen.

Pteronarcys californica, HAGEN, Synop., 16, p. 5.—*Id.*, Proc. Bost. Soc. Nat. Hist., xv, 284.—*Id.*, U. S. Geol. Surv. Terr., 1873, 573.

A full description is given in the monograph of this genus in the quoted proceedings.

HAB.—California; Washington Territory, between Rock and Cascade Rivers; Lake Winnipeg (Kennicott); Ogden, Utah, from a river tributary to Great Salt Lake, in June (C. Thomas). Nymphæ from the San Luis Valley, Colorado.

According to McLachlan's statement, the wings of the California specimens are very smoky and opaque; perhaps they were darkened by the carbolic acid used by the collectors. *Pt. californica* is a decidedly western species. *Pt. biloba*, from Trenton Falls, N. Y., a species as yet only repre-

sented by the female type in the British Museum, is very nearly related, but, according to McLachlan, a different species.

A specimen (nymph) of this species was secured by Dr. J. T. Rothrock in the San Luis Valley, Colorado.

A species of *Chloroperla* was also taken, but too much damaged to be recognizable.

ACRONEURIA.

An abnormal nymph of this genus, probably *A. abnormis*, was secured at Four-Mile Creek, Lower Park, Colo., by Dr. J. T. Rothrock. In regard to this species the following may be interesting:

ACRONEURIA ABNORMIS, Hagen.

Perla abnormis, HAGEN, Synop., 17, f. 1.

This species appears to vary in a very high degree. The late B. Walsh, after repeated observations of living specimens, confirmed variation in size and color, in the reticulation of the wings, and in the number of quadrangular areoles, which are sometimes nearly or altogether wanting; the shape of the prothorax, and the vulvar lamina of the female, commonly of a constant shape in this family, offer also slight variations in this species.

The male has usually long and well-developed wings; however, two short winged males, now before me, seem to belong to this species. The material in my collection of dry and alcoholic specimens, though rich in specimens from different localities, seems to be not yet sufficient to decide the question whether we have here several very closely related species, or simply varieties of *A. abnormis*.

Two females from South Montana and a male from Snake River, South-eastern Idaho, collected by Prof. C. Thomas, differ as follows:—The colors are darker; the abdomen yellow beneath, on each side dark brown. The male, in worse condition than the females, is a short winged one; the shape of the prothorax somewhat different, perhaps only altered by the bad preservation. The vulvar lamina of the two females is more produced than usual, covering one half of the following segment; the apical margin is nearly semicircular, notched very little in one female, and not at all in the other.

A cast nymphal skin, from Eagle River, Colorado, August 30, collected by Lieutenant Carpenter, belongs to a very large species. Length, 33 milli-

meters; setæ, 26 millimeters. There is nothing known concerning the previous stages of the North American *Perlina*; even the different larvæ and skins in my collection are not yet thoroughly studied. After a closer comparison with a nymph skin of *A. abnormis*, communicated by B. Walsh, I believe that the nymph skin from the Eagle River belongs to the same genus, but certainly to a different species. It is not so much spotted; the apical half of the wing cases is pale, without the black band, so conspicuous in *A. abnormis*; the abdomen is dark brown above, without the regular paler marks of *A. abnormis*; the basis of the blackish setæ is pale instead of the throughout dark color of the setæ of *A. abnormis*. Even the size of the skin seems too large for the known American Perlids, except for some very large specimens of *A. abnormis*, collected at the Saskatchewan River.

HAB.—Assuming the above described specimens to belong to *A. abnormis*, this species would have a very wide distribution. The northern limits known are the Saskatchewan and Peel Rivers and Canada; the southern limits, Georgia, and perhaps Mexico. It is known from all Eastern States on the Atlantic, and from many States between the Atlantic and the Rocky Mountains.

DICTYOPTERYX.

DICTYOPTERYX SIGNATA, Hagen.

Dictyopteryx signata, HAGEN, U. S. Geol. Surv. Terr., 1873, 575.

Yellowish-brown, pale beneath; labrum pale brown; head flat, with two irregular brown stripes, with an anterior rounded spot, trilobate behind; space between the stripes with an anterior rounded spot on each side near the eyes. Antennæ pale brown; first joint blackish-brown above, second and third pale; palpi pale. Prothorax as broad as the head, nearly square, brown, with a large, yellow, median band, somewhat dilated at the ends; on each side three carved marks, formed, by rather irregular black, polished scars; lateral margin straight; whitish around the base of the feet; segments darker at the base. Feet pale brown; femora with an external vitta and a ring before the knee; base of the tibiæ and tip of the tarsi dark fuscous. Setæ pale brown, darkest at the tip of the joints. Wings with a grayish-yellow tinge, darker on the costal margin; veins brown, darker,

and very irregular on the tip of the wing, five or four, or even fewer antecubitals; wings of the male as long as the abdomen, or one third or more shorter; the apical ariolets very irregular.

Male.—The last dorsal segment yellow; the apical margin recurvate, transversely cariniform, thickened, emarginate in the middle, scabrous, and rather villous exteriorly; appendages yellow; the superiors are small, recurved lobes; between them the larger inferiors, darker on the triangular tip, which is sharp, and a little emarginate beneath, just before the tip; an ovoid membrane between the inferiors belongs, perhaps, to the penis; last ventral segment produced between the setæ with an elliptical margin.

Female.—Last dorsal segment obtusely produced in the middle of the apical margin, with a median longitudinal impression; vulvar lamina large, rather inflated on the antepenultimate segment, forming two free circular lobes, very near together, beneath the penultimate segment.

Length, with the wings, ♂, 13–17 millimeters; ♀, 18–21 millimeters. Alar expansion, ♂, 16–26 millimeters; ♀, 30–40 millimeters. Length of the setæ, 11 millimeters.

HAB.—Foothills, Colorado, September, and mountains on the Pacific slope, August 16 to September 6.

This genus is new for the American fauna; all species known belong to Europe and Siberia. This new species is far more interesting as an exception, bearing gills in the imago state. There are on the ventral side five pairs of gills, formed by white, fleshy, blind sacs, two pairs on the under side of the head; the first pair widely separated on the basal part of the submentum; the second pair in the articulation with the prothorax; both pairs straight, placed transversely, looking outward. The three other pairs on the thorax always before the feet, but separated from them, being placed just in the articulation of the segments; the three thoracic pairs are incurved.

The occurrence of gills in the imago state of *D. signata* is the more exceptional, as all the hitherto known species are without them; at least, a close examination of dry specimens of all the species in my collection (only one of Siberia is unknown to me) did not disclose anything similar to the gills in *D. signata*. Dr. Gerstaecker, in a recently published paper, also

states the absence of gills in living specimens of *D. intricata* and *D. alpina*. Formerly, the genus *Pteronarcys* was the only known exception for its gill bearing imagos among the class of insects; now, besides the above described *Dictyopteryx*, there are two other gill bearing Perlid genera mentioned by Dr. Gerstaecker—*Damphipnoa lichenalis* from Chili, a genus closely related to *Pteronarcys*; and *Nemura cinerea* and *N. nitida*, with its male, *N. lateralis*, both from Europe.

The papers by Dr. Gerstaecker are published in the *Festschrift zum hundertjährigen Bestehen der Gesellschaft naturforschender Freunde*, Berlin, 1873, 4to, p. 60, with figures; and *Sitzungsbericht derselben Gesellschaft*, October 21, 1873, p. 99.

Taken at Roaring Fork, Colo., by Dr. J. T. Rothrock.

ISOPTERYX.

ISOPTERYX CYDIPPE, Hagen.

Some specimens, much damaged, presumably of this species, were taken in Southern New Mexico in September, 1874, by Dr. O. Loew.

FAM. ODONATA.

OPHIOGOMPHUS.

OPHIOGOMPHUS SEVERUS, Hagen.

Ophiogomphus severus, HAGEN, U. S. Geol. Surv. Terr., 1873, 591.

Greenish-yellow; head and mouth parts greenish-yellow; labium and labrum paler; antennæ black; part between the eyes black, forming a transverse black band above the base of the front, excised in the middle; vertex greenish-yellow, flat, the front margin deeply notched, the sides of the vertex cariniform, curved in an exact semicircle around the lateral ocelli; occiput greenish-yellow, with a small, black band along the superior border, beginning near the occiput. Thorax greenish-yellow, an ill defined brownish spot on the dorsum each side near the wings; the crest of the sinus not exceeding the bifurcation, black, and an incomplete blackish band on the humeral suture beginning at the wings.

(Three males and two females from Colorado, in alcohol; a single male from Yellowstone, preserved dry, shows the following pattern):—Dorsum

with a broad, black band in the middle, following the sinus above, and united with a complete black band on the humeral suture. Mesothoracic crest from the bifurcation to the prothorax yellow; a large, ovoid, black spot each side of the dorsum, not confluent with the bands; a black band on the second lateral suture, nearly united by a superior line at the base of the wings with a lateral band; an inferior, incomplete, black band on the first suture, ending at the stigma. Abdomen cylindrical, enlarged at the base, and on the seventh to ninth segments greenish-yellow; all the segments each side on the apical half with a large, blackish band; the bands are interiorly dilated at the tip and converging (diverging on the first segment); venter black on segments 3 to 6, orange on the following. In the Yellowstone male, the bands are broader and confluent on the tip; the yellow part between the bands forming a basal, hastiform spot; appendages yellow, the superiors about as long as the last segment, short, parallel, stout, trigonal, exteriorly rounded, subincurved, pointed on tip, which is bent outward, beneath somewhat thickened before tip, with numerous small, black spines; inferior appendage a little shorter, triangular, bifid to the base, contiguous, the basal half forming an obtuse elevation, the apex recurved with a small, black, superior tooth; genital parts in the second segment with the first hamule forming a lobe interiorly hollowed; the tip with a semicircular excision, the hind angle of the tip prolonged in a strongly bent, slender, black hook; second hamule longer, the tip suddenly narrowed, a little recurved, blackish, cut straight; penis with an inferior tooth on second joint, the last one with two long spines; sheath of the penis hollowed out, four-lobed, the two inner lobes cylindrical, divergent, the outer ones large, flat, semicircular; earlets yellow, large, rounded, on the hind band a series of small, black teeth. The female has the occiput exactly similar to the male, without any posterior teeth; appendages yellow, short, pointed; vulvar lobe triangular, a little shorter than the segment, bifid to the base, contiguous, indented short before the sharply pointed black tip, which is bent outward; feet yellow; femora an apical superior black band, beginning on the knee, divided anteriorly, beneath with numerous, very short, black spines; tibiae black beneath, and interiorly or on both sides with a black line and long, black spines; tarsi black, all, or only the basal joint, yellow

above; wings hyaline, veins black; the costa and some transversals yellow; pterostigma oblong, a little dilated in the middle, yellowish, darker in the middle, covering nearly three ariolets; 11–12 antecubitals, 7–10 postcubitals; 2 discoidal ariolets; membranula whitish.

Length of the body, 51 millimeters; alar expansion, 64–68 millimeters; pterostigma, $2\frac{1}{2}$ millimeters.

HAB.—Colorado (Mr. James Ridings); foothills and plains of Colorado, end of September (Lieutenant Carpenter); Fort Garland, Colo., June 27; South Montana and Yellowstone (Mr. C. Thomas). This is the species given in my last report (p. 726) doubtfully as *G. colubrinus*. This interesting species is very near *O. colubrinus* in the appendages and genital parts of the male, but different in the pattern of color on the head and abdomen, and the structure of the occiput in both sexes. *O. colubrinus* is a species rarely to be found in collections; even the female is not yet described.

Taken by H. W. Henshaw in 1873, and by Dr. H. C. Yarrow at Fort Garland, Colo., in 1874.

HERPETOGOMPHUS.

HERPETOGOMPHUS COMPOSITUS, Hagen.

Herpetogomphus compositus, HAGEN, Synop., 99, 1.—*Id.*, U. S. Geol. Surv. Terr., 1873, 597.

A female of this species (No. 104 G.) was collected by Dr. H. C. Yarrow in 1874 at San Ildefonso, N. Mex., near the Rio Grande River.

HAB.—Pecos River, Western Texas, Yellowstone region, Oregon, New Mexico.

AGRION.

Some specimens (Nos. 19 and 20) of this genus were collected at Taos, N. Mex., in 1874, by Dr. H. C. Yarrow, but were in such bad condition that it was impossible to determine the species.

ÆSCHNA.

ÆSCHNA CONSTRICTA, Say.

Æschna constricta, SAY, Ent. N. A., 1859, ii, 389 (LeConte's ed.).—HAGEN, Synop., 123, f. 5.—*Id.*, U. S. Geol. Surv. Terr., 1873, 591.

Male and female specimens (No. 273 A) collected at Pagosa Hot Springs, Colo., by Dr. H. C. Yarrow, September, 1874.

HAB.—Common everywhere east of Mississippi, from Canada to Maryland, and west to Wisconsin and British Columbia.

DIPLAX.

DIPLAX COSTIFERA (?).

A number of specimens (Nos. 154 C and 273 A) of this species, both male and female, were collected in New Mexico and Colorado by W. G. Shedd and Dr. H. C. Yarrow.

PLATHEMIS.

PLATHEMIS SUB-ORNATA.

A number of specimens (all in bad condition), male and female, collected in New Mexico by H. W. Henshaw.

MESOTHEMIS.

MESOTHEMIS CORRUPTA, Hagen.

Mesothemis corrupta, HAGEN, Syn. 171, f. 3.—*Id.*, U. S. Geol. Surv. Terr., 1873, 587.

Collected in Arizona by H. W. Henshaw in 1874.

HAB.—Common in Texas, California, and Illinois; Colorado, New Mexico?, Arizona.

LIBELLULA.

LIBELLULA FORENSIS, Hagen.

Libellula forensis, HAGEN, Syn., 154, 9.—*Id.*, U. S. Geol. Surv. Terr., 1873, 585.

A few females of this species were collected in Arizona by H. W. Henshaw in 1874.

HAB.—California, Victoria, Vancouver's Island, British Columbia, Montana, Arizona.

NOTE.—*L. forensis* is very similar to *L. pulchella*, a common species everywhere east of the Rocky Mountains, but may be distinguished from it by being larger and wanting the dark-brown tip of all the wings, besides other differences.

LIBELLULA SATURATA, Uhler.

Libellula saturata, HAGEN, Syn., 152, 4 (*partim*).—UHLER, Proc. Acad. Nat. Sci. Phila., 1857, 88, 4.—HAGEN, U. S. Geol. Surv. Terr., 1873, 586.

Specimens taken at Mineral Springs, Ariz., in 1873, by H. W. Henshaw.

HAB.—Montana, Arizona.

ARGYA.

ARGYA——(?).

Specimens belonging to this genus, but too much damaged for recognition, were taken in 1873 at Camp Apache, Ariz., Fort Wingate, N. Mex., and Fort Garland, Colo., by H. W. Henshaw, and at South Park, Colorado, by Dr. J. T. Rothrock.

HEMEROBINA.

POLYSTOECHOTES PUNCTATUS, Hagen.

Sembris punctata, FABR., Ent. Syst., ii, 73, 4.

Hemerobius nebulosus, FABR., Ent. Syst., Suppl., 202, 1, 2.

Hemerobius irroratus, SAY, Long's Exped. to Rocky Mts., ii, 306.—*Id.*, Asa Fitch's Rep., i, 92.

Polystoechotes sticticus, BURM., Handb., ii, 982, 1.—WALK., Cat., 231, 1.

Osmylus validus, WALK., Cat., 233, 3.

Polystoechotes punctatus, HAGEN, Syn., 206, 1.—*Id.*, U. S. Geol. Surv. Terr., 1872, 729.—*Id.*, *ib.*, 1873, 599.

Collected in 1873 by Dr. J. T. Rothrock at Twin Lakes, Colorado; in 1874, at Tierra Amarilla, N. Mex., and Taos, N. Mex., by Dr. H. C. Yarrow.

HAB.—United States, from Gulf of Mexico to British America, and from the Atlantic to the Pacific.

CHRYSOPA.

CHRYSOPA NIGRICORNIS, Burm.

Chrysopa nigricornis, BURM., Handb., ii, 980, 6.—SCHNEID., Mon. Chrysop., 126, 37, tab. xliii.—WALK., Cat., 259, 50.—HAGEN, Syn., 214, 11.—*Id.*, U. S. Geol. Surv. Terr., 1873, 599.

Chrysopa colon, FITCH, Rep., 1, 88.

Collected at Pagosa Hot Springs, Colo., at Taos and San Ildefonso, N. Mex., by Dr. H. C. Yarrow, and at Pueblo, Col., by C. E. Aiken.

HAB.—Carolina, New York, New Mexico, and Colorado.

CHRYSOPA EXPLORATA, Hagen.

Chrysopa explorata, HAGEN, Syn., 217, 18.

Collected in New Mexico by Dr. O. Loew in 1874.

HAB.—Mexico and New Mexico.

CHRYSOPA EXTERNA, Hagen.

Chrysopa externa, HAGEN, Syn., 221, 32.—*Ib.*, U. S. Geol. Surv. Terr., 1873, 599.

Some specimens in very bad condition collected in New Mexico by Dr. O. Loew.

HAB.—Washington Territory, New Mexico, Mexico, California.

CORYDALIS.

One larva of this genus from the Colorado Chiquito, collected in 1873 by H. W. Henshaw.

The larva differs from those of *C. cornuta* by a larger prothorax, luteous legs, and the mark of the head. There are now six species known from Texas and New Mexico; of course, it is still impossible to ascertain the species of the larva from Colorado, but probably it may belong to one of the three Texan species (U. S. Geol. Surv. Terr., 1873, 579, 600).

NOTE.—This specimen was inadvertently attributed to Professor Hayden's collection in the work quoted above.

RAPHIDIA.

The genus *Raphidia* belongs to the interesting class of genera which are represented largely in Europe and Asia, are entirely wanting in the fauna of North America east of the Rocky Mountains, but are represented again in California and in the other vast tracts of land west of the Rocky Mountains. I have seen only two specimens, one from Ogden, Utah (C. Thomas), the other from Rio Grande, Colorado, June 13 (collected by this expedition). Both belong to different species, and to *Raphidia* proper (not to *Inocellia*). Both being preserved in alcohol, I am not able to give any better information, the more so as the genus *Raphidia* contains the most difficult species for determination (U. S. Geol. Surv. Terr., 1873, 600).

MYRMELEON.

MYRMELEON INSCRIPTUS, Hagen.

Myrmeleon inscriptus, HAGEN, Syn., 230, 11.

A number of individuals supposed to be of this species were secured at Taos, N. Mex., San Ildefonso, N. Mex., Pagosa, Colo., Pueblo, Colo., by Dr. H. C. Yarrow and C. E. Aiken. They were in such bad condition, however, as to render a positive identification impossible.

PHRYGANINA.

Some specimens belonging to this genus were secured by Dr. J. T. Rothrock at Twin Lakes, Colorado, in 1873, and may possibly be *P. atripes*. They were, however, in such bad condition as to render a careful study almost impossible.

In addition, some specimens of *Limnophilus* were obtained, also in a damaged condition.

CHAPTER XV.

REPORT
UPON
THE COLLECTIONS
OF
TERRESTRIAL AND FLUVIATILE MOLLUSCA
MADE IN PORTIONS OF
COLORADO, UTAH, NEW MEXICO, AND ARIZONA,
DURING
THE YEARS 1872, 1873, AND 1874.
BY
Dr. H. C. YARROW.

CHAPTER XV.

The collections upon which the following report and list are based were placed in the hands of Mr. George W. Tryon, jr., Mr. W. G. Binney, Mr. Temple Prime, and Dr. James Lewis for determination, and it is to their kindness that we are indebted, not only for the identifications given, but for valuable notes in regard to the different species. To the latter gentleman our thanks are due for a criticism and revision of the manuscript of this report.

A communication made by Mr. Tryon to the Academy of Natural Sciences in regard to the collection of 1872 is by his permission appended to the report, and it will be seen that some valuable facts in regard to the distribution of various genera have been evolved by this series of shells, small though it may be.

The collection of 1872 was made in Utah and Nevada, principally by Mr. H. W. Henshaw and Dr. H. C. Yarrow, with the kind assistance of different members of the expedition; that of 1873, for the most part in Colorado Territory, by Dr. J. T. Rothrock and Mr. John Wolf, the botanists of the expedition; and that of 1874, in Colorado, New Mexico, and Arizona, by collectors of the expedition.

Although we are able to chronicle but few discoveries, the report is thought to possess a certain degree of value with regard to the limits advanced of range and distribution.

A tolerably abundant synonymy has been given, compiled from various works on conchology, the principal of which are those of Messrs. Binney, Bland, and Tryon.

The classification adopted is substantially in accordance with Prof. Theodore Gill's "Arrangement of the Families of Mollusks", published by the Smithsonian Institution in February, 1871, and to this gentlemen thanks are also due for assistance and advice.

CLASS GASTEROPODA.

SUBCLASS PULMONIFERA.

ORDER PULMONATA

SUBORDER GEOPHILA.

FAM. HELICIDAE.

Subfamily PUPINÆ.

Genus PUPA.

Subgenus Leucochila.

A number of specimens of this genus were found, and probably belong to the first following species.

PUPA FALLAX, Say.

Cyclostoma marginata, SAY, Jour. Acad. Nat. Sci. Phila., ii, 1821, 172.—SAY, Conch., Binney's ed., 22.

Bulimus marginatus, PFEIFFER, Mal. Blatt, 1194.—*Id.*, Mon. Hel. Viv., 414.—W. G. BINNEY, Terr. Moll., iv, 136.

Bulimus fallax, GOULD, Terr. Moll., ii, 288, pl. lii, f. 1.

Pupa fallax, SAY, Jour. Acad. Nat. Sci. Phila., v, 1825, 121.—SAY, Conch., Binney's ed., 28.—GOULD, Invertebrat., 1841, 192, f. 123 (excl. syn. *Placida*).—*Id.*, Bost. Jour. Nat. Hist., 1843, iv, 357, pl. xvi, f. 15.—DEKAY, N. Y., Moll. 1843, 51, pl. 35, f. 331.—PFEIFFER, Mon. Hel. Viv., ii, 309; iii, 333.—CHEMNITZ, ed. 1844, 2, 58, pl. xii, figs. 20, 21.—BINNEY & BLAND, Land & Fresh Water Shells N. A., 1867, 239.—BINNEY, Bul. Mus. Comp. Zoöl., iii, No. 9, 194.

Pupa parraiana, D'ORBIGNY, Moll. Cuba, 1853, 181, pl. xii, figs. 9–11.

Pupa albilabris, ADAMS, Verm. Moll., 1842, 158.—*Id.*, Amer. Jour. Sci. & Arts, xl, 271.

Pupilla fallax, MORSE, Am. Nat., 1868, 609, f. 53.

Paludina turrita, MENKE?, Syn. Méth., 40.

Common throughout the entire Eastern Province, which comprises all that remaining portion of the continent north of Mexico not included in the Pacific or Central Provinces.

No.	Locality.	Date.	Collector.
C	South Park, Colo	July, 1873	J. Wolf.
L	Twin Lakes, Colo.....	Aug., 1873	Do.
271 A 1	Pagosa, Colo	Sept., 1874	Dr. H. C. Yarrow.

Subgenus *Pupilla*.

PUPA MUSCORUM, Linn.

Pupa badia, ADAMS, Bost. Jour. Nat. Hist., iii, 331, pl. iii, f. 18.—*Id.*, Verm. Moll., 157.—GOULD, Bost. Jour. Nat. Hist., iii, 404, iv, 360.—DEKAY, N. Y. Moll., 49, pl. iv, f. 45.—CHEMNITZ, ed. 2, 117, pl. xv, figs. 25–29.—BINNEY, Terr. Moll., 323, pl. lxx, f. 3.—W. G. BINNEY, Terr. Moll., iv, 142.

Pupa muscorum, LINN., *part.* PFEIFFER, Mon. Hel. Viv., iv, 666, &c.

Pupilla badia, MORSE, Jour. Port. Soc., i, 1864, 37, figs. 89, 91, pl. x, f. 92.—*Id.*, Am. Nat., i, 1868, 609, f. 52.

Has been found in the islands of the Gulf of Saint Lawrence, and in Maine; Vermont; Crown Point, New York (Binney); also in Colorado. Is also widely distributed in Europe. The specimens secured by the expedition were found at an altitude of 9,500 feet, on wet ground.

No.	Locality.	Date.	Collector.
Z	Twin Lakes, Colo.	Aug. 5, 1873	J. Wolf.

PUPA BLANDI, Morse.

Pupilla blandi, MORSE, Ann. N. Y. Lyc., Nov., 1865, viii, 211, f. 8.

Pupa blandi, W. G. BINNEY, Exp. Neb., Ex. Doc. 25th Congress 2d Session, ii, pt. 2, 1859, 725 (no description).

Collected by expedition in the vicinity of Twin Lakes, Colorado, at an altitude of over 9,000 feet.

No.	Locality.	Date.	Collector.
16	Twin Lakes, Colo.	Aug., 1873	J. Wolf.

Genus *VERTIGO*, Müller.Subgenus *Isthmia*, Gray.

VERTIGO OVATA, Say.

Vertigo ovata, SAY, Jour. Acad. Nat. Sci. Phila., ii, 1822, 375.—SAY, Conch., Binney's ed., 26.—BINNEY, Terr. Moll., ii, 334, pl. lxxi, f. 4.—W. G. BINNEY, Terr. Moll., iv, 148.—MORSE, Am. Nat., i, 1868, 668, figs. 57, 58.—BINNEY & BLAND, Land & Fresh Water Shells N. A., 1869, 252.—BINNEY, Bull. Mus. Comp. Zoöl., iii, No. 9, 195.

Pupa ovata, GOULD, Bost. Jour. Nat. Hist., iv, 1843, 350, pl. xvi, figs. 7, 8.—DEKAY, N. Y. Moll., 1843, 50, pl. iv, f. 50.—ADAMS, Verm. Moll., 1842, 157.—*Id.*, Am. Jour. Sci. & Arts, xl, 271.—KÜSTER, in Chemnitz, ed. 2, 118, pl. xiv, figs. 1, 2; pl. xv, figs. 35–38.—PFEIFFER, Mon. Hel. Viv., ii, 360.—*Id.*, Symbolæ, ii, 54.

Pupa modesta, SAY, Long's Exped. Rocky Mts., 1824, ii, 25, pl. xv, f. 5.—*Id.*, Binney's ed., 32, pl. lxiv, f. 5.—GOULD, Inverteb., 1841, 188, f. 119.

Pupa ovulum, PFEIFFER, Olim, Symbolæ, i, 46.

Isthmia ovata, MORSE, Jour. Port. Soc., i, 1864, 38, f. 93, pl. x, f. 94.

Belongs to the Interior Region of the Eastern Province, and is widely distributed from Maine to Mexico, and still farther north and west, and in Cuba.

No.	Locality.	Date.	Collector.
L 3 L	Twin Lakes, Colo.	Aug., 1873	J. Wolf.
Z	..... do	Sept., 1873	Do.
N	Saguache, Col .....	.... do	Do.

Two remaining sets of specimens have not yet been identified. They were found at an altitude of 9,000 feet in moist, wet, boggy ground.

VERTIGO SIMPLEX, Gould.

Pupa simplex, GOULD, Bost. Jour. Nat. Hist., iii, 1840, 403, pl. iii, f. 21.—*Id.*, *ib.*, iv, 1843, 359.—*Id.*, Inverteb., 1841, 190, f. 121.—PFEIFFER, Mon. Hel. Viv., ii, 302.—DEKAY, N. Y. Moll., 1843, 52, pl. xxxvi, f. 347.—BINNEY, Terr. Moll., ii, 343, pl. lxxii, f. 3.

Vertigo simplex, STIMPSON, Shells N. E., 53 (no description).—W. G. BINNEY, Terr. Moll., iv, 148.—MORSE, Am. Nat., i, 1868, 670, figs. 67, 68.

Found in Canada and New England (Binney); also in Colorado, in boggy ground.

No.	Locality.	Date.	Collector.
J 3	South Park, Colo	Aug., 1873	J. Wolf.
L	Twin Lakes, Colo .....	.... do	Do.

Subfamily HELICINAE.

Genus STENOTREMA, Raf.

STENOTREMA MONODON, Rackett.

- Helix monodon*, RACKETT, Linn. Trans., xiii, 1822, 42, pl. v, f. 2.—*Id.*, ed. Chenu., 269, pl. xxvii, f. 5.—WOOD, Ind., suppl., 1828, pl. vii, f. 15; ed. Hanley, 226, f. 15.—BINNEY, Bost. Jour. Nat. Hist., iii, 1840, 360, pl. x, f. 1.—*Id.*, Terr. Moll., ii, 147, pl. xli, lower fig.—GOULD, Inverteb., 1841, 174, f. 113.—ADAMS, Verm. Moll., 1842, 159.—W. G. BINNEY, Terr. Moll., iv, 60.—DEKAY, N. Y. Moll., 1843, 35 (pt. excl. syn.), pl. iii, f. 19 (not f. 21 a, b).—MRS. GRAY, Fig. Moll. An., pl. cxci, f. 11 (*ex* Bost. Jour. Nat. Hist., no descr.).—BILLINGS Canadian Nat., ii, 1857, 100, f. 6.—MORSE, Am. Nat., i, 1867, 151, figs. 12, 13.—PFEIFFER, Mon. Hel. Viv., iv, 320.
- Helix convexa*, CHEMNITZ, *part.* (excl. syn. et tab. lxvi, f. 24–27), pl. x, figs. 17, 18.—PFEIFFER, Mon. Hel. Viv., iii, 268 (excl. β et γ).—DESHAYES, in Lam., viii, 112; 3d ed., iii, 308.—*Id.*, Encycl. Méth., ii, 1830, 253.—*Id.*, in Fer., l. c., i, 144.—REEVE, Con. Icon., 1852, 696 (excl. syn., no., 1854, 717).
- Helicodonta hirsuta*, a, FERUSSAC, Tab. Syst., 101 (no desc.).
- Stenotrema monodon*, MORSE, Jour. Port. Soc., i, 1864, 10, f. 13; pl. ii, f. 2; pl. iv, f. 14.—TRYON, Am. Jour. Conch., iii, 1867, 56, pl. ix, figs. 18, 20.
- Helix monodon* var. *cincta*, LEWIS, Proc. Acad. Nat. Sci. Phila., 1874. (This last var. is of unusually compressed form, with a very wide umbilicus, peritreme subcarinate, and often exhibiting a peripheral brown band like the banded var. of *H. elevata*. Found in North Carolina.)

Throughout entire North America, as are also its varieties, viz, var. *fraterna*, Say, and var. *leaii*, Ward.

No.	Locality.	Date.	Collector.
Y 13	Colorado Springs, Colo	July, 1874	John Yarrow.

Genus HELICODISCUS.

HELICODISCUS LINEATUS, Say.

- Helix lineata*, SAY, Jour. Acad. Nat. Sci. Phila., i, 1817, 18; ii, 1824, 273.—NICH., Encycl., 3d ed., iv, 1819.—SAY, Conch., Binney's ed., 7, 24.—BINNEY, Bost. Jour. Nat. Hist., iii, 1840, 436, pl. xxii, f. 6.—*Id.*, Terr. Moll., ii, 261, pl. xlviii, f. 1.—DEKAY, N. Y. Moll., 1843, 44.—GOULD, Invert., 1841, 179, f. 103.—ADAMS, Ver., Moll., 1842, 161.—FERUSSAC, Tab. Syst., 44.—*Id.*, Hist., pl. lxxix, f. 1.—DESHAYES, in Fer., i, 80.—CHEMNITZ, 2d ed., ii, 203, tab. ci, figs. 13–15.—PFEIFFER, Mon. Hel. Viv., i, 184.—REEVE, Con. Icon., 1852, 724.—W. G. BINNEY, Terr. Moll., iv, 123.—MORSE, Am. Nat., i, 1867, 546, f. 44.

Planorbis parallelus, SAY (?), Proc. Acad. Nat. Sci. Phila., ii, 1821, 164.—SAY, Conch., Binney's ed., C3.

Helicodiscus lineata, MORSE, Jour. Port. Soc., i, 1864, 25, figs. 61, 62, pl.ii, f. 3; pl. viii, f. 63.—TYRON, Am. Jour. Conch., ii, 1866, 264, pl. iv, f. 60.

Range—throughout Eastern North America. Found also on the Rio Chama, New Mexico, and in Arizona.

No.	Locality.	Date.	Collector.
H L 1	Gila River, Ariz	Oct., 1873	Dr. O. Loew.

Genus PATULA, Hald.

PATULA STRIGOSA, Gould.

Helix strigosa, GOULD, Proc. Bost. Soc. Nat. Hist., ii, 1846, 166.—*Id.*, U. S. Exp. Exped., Moll., 1852, 36, f. 41.—*Id.*, Terr. Moll., ii, 210, pl. xxvi, a.—PFEIFFER, Mon. Hel. Viv., i, 121; iv, 91.—*Id.*, Mal. Bl., 1857, 321.—W. G. BINNEY, Terr. Mol., iv, 23.—BINNEY & BLAND, Land & Fresh Water Shells N. A., pt. i, 1869, 72.—BINNEY, Bul. Mus. Comp. Zool., iii, No. 9, 192.

Anguispira strigosa, TRYON, Am. Jour. Conch., ii, 1866, 261, pl. iv, f. 40.

(*Helix cooperi* should also probably be admitted as a synonym.)

Binney states the range of this species: "From Rio Piedra, of Western New Mexico, to Bighorn Mountains, Nebraska. It seems to inhabit the Central Basin." And in his more recent paper he gives the following distribution: "This species is peculiar to the 'Central Province', which extends from Mexico to the British possessions, between the Rocky Mountains in the east and the Sierra Nevada and Cascade Mountains in the west, while the succeeding species, *P. striatella*, Anth., is more widely distributed throughout the Pacific Province, which consists of a narrow strip between the Sierra Nevada and Cascade Mountains in the east and the Pacific Ocean in the west. Its southern limit is San Diego, from whence it extends north-erly to Alaska. This latter form is abundant in the Sierra Nevada."

Mr. Tryon informs me that, after a careful examination and comparison of many specimens of this shell, he believes it identical with *Helix haydenii*, Gabb, a variety with elevated lines, and with this experience *H. idahoensis* is probably another extreme variety of this protean form.

Dead specimens only secured in elevated localities in Utah.

No.	Locality.	Date.	Collector.
C	Wahsatch Mountains, Utah	July, 1872	H. W. Henshaw.
B	Antelope Springs, Nev	Aug., 1872	Dr. H. C. Yarrow.
A	Beaver, Utah	Sept., 1872	Lieut. W. Mott.
D (var. <i>minor</i>).	Fillmore Cañon, Utah .....	.... do	Dr. H. C. Yarrow.
5	Blue River, Colo	June, 1873	J. Wolf.
19	Saguache, Colo	Sept., 1873	Do.

PATULA STRIATELLA, Anthony.

Helix striatella, ANTHONY, Bost. Jour. Nat. Hist., iii, 1840, 278, pl. iii, f. 2.—BINNEY, Bost. Jour. Nat. Hist., iii, 1840, 432, pl. xxi, f. 5.—*Id.*, Terr. Moll., ii, 217, pl. xxx, f. 2.—GOULD, Invert., 1 1841, 178, f. 112.—ADAMS, Verm. Moll., 1842, 162.—DEKAY, N. Y. Moll., 1843, 43, pl. iii, f. 40.—CHEMNITZ, 2d ed., ii, 115, tab. lxxxv, figs. 36–38.—PFEIFFER, Mon. Hel. Viv., i, 104.—REEVE, Con. Icon., 1853, 727.—W. G. BINNEY, Terr. Moll., iv, 99.—MORSE, Am. Nat., i, 1867, 545, f. 40.

Helix ruderata, ADAMS, Sill. Jour. (1), 40–408 (*nec* Studer).

? *Helix cronkheitei*, NEWCOMB, Proc. Cal. Acad. Nat. Sci., iii, 1865, 180.

Patula striatella, MORSE, Jour. Port. Soc., i, 1864, 21, f. 48, pl. ii, f. 6; pl. viii, f. 49.

Anguispira striatella, TRYON, Am. Jour. Conch., ii, 1866, 262, pl. iv, f. 51.

Patula cronkheitei, TRYON, Am. Jour. Conch., ii, 1866, 263.

This species is found throughout Northern North America on both the Atlantic and Pacific coasts. Secured as follows:—

No.	Locality.	Date.	Collector.
L 2 L	Mountains near Fort Garland, Colo	May, 1873	H. W. Henshaw.
D 1	Twin Lakes, Colo	July, 1873	J. Wolf.
C 3	South Park, Colo .....	.... do	Do.
182	Twin Lakes, Colo	Aug., 1873	Dr. J. T. Rothrock.
J 2	South Park, Colo .....	.... do	J. Wolf.

PATULA PERSPECTIVA, Say.

Helix perspectiva, SAY, Jour. Acad. Nat. Sci. Phila., i, 1817, 18.—NICH., Encycl., iv, 3d ed., 1819; Say, Conch., Binney's ed., 9.—BINNEY, Bost. Jour. Nat. Hist., iii, 1840, 430, pl. xxi, f. 4.—*Id.*, Terr. Moll., ii, 256, pl. xxx, f. 1.—DEKAY, N. Y. Moll., 1843, 42, pl. iii, f. 38.—FERUSSAC, Tab. Syst., 44.—*Id.*, Hist. Nat. des Moll., pl. lxxix, f. 7.—DESHAYES, in Lam., viii, 130; 3d ed., iii, 315.—*Id.*, in Fer., i, 81.—CHEMNITZ, 2d ed., ii, 114, tab. lxxxv, figs. 30–32.—PFEIFFER, Mon. Hel. Viv., i, 103; iii, 99 (*excl. Helix fliola*).—REEVE, Con. Icon., 695.—W. G. BINNEY, Terr. Moll., iv, 122.—LEIDY, T. M. U. S., i, 1851, 153, pl. vii, figs. 4–7 (*anat.*).

Helix patula, DESHAYES, Encycl. Méth., ii, 1830, 217.

Anguispira perspectiva, TRYON, Am. Jour. Conch., ii, 1866, 262, pl. iv, f. 50.

Distributed throughout the whole of Eastern North America. Taken in New Mexico by expedition.

No.	Locality.	Date.	Collector.
166 G	San Ildefonso, N. Mex	Aug., 1874	Dr. H. C. Yarrow.

Genus VALLONIA, Risso.

VALLONIA PULCHELLA, Müll.

Helix pulchella, MÜLL, Verm., 30.—PFEIFFER, Mon. Hel. Viv., i, 365.—BINNEY, Bost. Jour. Nat. Hist., iii, 1840, 375, pl. 9, f. 2.—*Id.*, Terr. Moll., ii, 175, 17, f. 1.—GOULD, Invert., 1841, 176, f. 102.—ADAMS, Verm. Moll., 1842, 159.—LEIDY, T. M. U. S., i, 1851, 26, pl. ix, figs. 7-9.—BINNEY & BLAND, Land & Fresh Water Shells N. A., 1869, pl. 157.—BINNEY, Cat. Terr. Moll., Bull. Mus. Comp. Zoöl., iii, No. 9, 194.

Helix minuta, SAY, Jour. Acad. Nat. Sci. Phila., i, 1817, 123.—NICH., Encycl., 3d ed., 1819; Binney's ed., 3.—DEKAY, N. Y. Moll., 1843, 40, pl. 3, f. 33.—MORSE, Am. Nat., i, 1867, 544, f. 39.—ROBERTS, U. S. Geol. Surv. Terr., 1870, 468.

Helix costata, MÜLLER, *vide* PFEIFFER, Mon. Hel. Viv., i, 366.

Vallonia minuta, MORSE, Port. Soc., 1864, 21, figs. 54-56, pl. 8, f. 57.—TRYON, Am. Jour. Conch., iii, 1867, 36, pl. 8, f. 20.

A widely distributed form from Canada to Florida; also found throughout Europe, Siberia, Thibet, Madeira, Azores, &c. Belongs more particularly to the northern region of the Central Province.

No.	Locality.	Date.	Collector.
C 3	South Park, Colo	July, 1873	J. Wolf.

FAM. VITRINIDAE.

Genus VITRINA, Drapr.

VITRINA PFEIFFERI, Newcomb.

Vitrina pfeifferi, NEWCOMB, Proc. Cal. Acad. Nat. Sci., ii, 1861, 92.—TRYON, Am. Jour. Conch., ii, 1866, 244, pl. iii, f. 3.—BINNEY, Bul. Mus. Comp. Zoöl., iii, No. 13, 192-198.

An exclusively western form, found from 37° to 42° latitude, from

Rocky Mountains to Pacific Ocean. Twin Lakes, Colorado, is the most easterly locality now known.

No.	Locality.	Date.	Collector.
L 1	Fort Garland, Colo.....	May, 1873	H. W. Henshaw.
E	Twin Lakes, Colo.....	Aug. 5, 1873	J. Wolf.

VITRINA LIMPIDA, Gould.

Vitrina pellucida, DEKAY, N. Y. Moll., 1843, 25, pl. iii, f. 42 (*nec* Müller).—ADAMS, Verm. Moll., 1842, 162.—BINNEY, Terr. Moll., ii, 58, pl. lxxvii, a, f. 1.

Vitrina americana, PFEIFFER, 1852, Proc. Zool. Soc., Dec., 156.—CHEMNITZ, ed. 2, 1854, 9, pl. i, figs, 22-25.

Vitrina limpida, GOULD, in Agassiz's Lake Superior, 1850, 243; Terr. Moll., l. c.—PFEIFFER, Malac. Blatt, 1856, ii, 10.—*Id.*, Mon. Hel. Viv., iv, 798.—W. G. BINNEY, Terr. Moll., 33.—REEVE, Con. Icon., 62.—MORSE, Jour. Port. Soc., i, 1864, p. ii, pl. v, f. 17.—*Id.*, in Am. Nat., i, 1867, 314, f. 20.—TRYON, Am. Jour. Conch., ii, 1866, 243, pl. iii, f. 1.

Found in Northeastern States and northwest of Lake Superior, by the expedition in Colorado.

No.	Locality.	Date.	Collector.
J 4	South Park, Colo	Aug., 1873	J. Wolf.

Genus ZONITES, Montf.

Subgenus *Hyalina* (Fér.) Gray.

ZONITES ARBOREUS, Say.

This and the succeeding species are widely distributed, being found throughout Eastern North America, and in fact all over the northern portion of the continent where the mountains have ceased to be barriers to distribution.

No.	Locality.	Date.	Collector.
C 2	South Park, Colo.....	July, 1873	J. Wolf.
D	Twin Lakes, Colo.	Aug., 1873	Do.

ZONITES MINUSCULUS, Binney.

No.	Locality.	Date.	Collector.
L 1 L	Mountains near Fort Garland, Colo	May, 1873	H. W. Henshaw.

ZONITES VIRIDULUS, Menke.

Collected by the expedition in Colorado.

No.	Locality.	Date.	Collector.
J 7	South Park, Colo	Aug., 1873	J. Wolf.

Subgenus *Conulus*, (Fitz.) Moq.-Tand.

ZONITES FULVUS, Drapr.

Helix chersina, SAY, Jour. Acad. Nat. Sci. Phila., ii, 1821, 156.—SAY, Conch., Binney's ed. 18, 81.—BINNEY, Bost. Jour. Nat. Hist., iii, 1840, 416, pl. xxvi, f. 3.—*Id.*, Terr., Moll., ii, 243, pl. xvii, f. 4.—GOULD, Invert., 1841, 185, f. 105.—ADAMS, Ver., Moll., 1842, 162.—*Id.*, Silliman's Jour. (i), xl, 273.—DEKAY, N. Y. Moll., 1843, 44, pl. xxxv, f. 338.—W. G. BINNEY, Terr. Moll., iv, 119.—MORSE, Am. Nat., i, 1867, 544, f. 38.

Helix egena, SAY, Jour. Acad. Nat. Sci. Phila., v, 1825, 120.—SAY, Conch., Binney's ed., 30.—DEKAY, N. Y. Moll., 1843, 45.—CHEMNITZ, ed. 2, i, 1846, 237, pl. xxx, figs. 19-21 (?).—REEVE, Con. Icon., No. 1263, 1854.—PFEIFFER, Mon. Hel. Viv., i, 31 (not of Gould in Terr. Moll.).

Helix fulva, DRAPARNAUD, teste MIGHELS (Bost. Jour. Nat. Hist., iv, 333), CHEMNITZ, PFEIFFER (Mon. Hel., i, 30), REEVE, FORBES, & HANLEY.

Conulus chersinus, MORSE, Jour. Port. Soc., i, 1864, 19, figs. 44, 46, pl. ii, f. 4; pl. vii, f. 45.

Conulus chersina, TRYON, Am. Jour. Conch., ii, 1866, 256, pl. iv, f. 37.

Widely distributed throughout North America, and in the circumpolar regions of Asia and Europe. Found by the expedition in following locality:—

No.	Locality.	Date.	Collector.
C 1	South Park, Colo	July, 1873	J. Wolf.
G	Twin Lakes, Colo	Aug. 4, 1873	Do.
182, 1	..... do	Aug., 1873	Do.
J 1	South Park, Colo	Aug., 1873	Do.

FAM. SUCCINIDAE.

Genus SUCCINEA.

Subgenus Succinea, Drapr.

SUCCINEA AVARA, Say.

- Succinea avara*, SAY, Long's Exped. Rocky Mts., ii, 1822, 260, pl. xv, f. 6.—SAY, Conch., Binney's ed., 32, pl. lxxiv, f. 6.—GOULD, Invert., 1841, 196, f. 127.—ADAMS, Verm. Moll., 1842, 156.—DEKAY, N. Y. Moll., 1843, 54, pl. iv, f. 55.—PFEIFFER, Symbol., ii, 56.—*Id.*, Mon. Hel. Viv., ii, 525.—*Id.*, Chemnitz, ed., 1854, ii, 51, pl. v, figs. 18–20.—BINNEY, Terr. Mol., iv, 35.—MORSE, Jour. Port. Soc., i, 1864, 29, f. 75, pl. iv, f. 76.—*Id.*, Am. Nat., i, 1868, 607, f. 47.—TRYON, Am. Jour. Conch., ii, 1866, 233, pl. ii, figs. 11, 12.—BINNEY & BLAND, Land & Fresh Water Shells N. A., pt. i, 1869, 262.—BINNEY, Bul. Mus. Comp. Zoöl., iii, No. 9, 195.—ROBERTS, U. S. Geol. Surv. Terr., 1870, 468.
- Succinea wardiana*, LEA, Proc. Am. Phil. Soc. Phila., ii, 1841, 31.—*Id.*, Trans., ix, 3.—*Id.*, Obs., iv, 1844, 3.—PFEIFFER, Mon. Hel. Viv., ii, 525.
- * *Succinea vermeta*, SAY, teste GOULD (see doubtful species, p. 271).—TRYON, Am. Jour. Conch., ii, 1866, 233, pl. ii, f. 10.

Inhabiting the whole Eastern Province. First discovered by Long's expedition to the Rocky Mountains.

No.	Locality.	Date.	Collector.
6	South Park, Colo	July, 1873	J. Wolf.
J 5	..... do	Aug., 1873	Do.
182 A	Twin Lakes, Colo .....	..... do	Do.
F	..... do .....	..... do	Do.
G 1	..... do .....	..... do	Dr. J. T. Rothrock.
181	..... do .....	..... do	Do.
20 H	Fairplay, Colo .....	..... do	Do.
R	..... do	Oct., 1873	Do.
P	Loma, Colo .....	..... do	Do.

The sets numbered respectively 182 A and 181 were found in clear, running, cold mountain streams, and were probably driven into them by storms or by a sudden rise of the waters; that marked R at an altitude of 10,000 feet.

*Dr. Lewis considers the large form referred by Binney and Bland to *Succinea avara* var. *major* to be a good species. The name *vermeta* seems to be discredited in its application to that form. If Messrs. Binney and Bland are correct in refusing to apply the name *vermeta* to the form in question, it remains for some future writer to give the species a proper place.

SUCCINEA LINEATA Binney.

Succinea lineata, W. G. BINNEY, Proc. Acad. Nat. Sci. Phila., 1857, 19.—BINNEY, Proc. Bost. Soc. Nat. Hist., vi, 1857, 155.—*Id.*, Terr. Moll., iv, 38, pl. lxxx, f. 5.—TRYON, Am. Jour. Conch., ii, 1866, 235, pl. ii, f. 16.—BINNEY & BLAND, Land & Fresh Water Shells N. A., pt. i, 1869, 262.—BINNEY, Bul. Mus. Comp. Zoöl., iii, No. 9, 195.—ROBERTS, U. S. Geol. Surv. Terr., 1870, 468.

This species is extensively distributed throughout the "Interior Region" of W. G. Binney, having entered it probably from the Northern. First chronicled from Nebraska.

No.	Locality.	Date.	Collector.
49 A B	Eastern Utah.....	July, 1872	Dr. H. C. Yarrow.

SUCCINEA STRETCHIANA, Bland.

Succinea stretchiana, BLAND, Ann. N. Y. Lyc., viii, 1865, 168, f. 16.—TRYON, Am. Jour. Conch., ii, 1866, 231, pl. ii, f. 5.

Described from a specimen found in Washoe County, Nevada.

Found in Colorado and New Mexico by the expedition. The specimens from Colorado are extremely large for this species; but Dr. James Lewis informs me they are identical with the type, although some are nearly twice the size of it.

No.	Locality.	Date.	Collector.
271 A	Pagosa, Colo	Sept. 18, 1874	Dr. H. C. Yarrow.
246 A	Tierra Amarilla, N. Mex .....	..... do	Do.
234 I	..... do .....	..... do	W. G. Shedd.

SUBORDER BASOMMATOPHORA.

SUPERFAMILY LIMNOPHILA.

FAMILY PHYSIDAE.

Genus PHYSA, Drap.

PHYSA GYRINA, Say.

Physa gyrina, SAY, Jour. Acad. Nat. Sci. Phila., ii, 1821, 171.—SAY, Conch., Binney's ed., 67.—HALD., Mon., 1843, 32, pl. iii, figs. 1-6.—(?)DEKAY, N. Y. Moll., 1843, 79, pl. v, f. 87.—CHEMNITZ, ed. 2, 20, pl. v, figs. 7-10.—ADAMS, Verm. Moll., 1842, 154.—BINNEY, Land & Fresh Water Shells N. A., pt. ii, 1865, 77.

- Physa elliptica*, LEA, Trans. Am. Phil. Soc. Phila., v, 1837, 115, pl.—*Id.*, Obs., i, 227.—
 DEKAY, N. Y. Moll., 1843, 77 (excl. syn. *cylindrica*, err. typ.).—CHEMNITZ,
 ed. 2, 22, pl. iii, figs. 20, 22.
Physa hildrethiana, LEA, Proc. Am. Phil. Soc. Phila., ii, 1841, 32.—*Id.*, Trans., ix,
 1844, 7.—*Id.*, Obs., iv, 7.

Widely distributed throughout the United States.

Collected as follows:—

No.	Locality.	Date.	Collector.
20	Rio Grande, Colo	Sept., 1873	J. Wolf.

PHYSA ELLIPTICA, Lea.

- Physa elliptica*, LEA, Trans. Am. Phil. Soc. Phila., v, 1837, 115.
Physa oleacea, TRYON, Am. Jour. Conch., ii, 6.

This species is widely distributed; the extreme points, as far as known, being Vermont, San Francisco, Michigan, Georgia, Louisiana, and Utah, and it is also believed to exist in Eastern Nevada and Northern Arizona. Some of the specimens secured were from the Virgin River in Southern Utah, not more than seven or eight miles from the Arizona border, which would seem to indicate an extreme southern limit, beyond our present knowledge.

NOTE.—Dr. Lewis informs me that he has specimens referable to this species, but does not confound them with the less solid and more slender *elliptica*.

No.	Locality.	Date.	Collector.
(?)	Provo, Utah	July, 1872	Dr. H. C. Yarrow and H. W. Henshaw.
(?)	Beaver, Utah	Sept., 1872	Do.
(?)	Rush Lake, Utah .....	.... do	H. W. Henshaw.
(?)	Virgin River, Utah	Oct., 1872	Dr. H. C. Yarrow and H. W. Henshaw.

*It may be said, in regard to this species, that Mr. Lea upholds it tenaciously; and it is but fair to state, if it is not distinct from *Physa gyrina*, it is a very strongly marked variety.

PHYSA HETEROSTROPHA, Say.

- Limnæa heterostrophæ*, SAY., Am. ed. Nich. Encycl., 1817-19, pl. 1, f. 6.—SAY, Conch., Binney's ed., 46, pl. lxi, f. 6.
- Physa heterostrophæ*, SAY, Jour. Acad. Nat. Sci. Phila., ii, 1821, 172.—SAY, Conch., Binney's ed., 68.—HALD., Mon., 1843, 23, pl. ii, figs. 1-9.—GOULD, Invert. Mass., 1841, 211, f. 141.—ADAMS, Verm. Moll., 1842, 154.—DESHAYES, in Lamarck, An. sans Ver., viii, 402; ed. 2, iii, 412.—DEKAY, N. Y. Moll., 1843, 76, pl. v, f. 82.—CHEMNITZ, ed. 2, 7, pl. 1, figs. 7, 8.—MRS. GRAY, Fig. Moll. An., pl. cccx, f. 9.—POTIEZ & MICHAUD, Gal. des Moll., i, 224, pl. xiii, figs. 15, 16.—ANON., Can. Nat., ii, 1857, 209, f. —.—BINNEY, Land & Fresh Water Shells N. A., pt. ii, 1865, 84.—ROBERTS, U. S. Geol. Surv. Terr., 1870, 468.
- Physa fontana*, HALD., Mon., pt. ii, 1841, p. 3 of cover.
- Physa cylindrica*, NEWCOMB, in DeKay, N. Y. Moll., 1843, 77, pl. v, f. 82.
- Physa aurea*, LEA, Trans. Am. Phil. Soc. Phila., vi, 1839, 18, pl. xxiii, f. 106.—*Id.*, Obs., ii, 1839, 18.—DEKAY, N. Y. Moll., 1843, 80, pl. v, f. 89.
- Physa plicata*, DEKAY, N. Y. Moll., 1843, 78, pl. v, f. 85.
- Physa osculans*, HALD., Mon. Part., figs. 11, 12.
- Physa striata*, MENKE, Syn. Méth., ed. 2, 1830, 132, teste HALDEMAN.
- Physa subarata*, MENKE, loc. cit., teste HALDEMAN.
- Physa charpentieri*, KÜSTER, in Chemnitz, ed. 2, 23, pl. 14, figs. 4-6.
- Physa philippi*, KÜSTER, loc. cit., 19, pl. iii, figs. 3-6.
- Physa inflata*, LEA, Proc. Am. Phil. Soc. Phila., ii, 32.—*Id.*, Trans., ix, 7.—*Id.*, Obs., iv, 7.
- Helix heterostrophus*, EATON, Zoöl. Text-Book, 1866, 195.
- Bulla crassula*, DILLWYN, Conch., tab. 1, 487, No. 36 (=fontinalis).—CHEMNITZ, Conch., ix, 33, pl. ciii, figs. 879, 880, var. 3.—GMEL., Syst. Nat., 3407.—SCHROTER, Einl. I., 261, *Helix*, No. 84.
- Cochlea neritoides*, LISTER, Conch., pl. cxxxv, f. 34.

This species is represented in the collection by a few individuals brought from the shores of Lake Sevier, forty miles from Fillmore, Utah, by Mr. G. K. Gilbert, geologist of the survey. No living shells were found, and the probabilities are that the shells collected were washed from the Sevier River, which is fresh water, into the briny waters of the lake, and there perished. It is rather curious that a shell so common, and with such a wide range of distribution, should have been met with in but one locality in Utah.

No.	Locality.	Date.	Collector.
(?)	Sevier Lake, Utah	Aug., 1872	G. K. Gilbert.
362 B	Pueblo, Colo	Oct., 1874	C. E. Aiken.

PHYSA ALTONENSIS, Lea.

Physa altonensis, LEA, Proc. Acad. Nat. Sci. Phila., 1864, 114.

Type found at Alton, Ill.

Found by the collectors of the expedition as follows:—

No.	Locality.	Date.	Collector.
500 O	Pescado, N. Mex	July, 1873	H. W. Henshaw.
500 B	..... do .....	..... do	Do.
575 B	White Mountains, Ariz	Aug., 1873	Do.
A 16	Near Camp Apache, Ariz .....	..... do	G. M. Keasbey.
1176	..... do	July, 1874	Jas. M. Rutter.

The two last numbers represent a variety differing in some essential points from the type.

PHYSA ANCILLARIA, Say.

Physa ancillaria, SAY, Jour. Acad. Nat. Sci. Phila., v, 1825, 124.—SAY, Conch., Binney' ed., 114.—BINNEY & BLAND, Land & Fresh Water Shells N. A., ii, 1869, 81, f. 139.—HALD., Mon., 1843, 27, pl. iii, figs. 1–10.—GOULD, Invert., 1841, 213, f. 142.—ADAMS, Verm. Moll., 1842, 154.—DEKAY, N. Y. Moll., 1843, 78 pl. v, 90.—CHEMNITZ, 2d ed., 20, pl. xii, figs. 12, 13.—CHENU., Man. de Conch., ii, 480, f. 3550.—ANON., Can. Nat., ii, 1857, 211, fig.

Physa obesa, DEKAY, N. Y. Moll., 1843, 78, pl. v, f. 86.

Is distributed from New England to Louisiana southward and to New Mexico westward. Taken as follows:—

No.	Locality.	Date.	Collector.
1337	San Ildefonso, N. Mex	Aug., 1874	Dr. H. C. Yarrow.
Y 18	..... do .....	..... do	Do.
166 G	..... do .....	..... do	Do.

The last enumerated is a variety.

PHYSA LORDI, Bd.

Physa lordi, BD., Proc. Zool. Soc. London, 1863, 68.—W. G. BINNEY, Land & Fresh Water Shells N. A., 1865, 76.

Is a characteristic shell of the higher grounds of the Rocky Mountains, according to Baird. The specimen secured differs slightly from the type, and is considered a variety by Dr. Lewis.

It is thought by Mr. Wheatley that *sayii*, *ampullacea*, *lordi*, and *parkerii* are one species; if this be so, the synonymy will have to be headed by *P. sayii*, to which Dr. Lewis assents.

Secured as follows:—

No.	Locality.	Date.	Collector.
H L 1	Gila River, N. Mex	—, 1873	Dr. O. Loew.

PHYSA HAWNII, Lea.

Physa hawnii, LEA, Proc. Acad. Nat. Sci. Phila., ii, 1864, 8, 115.

HAB.—Verdigris River, Kansas (F. Hawn).

Found at the following locality:—

No.	Locality.	Date.	Collector.
70 A	White Mountains, Ariz.	Aug., 1873	G. K. Gilbert.

PHYSA TRASKII, Lea.

Physa traskii, LEA, Proc. Acad. Nat. Sci. Phila., 1864, ii, 8, 115.

HAB.—Rio Los Angeles, Cal.

Taken at the following locality:—

No.	Locality.	Date.	Collector.
R 4	Santa Fé, N. Mex.	July, 1873	Dr. O. Loew.

? PHYSA D'ORBIGNIANA, Lea.

No.	Locality.	Date.	Collector.
500 R	Arizona	—, 1873	H. W. Henshaw.
L 44 A	Abiquiu, N. Mex	Sept., 1874	Dr. O. Loew.

The latter number represents a very small variety, which is placed provisionally under this head. Further investigations may prove it to be a new species.

PHYSA WARRENIANA, Lea.

Physa warreniana, LEA, Proc. Acad. Nat. Sci. Phila., 1864, ii, 8, 115.

HAB.—Loup Fork of the Platte River; Milwaukee, Wis.; Grand Rapids, Mich. Taken only at the following locality :—

No.	Locality.	Date.	Collector.
L 18	Abiquiu, N. Mex.	Sept., 1874	Dr. O. Loew.

PHYSA SMITHSONIANA, Lea.

Physa smithsoniana, LEA, Proc. Acad. Nat. Sci. Phila., 1864, ii, 8, 115.

HAB.—Loup Fork of the Platte River.

Secured by the expedition as follows :—

No.	Locality.	Date.	Collector.
L 42	Southwestern New Mexico	Sept., 1874	Dr. O. Loew.

FAM. LIMNAEIDAE.

Genus LIMNAEA, Lam.

LIMNAEA STAGNALIS, Linn.

Limnæa jugularis, SAY, Mich. Encycl., 1817–19.—SAY, Conch., Binney's ed., 46.—HALD., Mon., 1841, 16, pl. iv.—DEKAY, N. Y. Moll., 1843, 74, pl. v, f. 41.—KÜSTER, Chemnitz ed., 2, 3, pl. i. f. 7.

Limnæa appressa, SAY, Jour. Acad. Nat. Sci. Phila., ii, 1818, 168; Binney's ed., 66.—HALD., Mon., 1842, 18, pl. v.—ADAMS, Verm. Moll., 1842, 115, (Pamph. 3).—DEKAY, N. Y. Moll., 1843, 74.—KÜSTER, Chemnitz ed. 2, 4, pl. i, figs. 8, 9.

Limnæa stagnalis, LINN., Syst. Nat., &c., Sheppard, 1829.—*Id.*, Tr. Lit. Hist. Soc. Quebec, i, 196.—KIETLAND, Am. Jour. Sci. & Arts (1), xxxi, 35, f. 10.—*Id.*, Ohio Rep., 200.—ANON., Can. Nat., ii, 1857, 196, figs. 1, 2.—BINNEY, Land & Fresh Water Shells N. A., pt. ii, 1865, 25.

Limnæa speciosa, ZIEGLER OF ROSSMASSLER, Icon., pt. ii, 1835, 96, f. 50.

Widely distributed from Vermont to Northwestern States; to Pacific Ocean (Lea); Oregon; Southern Utah; numerous in British America, and probably in Alaska.

Taken by the expedition in the following localities:—

No.	Locality.	Date.	Collector.
(?)	Utah Lake, Utah	July, 1872	H. W. Henshaw and Dr. H. C. Yarrow.
(?)	Ditches near Salt Lake City, Utah .....	.... do	Dr. H. C. Yarrow.
(?)	Panquitch Lake, Utah	Oct., 1872	Do.
21	Loma, Colo	Sept., 1873	J. Wolf.
B	Rio Grande, Colo.	Oct., 1873	Do.
B 1	Del Norte, Colo .....	.... do	Do.

LIMNAEA REFLEXA, Say.

- Limneus reflexus*, SAY, Jour. Acad. Nat. Sci. Phila., ii, 1821, 167.—*Id.*, Am. Conch., iv, 1832, pl. xxi, f. 2.—*Id.*, Binney's ed., 65, 188, pl. xxxi, f. 2.—*Id.*, Chemnitz's ed., 44, pl. vii, f. 4.—KÜSTER, in Chemnitz, ed. 2, 41, pl. vii, figs. 11, 12.
- Limnæa reflexa*, HALD., Mon., 1842, 26, pl. viii.—DEKAY, N. Y. Moll., 1843, 71, pl. iv, figs. 65–72.—BINNEY, Land & Fresh Water Shells N. A., pt. ii, 1865, 39.—ROBERTS, U. S. Geol. Surv. Terr., 1870, 468.
- Limneus elongatus*, SAY, Jour. Acad. Nat. Sci. Phila., ii, 1821, 167.—*Id.*, Long's Exped. Rocky Mts., ii, 1823, 263.—SAY, Conch., Binney's ed., 65, 130; Chemnitz ed., 43, pl. vii, f. 5.
- Limneus umbrosus*, SAY, Am. Conch., iv, 1832, pl. xxxi, f. 2.—*Id.*, Binney's ed., 187, pl. xxxi, f. 2.—HALD., Mon., 1842, 24, pl. vii.—DEKAY, N. Y. Moll., 1843, 68, pl. iv, f. 76.—KÜSTER, in Chemnitz, ed. 2, 41, pl. vii, figs. 13–16.
- Limnæa exilis*, LEA, Trans. Am. Phil. Soc. Phila., v, 1837, 114, pl. xix, f. 82.—*Id.*, Obs., i, 226.—KÜSTER (*Limnæus*), in Chemnitz, ed. 2, 40, pl. vii, f. 9.
- Limnæus palustris* var. *distortus*, ROSSMASSLER, Icon., i, 1835, 97, pl. ii, f. 52.
- Limnophysa reflexa*, CHEMNITZ, Man. de Conch., ii, 480, f. 3544.

Observed from northern tier of States, from New York to the Pacific, and in Canada. It extends more to the southward in the western portions of its area, having been found in Kansas, Utah, and Colorado, and in the Columbia and Sacramento Rivers (Binney).

Secured by the expedition at the following locality:—

No.	Locality.	Date.	Collector.
O	Loma, Colo	Oct., 1873	Dr. J. T. Rothrock.

LIMNAEA PALUSTRIS, Müller.

- Helix palustris*, MÜLLER, Syn. Nov. Gen., 1834, p. —.—RACKETT, Trans. Linn. Soc., xiii, 1822, 42.

- **Limnæus elodes*, SAY, Jour. Acad. Nat. Sci. Phila., ii, 1821, 169.—*Id.*, Am. Conch., iv, 1832, pl. xxxi, f. 3.—*Id.*, Binney's ed., 66, 188, pl. xxxi, f. 3.—*Id.*, Chemnitz's ed., 44, pl. viii, f. 3.—KÜSTER, in Chemnitz, ed. 2, 42, pl. vii, figs. 17–21.
- Limnæa elodes*, GOULD, Invert. Mass., 1841, 221, figs. 146, 147.—ADAMS, Verm. Moll., in Thom's Hist., 1842, 153.—ANON., Can. Nat., ii, 1857, 199.
- Limnæa fragilis* (not of Linnæus), HALD., Mon., 1842, 20, pls. vi–xv, f. 1; 53, pl. xiv, f. 1.—DEKAY, N. Y. Moll., 1843, 68, pl. iv, f. 68.
- Limnæa palustris*, MÜLLER (*Buccinum*), &c.—SHEPPARD, Trans. Lit. Hist. Soc. Quebec, i, 1829, 196.—BINNEY, Land & Fresh Water Shells N. A., pt. ii, 1865, 45.—ROBERTS, U. S. Geol. Surv. Terr., 1870, 468.
- Limnæa nuttalliana*, LEA, Proc. Acad. Nat. Sci. Phila., ii, 1841, 33.—*Id.*, Trans. Am. Phil. Soc. Phila., ix, 1844, 9.—*Id.*, Obs., ii, 9.—KÜSTER (*Limnæus*), in Chemnitz, ed. 2, 38, pl. vii, f. 5.
- Limnæa plebeia*, GOULD (?).
- Limnæa expansa*, HALD., Mon., 1842, 29, pl. ix, figs. 6–8.—*Id.*, Suppl. to pt. i, 1840, 3.—DEKAY, N. Y. Moll., 1843, 75, pl. xxxvi, f. 348.—KÜSTER (*Limnæus*), in Chemnitz, ed. 2, 39, pl. vii, figs. 6, 7.

Ranging from New England through Pennsylvania and Kansas to California and Oregon. Very numerous in British America (Binney). No living specimens found in Utah; very abundant on the mud flats of the Sevier, and at Panquitch Lake, with *Planorbis trivolvis*.

Found in following localities :—

No.	Locality.	Date.	Collector.
(?)	Mud flats, near Sink of Sevier River, Utah...	Sept., 1872	Dr. H. C. Yarrow.
(?)	Shores of Sevier Lake, Utah.....	.... do	G. K. Gilbert.
(?)	Panquitch Lake, Utah	Oct., 1872	Dr. H. C. Yarrow.
(?)	Southern Utah.....	.... do	Dr. H. C. Yarrow and H. W. Henshaw.
2	Georgetown, Colo.	June, 1873	Dr. J. T. Rothrock.
2 A	.... do .....	.... do	Do.
4	South Park, Colo	July 1873	J. Wolf.
A	Twin Lakes, Colo.....	Aug., 1873	Do.
17 A	.... do .....	.... do	Do.
N 1	Saguache, Colo	Sept., 1873	Do.
22	Loma, Colo .....	.... do	Do.

* Probably future researches will replace *elodes*.

† Dr. Lewis states that "excellent reasons exist why *Limnæus elodes* should be retained. In all probability, our shell is distinct. I am sure that *catascopium* gives birth to *elodes* by proper change of station. The European *pereger* is by no means identical with *catascopium*, though it may be presumed to stand in the same relation to the European *palustris* that *catascopium* does to the American *elodes*."

LIMNÆA DESIDIOSA, Say.

- Limnæa desidiosa*, SAY, Jour. Acad. Nat. Sci. Phila., ii, 1821, 169.—*Id.*, Long's Exped. Rocky Mts., ii, 1823, 263.—*Id.*, Am. Conch., vi, pl. i, f. 5.—*Id.*, Binney's ed., 66, pl. iv, f. 3.—ADAMS, Verm. Moll., 1842, 154.—DEKAY, N. Y. Moll., 1843, 73, pl. v, f. 78.—KÜSTER, Chemnitz, ed. 2, 47, pl. viii, figs. 22-26 (*Limnæus*).—GOULD, Invert. Mass., 1841, 219, f. 150.—HALD., Mon., 1842, 31, pl. x; 48, pl. xiii, figs. 16-18.—ANON., Can. Nat., ii, 1857, 198, f. —.—BINNEY, Land & Fresh Water Shells N. A., pt. ii, 1865, 48.—ROBERTS, U. S. Geol. Surv. Terr., 1870, 468.
- Limnæa acuta*, LEA, Trans. Am. Phil. Soc. Phila., v, 1837, 114, pl. xix, f. 81.—*Id.*, Obs., i, 226.
- Limnæa obrussa*, SAY, Jour. Acad. Nat. Sci. Phila., sec. v, 1825, 123.—SAY, Conch., Binney's ed., 113.—DEKAY, N. Y. Moll., 1843, 75.
- Limnæa philadelphica*, LEA, Proc. Am. Phil. Soc. Phila., ii, 1841, 32.—*Id.*, Trans., ix, 1844, 8.—*Id.*, Obs., iv, 8.
- Limnæa fusiformis*, LEA, Proc. Am. Phil. Soc. Phila., ii, 1841, 33.—*Id.*, Trans., ix, 1844, 10.—*Id.*, Obs., iv, 10.

According to Mr. Binney, the western range of this species is Kansas, extending from New England; but Professor Hayden found it during his Yellowstone expedition. It was found, also, to be very abundant in the locality below indicated, and was not seen elsewhere. Occurs in some of the mountain passes westward.

No.	Locality.	Date.	Collector.
(?)	Shores of Lake Sevier, Utah	Sept., 1872	G. K. Gilbert.

LIMNÆA CAPERATA, Say.

- Limnæus caperatus*, SAY, New Harm. Diss., ii, 1829, 230; descr., 23.—SAY, Conch., Binney's ed., 148.—KÜSTER, in Chemnitz, ed. 2, 47, pl. viii, figs. 27-30.
- Limnæa caperata*, HALD., Mon., 1842, pl. xi, figs. 1-9.—ADAMS, Ver. Moll., 1842, 154.—DEKAY, N. Y. Moll., 1843, 69, pl. iv, figs. 66-69; pl. v, f. 79.—MRS. GRAY, Fig. Moll. An., pl. cccx, f. 8.—BINNEY, Land & Fresh Water Shells N. A., pt. ii, 1865, 56.
- Limnæa umbilicata*, ADAMS, Am. Jour. Sci. & Arts [1], xxxix, 1840, 374.—*Id.*, Bost, Jour. Nat. Hist., iii, 1840, 325, pl. iii, f. 14.—GOULD, Invert. Mass., 1841, 218, f. 149.

This species is found in the British possessions as far north as Hudson's Bay, and through the northern tier of States from New England to Lake Superior (Binney) and westward.

Secured as follows :—

No.	Locality.	Date.	Collector.
7	Trout Creek, Colo.	July, 1873	J. Wolf.

LIMNAEA HUMILIS, Say.

- Limnæa humilis*, SAY, Jour. Acad. Nat. Sci. Phila., ii, 1822, 378.—SAY, Conch., Binney's ed., 110.—HALD., Mon., 1842, 41, pl. xiii, figs. 1-8.—DEKAY, N. Y. Moll., 1843, 71, pl. iv, f. 71.—BINNEY, Land & Fresh Water Shells N. A., pt. ii, 1865, 63.—ROBERTS, U. S. Geol. Surv. Terr., 1870, 468.
- Limnæus modicellus*, SAY, Jour. Acad. Nat. Sci. Phila., v, 1825, 122.—SAY, Conch., Binney's ed., 113.—GOULD, Invert. Mass., 1841, 218, f. 151.
- Limnæa linsleyi*, DEKAY, N. Y. Moll., 1843, 72, pl. iv, f. 74.—LINSLEY, Shells Conn., Am. Jour. Sci. & Arts (1), xlviii, 1845, 282.
- Limnæa parva*, LEA, Proc. Am. Phil. Soc. Phila., ii, 1841, 33.—*Id.*, Trans., ix, 1844, 11.—*Id.*, Obs., iv, p. ii.
- Limnæa plica*, LEA, Proc. Am. Phil. Soc. Phila., ii, 1841, 33.—*Id.*, Trans., ix, 10.—*Id.*, Obs., ix, 1844, 10.
- Limnæa griffithiana*, LEA, Proc. Am. Phil. Soc. Phila., ii, 1841, 33; ix, 1844, 8.—*Id.*, Obs., iv, 8.
- Limnæa planulata*, LEA, Proc. Am. Phil. Soc. Phila., ii, 1841, 33; ix, 1844, 9.—*Id.*, Obs., iv, 9.
- Limnæa rustica*, LEA, Proc. Am. Phil. Soc. Phila., ii, 1841, 33; ix, 1844, 10.—*Id.*, Obs., iv, 10.
- Limnæa exigna*, LEA, Proc. Am. Phil. Soc. Phila., ii, 1841, 33; ix, 1844, 9.—*Id.*, Obs., ix, 10.
- Limnæa curta*, LEA, Proc. Am. Phil. Soc. Phila., ii, 1841, 33; ix, 1844, 11.—*Id.*, Obs., iv, 2.

Ranges from Maine to Georgia and from Kansas and Colorado to Lake Superior.

Specimens collected as follows :—

No.	Locality.	Date.	Collector.
1	Denver, Colo.	—, 1873	J. Wolf.
8	South Park, Colo.	July 15, 1873	Do.

Genus CARINIFEX, W. G. Binney.

CARINIFEX NEWBERRYI, Lea.

- Planorbis newberryi*, LEA, Proc. Acad. Nat. Sci. Phila., 1858, 41.
- Carinifex newberryi*, BINNEY, Land & Fresh Water Shells N. A., pt. ii, 1865, 74.

Heretofore this species, according to Binney, has been discovered in

Oregon and California only. My friend Mr. G. W. Tryon considers the presence of it in Utah as a valuable fact—indicating a much greater distribution than was formerly known.

No.	Locality.	Date.	Collector.
(?)	Shores of Lake Sevier, Utah	Sept., 1872	G. K. Gilbert.

FAM. PLANORBIDAE.

Genus PLANORBIS, Guettard.

Subgenus Helisoma, Swainson.

PLANORBIS TRIVOLVIS, Say.

- Planorbis trivolvis*, SAY, Nich. Encycl., 1817-19, pl. ii, f. 2.—*Id.*, Am. Conch., pt. vi, 1834, pl. liv, f. 2.—*Id.*, Binney's ed., 44, pl. lxx, f. 2; pl. liv, f. 2.—DEKAY, N. Y. Moll., 1843, pl. iv, f. 59 *a, b*.—GOULD, Invert. Mass., 1841, 201, f. 131.—HALD., Mon., 1844, 13, pl. ii, figs. 4-7.—ADAMS, Verm. Moll., 1842, 154.—KÜSTER, Chemnitz, ed. 2, 53, pl. v, figs. 4-6; pl. vi, figs. 1-6, 20-25.—POTIEZ & MICHAUD, Gal. des Moll., i, 214, pl. xxi, figs. 19-21.—ANON., Can. Nat., ii, 1857, 202, f. —.—BINNEY, Land & Fresh Water Shells N. A., pt. ii, 1865, 116.—ROBERTS, U. S. Geol. Surv. Terr., 1870, 468.
- Bulla fluviatilis*, SAY, Jour. Acad. Nat. Sci. Phila., ii, 178.—SAY, Conch., Binney's ed., 71.
- Planorbis regularis*, LEA, Trans. Am. Phil. Soc. Phila., ix, 6.—*Id.*, *ib.*, Proc., ii, 1841, 32.—*Id.*, *ib.*, Obs., iv, 6.
- Planorbis megastoma*, DEKAY, N. Y. Moll., 1843, 61, pl. iv, figs. 60, 61.
- Physa planorbula*, DEKAY, N. Y. Moll., 1843, 76, pl. v, f. 83.
- Planorbis corpulentus*, DEKAY, N. Y. Moll., 1843, 64, pl. xiii, f. 185.—WHITTEMORE, Am. Jour. Sci. & Arts [1], xxxviii, 193.
- ? *Planorbis proboscideus*, POTIEZ & MICHAUD, Gal. des Moll., i, 1838, 213, pl. xxv, figs. 13-15.
- Planorbis macrostomus*, WHITEAVES, Can. Nat., viii, 1863, 113, f. —.
- Planorbis trivolvis* var. *fallax*, HALD., Mon., 1844, pl. iii, figs. 1-3.
- Planorbis lentus*, GOULD, Invert., 1841, 202, f. 132.
- Helix trivolvis*, EATON, Zool. Text Book, 1826, 194.
- Cochlea trium-orbum*, LISTER, Conch., pl. cxi, f. 46.—PETIVER, Gazophyl., pl. cvi, f. 16.

A very common species, being found everywhere throughout the United States and Canada. In but one locality in Utah was it found living, viz, the ditches near Salt Lake City.

At Panquitch Lake, Southern Utah, immense numbers of these shells

were found in the washed up grass from the bottom ; but, although carefully searched for, no living individuals were secured.

Mr. Tryon informs me our specimens are unusually large, with the margin of the aperture expanded like those from the Saint Lawrence River, described by Mr. Whiteaves as *Planorbis macrostomus*.

Collected by expedition as follows :—

No.	Locality.	Date.	Collector.
(?)	Ditches near Salt Lake City, Utah	July, 1872	Dr. H. C. Yarrow.
(?)	Utah Lake, Utah .....	.... do	Dr. H. C. Yarrow and H. W. Henshaw.
(?)	Mud flats near Sink of Sevier River, Utah ...	Sept., 1872	Dr. H. C. Yarrow.
(?)	Fillmore Lake, Utah	Oct., 1872	Dr. H. C. Yarrow and H. W. Henshaw.
(?)	Panquitch Lake, Utah .....	.... do	Dr. H. C. Yarrow.
K	Saguache, Colo	Sept., 1873	J. Wolf.

Subgenus *Gyraulus*, Agass.

PLANORBIS PARVUS, Say.

Planorbis parvus, SAY, Nich. Encycl. 1817-'19, pl. i, f. 6.—SAY, Conch., Binney's ed., 45, pl. lxi, f. 6.—HALD., Mon., 1844, 27, pl. iv, figs. 19-23.—GOULD, Invert., 1841, 209, f. 139.—ADAMS, Verm. Moll., 1842, 156.—DEKAY, N. Y. Moll., 1843, 63, pl. iv, f. 58.—ANON., Can. Nat., ii, 1857, 208, f. —.—BINNEY, Land & Fresh Water Shells N. A., pt. ii, 1865, 133, figs. 222-224.—ROBERTS, U. S. Geol. Surv. Terr., 1870, 468.

Planorbis concavus, ANTHONY, Shells of Cincinnati (no desc.).

Planorbis elevatus, ANTHONY, Bost. Jour. Nat. Hist., iii, 1840, 327, pl. iii, f. 16.—GOULD, Invert. Mass., 1841, 207.—DEKAY, N. Y. Moll., 1843, 65.

Helix parvus, EATON, Zoöl. Text-Book, 1826, 115.

Abundant throughout the United States.

Collected as follows :—

No.	Locality.	Date.	Collector.
3	South Park, Colo	July, 1873	J. Wolf.
I	.... do .....	.... do	Do.

FAM. VALVATIDÆ.

Genus VALVATA, O. F. Müller.

VALVATA SINCERA, Say.

Valvata sincera, SAY, Long's Exped. Rocky Mts., 1823, 264, pl. xv, f. 11.—SAY, Conch., Binney's ed., 130, pl. lxxiv, f. 11.—HALD., Mon., 6, pl. i, figs. 5-10.—ADAMS, Verm. Moll., 152.—*Id.*, Am. Jour. Sci. & Arts (1), xl, 267.—DEKAY, N. Y. Moll., 119, pl. vi, figs. 127, 128.—BINNEY, Land & Fresh Water Shells N. Y., pt. iii, 1865, 12.

Valvata depressa, pars KÜSTER, in Chemnitz, ed. 2, 1852, 88.—MENKE, Zeit. für Mal., ii, 1845, 122 (including *tricarinata* and *simplex*).

Valvata striata, LEWIS, Proc. Acad. Nat. Sci. Phila., 1856, 260.

Found in same locality as some individuals of the genus *Tryonia*, and is apparently rare in Utah, although found in the northwest rather abundantly.

No.	Locality.	Date.	Collector.
(?)	Near Salt Lake City, Utah	July, 1872	Dr. H. C. Yarrow.

Mr. Tryon has furnished the following three names of species occurring in our collections; but, as there is some doubt on this point, we have preferred to mark them doubtful:—

FAM. VIVIPARIDÆ.

Genus CAMPELOMA, Raf.

?CAMPELOMA INTEGRÆ, Say.

Detroit River; Madeline Island; Lake Superior.

FAM. RISSOIDÆ.

Genus TRYONIA, Stimpson.

?TRYONIA EXIGUA, Conrad.

With regard to this species, Mr. Tryon writes me that a representative of the genus *Tryonia* was found in the same locality as *Carinifex newberryi*, viz, shores of Sevier Lake, Middle Utah. Mr. Tryon informs me this is probably *T. exigua*, Stimp., or else a new species. Unfortunately, not enough specimens were secured to establish the latter. He considers this discovery a valuable one.

FAM. CERIPHASIIDÆ.

Genus CERIPHASIA, Swains.

? CERIPHASIA LIVESCENS, Menke.

A numerous species in the Northwestern States, originally described from Lake Erie, New York, by Menke.

? CERIPHASIA SUBULARE, Lea.

From rivers and creeks of Northwestern States ; Detroit River.

CLASS CONCHIFERA.

ORDER DIMYARIA.

SUPERFAMILY CORBICULACEA.

FAMILY CYRENIDÆ.

Genus SPHAERIUM, Scopoli.

SPHÆRIUM PARTUMEIUM *varietas*, Say.

Cyclas partumeia, SAY, Jour. Acad. Nat. Sci. Phila., ii, 1822, 380.

Cyclas cornea, var. 2, LAMARCK, An. sans Vert., v, 1818, 558.

Cyclas orbicularia, BARRATT, Am. Jour., xlviii, 1845, 276.

Cyclas mirabilis, PRIME, Proc. Bost. Soc. Nat. Hist., iv, 1851, 157.

Cyclas cœrulea, PRIME, *loc. sub cit.*, iv, 1851, 161.

Cyclas eburnea, ANTHONY, *loc. sub cit.*, iv, 1852, 279.

Sphærium partumeium, PRIME, Mon. Am. Corbiculadæ, Smithson, Miscel. Pub., No. 145, 1865, 45.

The specimens collected by the expedition were submitted to Mr. Temple Prime, of New York, who has kindly furnished the following notes:—

“ This is a very interesting variety, forming, as it were, the connecting link between *S. partumeium*, of the east, and *S. lenticula*, Gould, of the west coast. It offers many points of resemblance with *partumeium* var. *jayanum*, from the East; it is, however, more transverse than this variety.

“ TEMPLE PRIME.

“ MAY, 1875.”

NOTE.—Since the above was written, the specimens have been re-examined by Dr. Lewis, who states his belief that the species above indicated is *S. truncatum* Linsby.

Collected as follows:—

No.	Locality.	Date.	Collector.
19	Saguache, Colo	Sept., 1873	J. Wolf.
23	Rio Grande, Colo .....	.... do	Do.

FAM. PISIDIIDAE.

Genus PISIDIUM, Pfeiffer.

PISIDIUM ABDITUM, Hald.

- Pisidium abditum*, HALD., Proc. Acad. Nat. Sci. Phila., i, 1841, 53.—PRIME, Mon. Am. Corb., 1865, 68.—ROBERTS, U. S. Geol. Surv. Terr., 1870, 469.
- Cyclas minor*, C. B. ADAMS, Proc. Bost. Soc. Nat. Hist., i, 1841, 48.
- Pisidium tenellum*, GOULD, Agassiz's Lake Sup., 1848, 245.
- Pisidium obscurum*, PRIME, Proc. Bost. Soc. Nat. Hist., iv, 1851, 161.
- Pisidium rubellum*, PRIME, *loc. sub cit.*, iv, 1851, 163.
- Pisidium minus*, STIMPSON, Moll. New England, 1851, 16.
- Pisidium kurtzi*, PRIME, Proc. Bost. Soc. Nat. Hist., iv, 1851, 162.
- Pisidium zonatum*, PRIME, *loc. sub cit.*, iv, 1851, 162.
- Pisidium regulare*, PRIME, Bost. Jour. vi, 1852, 363, pl. xii, figs. 11, 12.
- Pisidium notatum*, PRIME, *loc. sub cit.*, vi, 1852, 365, pl. xii, figs. 20–22.
- Pisidium arcuatum*, PRIME, *loc. sub cit.*, vi, 1852, 364, pl. xii, figs. 14–16.
- Pisum abditum*, DESHAYES, Brit. Mus. Cat., 1854, 282.
- Pisum minus*, DESHAYES, *loc. sub cit.*, 1854, 281.
- Pisidium resartum*, INGALLS, *in litt.*, 1855.
- Pisidium rubrum*, LEWIS, *in litt.*, 1855.
- Pisidium plenum*, LEWIS, *in litt.*, 1855.
- Musculium abditum*, ADAMS, Rec. Gen., ii, 1858, 451.
- Musculium minus*, ADAMS, *loc. sub cit.*, ii, 1858, 451.
- Musculium rubellum*, ADAMS, *loc. sub cit.*, ii, 1858, 452.
- Musculium obscurum*, ADAMS, *loc. sub cit.*, ii, 1858, 452.
- Musculium kurtzi*, ADAMS, *loc. sub cit.*, ii, 1858, 451.
- Musculium zonatum*, ADAMS, *loc. sub cit.*, ii, 1858, 452.
- Pisum obscurum*, ADAMS, *loc. sub cit.*, ii, 1858, 660.
- Pisum kurtzi*, ADAMS, *loc. sub cit.*, ii, 1858, 660.
- Pisum rubellum*, ADAMS, *loc. sub cit.*, ii, 1858, 660.
- Pisum zonatum*, ADAMS, *loc. sub cit.*, ii, 1858, 660.
- Pisidium retusum*, PRIME, Proc. Zool., xxviii, 1860, 322.

HAB.—North America: in New England; in the States of New York, New Jersey, Pennsylvania, Ohio, Michigan, South Carolina, and California; Wyoming Territory, Utah Territory; in the Lake Superior region; at Montreal in Canada; and in Honduras.

Dr. Prime states, in his "Monograph" *loc. cit.*, that this species is distributed over such a vast area of country, and varies so much according to the different localities in which it is found, that it is hardly surprising that its numerous varieties should have been mistaken for so many species. It was secured in but one locality in Middle Utah, viz, on mountain sides near the Beaver River.

No.	Locality.	Date.	Collector.
M i	Beaver, Utah.....	Sept., 1872	Dr. H. C. Yarrow.

PISIDIUM VARIABLE, Prime.

Cyclas nitida, MIGHELS, LINSLEY, Am. Jour., xlviii, 1845, 276.

Pisidium variable, PRIME, Proc. Bost. Soc. Nat. Hist., iv, 1851, 163.

Pisidium grande, WHITTEMORE, *in litt.*, 1855.

Musculium variable, ADAMS, Rec. Gen., ii, 1858, 452.

Pisum variable, ADAMS, *loc. sub cit.*, ii, 1858, 660.

Pisidium variable, PRIME, Mon. Am. Corbiculadæ, Smithson, Miscel. Pub., No. 145, 1865, 66.

According to Prime, this species is distributed throughout North America, in New England, the States of New York, Pennsylvania, and Virginia.

Specimens were found to be abundant in Colorado, near the Rio Grande River.

No.	Locality.	Date.	Collector.
23 A	Rio Grande of Colorado	Sept., 1873	J. Wolf.

FAM. UNIONIDAE

A number of *Anodonta* were collected during the field season of 1872, but, unfortunately, were destroyed or lost in transit to Washington, with the exception of the following species:—

ANODONTA OREGONENSIS, Lea.

Collected from the Sevier River, Utah, by Lieut. Wallace Mott, U. S. A., and Dr. H. C. Yarrow.

ADDENDA.

ANODONTA DEJECTA, Lewis.

In 1874, a new and interesting species was discovered and submitted to Dr. James Lewis, of Mohawk, N. Y., who has kindly furnished the description given in the following addenda:—

“Description of a new species of Anodonta, by James Lewis, Mohawk, N. Y., May 27, 1875.

“ANODONTA DEJECTA, sp. nov.

“Shell obovate, subcylindrical, inequilateral, slightly disposed to be alate posteriorly, emarginate on the base, posteriorly dilated and somewhat broadly triangular; substance of the shell of moderate thickness, and disposed to be opaque; beaks scarcely elevated above the dorsal margin, having a few minute, irregular undulations at their tips; ligament somewhat long; epidermis yellowish-brown or olivaceous, polished, and without rays; lines of growth coarse and somewhat distant; anterior cicatrices distinct; posterior cicatrices confluent; dorsal cicatrices in the cavity of the beak a little removed from the dorsal margin, which is slightly arcuate; nacre white or faintly tinted salmon-color and iridescent.

“Transverse diameter, 2.90 inches; altitude, 1.35 inches; lateral diameter, 1 inch.

“Found in Arkansas River or its tributaries west of the one hundredth meridian, by Dr. H. C. Yarrow, surgeon and zoölogist to expedition for exploration west of the one-hundredth meridian.

“National Museum, Smithsonian Institution.

“A number of shells taken west of the one hundredth meridian were sent to me for identification a short time ago, and among them were specimens of the above described *Anodonta*, which appeared to me to be new, and I referred Dr. Yarrow to Mr. Lea, who requested that the shells be sent back to me for description. The specimens consist of one imperfect shell and fragments of others.

“The most perfect specimen is slightly abnormal, but presents features which are unquestionably characteristic, as they are also indicated in the other (fragmentary) specimens. The form of the shell is somewhat like

that of an arcuate *Margaritana marginata*. The lines of growth indicating the form of the half-grown shell betray its resemblance to a very transverse inflated *Unio tappanianus*. There is no familiar species of *Anodonta* with which this species is comparable."

The following has been furnished me by Mr. Tryon for incorporation in this report:

"Extract from a verbal communication made by Mr. G. W. Tryon, jr., of the Academy of Natural Sciences of Philadelphia, to the Conchological Section of the Academy, May, 1873.

"Mr. Tryon called attention to an interesting series of land and fluviatile *Mollusca* from Utah, presented this evening. These shells were collected by the Expedition for explorations west of the one-hundredth meridian, acting under the authority of the United States Engineer Office at Washington.

"The specimens of *Helix strigosa*, Gould, exhibited every variation of form, from the typical shells with depressed rounded whorls and smooth surface, to those with several revolving raised lines and a carinated periphery; in the latter condition, they are identical with *H. hemphillii*, Newcomb (Am. Jour. of Conch., v, 1869, 165, 'White Pine Mining District'). In others, again, the raised lines are more numerous, and sufficiently prominent to be called ribs, and the periphery is not carinated; in this state, they are *H. haydeni*, Gabb (Am. Jour. Conch., v, 1869, 24). This little species has been heretofore considered to belong to a new generic type for America, being the only species having revolving ribs; its nearest relationship was apparently with a small group of Madeira *Helices*. The form of the shell, its external appearance, and the closely approaching extremities of the labrum, connected by a callus upon the parietal wall, reminds one of *Cyclostoma*; but no opercula were obtained with the fifty odd specimens in semi-fossilized condition collected by Prof. F. V. Hayden, in Weber Cañon, Utah. It is extraordinary that any species should be found to vary so much as does *H. strigosa* in those characters which have heretofore been regarded as most persistent and distinctive. It is much easier to imagine the growth lines developed into ribs than a form in which the growth lines

are crossed by revolving ribs. In *H. idahoensis*, Newcomb (*ibid.*, ii, 1866, 1), we find the surface raised into sharp ribs, parallel with the lines of accretion; and as in all other respects this species does not appear to differ from *Strigosa*, it is very probable that *idahoensis* will also prove to be a variety of this protean species.

"Included in the collection are two specimens of the genus *Tryonia*, Stimpson. This curious little genus was heretofore considered restricted to the Colorado desert of Southern California, where, in a fossilized condition, it exists in such numbers as frequently to cover the surface of the ground. Two species have been described, viz: the type *T. (Melania) exigua*, Conrad (of which *Melania protea*, Gould, is a synonym), and *Tryonia clathrata*, Stimpson. The two Utah specimens are probably *T. exigua*. The genus *Tryonia* is included in a group of very small species of *Amnicolidæ*, having the whorls ornamented by ribs, nodules, or spines; it includes the genera—

"*Paludestrina*, Orb., 1841, West India and South America.

"*Pyrgula*, Crist. and Jan., 1832, Europe.*

"*Potamopyrgus*, Stimp., 1865, New Zealand.

"In addition to the above, the collection includes *Succinea lineata*, W. G. Binney; *Limnæa palustris*, Müll.; *L. stagnalis*, Linn., and *L. desidiosa*, Say; *Physa elliptica*, Lea; and *Planorbis trivolvis*, Say; the latter very large specimen, with the margin of the aperture expanded, like those from the Saint Lawrence River described by Mr. Whiteaves as *P. macrostomus*."

* Mr. John Wolf has described *Pyrgula scalariformis* from the Post Pliocene near Tazwell, Illinois River. Other minute species may be detected hereafter, when our rivers are more carefully explored, as in France a number of new species have rewarded the minute search of recent collectors.

CHAPTER XVI.

REPORT

UPON

THE COLLECTIONS OF FRESH WATER LEECHES

MADE IN PORTIONS OF

NEVADA, UTAH, COLORADO, NEW MEXICO, AND ARIZONA,

DURING

THE YEARS 1872, 1873, AND 1874.

BY

Prof. A. E. VERRILL.

CHAPTER XVI.

The following report upon the Leeches collected by the expedition, and committed to me for examination, is mostly extracted from a Synopsis of the Fresh Water Leeches of North America in the Annual Report of the United States Commissioner of Fish and Fisheries for 1872 and 1873, upon which I was engaged when the specimens were received, and in which, through the courtesy of Lieutenant Wheeler, I was permitted to include the results of a study of his specimens.

The following artificial key has been prepared in order to facilitate the identification of the genera. It is intended to apply only to the North American genera.

Analytical key to the genera of North American Fresh-water Leeches.

- a. Head tapering, continuous with the body (b):
 - aa. Head dilated; neck constricted (h):
 - b. Ocelli marginal in a curved line; no proboscis (c):
 - bb. Ocelli in one to four pairs along the median line; an exsertile proboscis *Clepsine.*
 - bbb. Ocelli none; no proboscis *Liostomum.*
 - c. Oesophagus with folds, and armed with three convergent jaws (d):
 - cc. Oesophagus with folds; no jaws (f):
 - d. Jaws with denticles (e):
 - dd. Jaws without denticles *Democedes.*
 - e. Oesophagus with 9 folds; jaws prominent *Macrobdella.*
 - ee. Oesophagus with 12 folds; jaws small *Aulastomum.*
 - eee. Oesophagus with 6 folds; jaws broad *Hirudo.*
 - f. Folds, 12; transverse lobes; ocelli, 8 or 10. *Semiscolex.*
 - ff. Folds, 6; 3 transverse lobes; ocelli 10 *Hexabdelta.*
 - fff. Folds, 3; no transverse lobes; ocelli 6 or 8 (g):
 - g. Body distinctly dilated and flat posteriorly; ocelli, 8. . . *Nephelopsis.*
 - gg. Body not much dilated posteriorly; subdepressed; ocelli, 6 or 8 *Nephelis.*
 - h. Body subterete; no lateral appendages (i):
 - hh. Body somewhat depressed; a row of pulsating vesicles along each side *Cystobranchus.*
 - i. Head obliquely attached, dilated; margins not fringed. . . . *Ichthyobdella.*
 - ii. Head campanulate; margin fringed with minute bristles. . . . *Astacobdella.*

AULASTOMUM LACUSTRE Leidy.

Aulastomum lacustre LEIDY, Proc. Acad. Nat. Sci. Phil., 1868, 229.—VERRILL, Am. Jour. Sci., iii, 1872, 135.—*Id.*, Syn. N. A. Fresh Water Leeches, in Report U. S. Com. Fish & Fisheries, 1874, 670.

This species, as described by Dr. Leidy, has ten ocelli, eight in the upper lip; the last pair separated by an annulus from the others. Male aperture in the twenty-fourth annulus; female orifice in the twenty-ninth. Œsophagus capacious, with twelve folds. "Jaws thin, small, when at rest included in pouches formed by an eversion of the mucous membrane. Teeth, twelve in number to each jaw, bilobed at base." Color (var. *a*) throughout olive-green, closely maculated everywhere with confluent spots of a darker hue of the same color. When full grown, this species becomes six to eight inches or more long and half an inch broad.

In my specimens, the male organ is long, very slender, thread-like, and is protruded from an opening in the twenty-fifth segment behind the mouth (counting the buccal segment). The female orifice is small, with slightly raised borders, and is situated between the twenty-ninth and thirtieth segments. The fourth pair of ocelli is on the buccal segment; and the fifth pair is on the third segment, behind the mouth.

Var. b, tigris.—Large and broad, depressed. Color yellowish-green to dark olive-green, with scattered irregular blackish spots and blotches.

Var. c, fuliginosum.—Color uniform dusky or brownish-black.

Var. d, virescens.—Color uniform greenish or yellowish-green, varying to dark green; usually paler beneath.

• Connecticut to Lake Superior, Utah, and New Mexico.

Var. a, Denver, Col., H. W. Henshaw, expedition of 1873; August, 1873, between Santa Fé and Fort Wingate, N. Mex., Dr. Oscar Loew.

Var. b, Fairfield, Utah, Dr. H. C. Yarrow; in a tributary of Great Salt Lake, Utah, 1872; Taos, N. Mex., 154 B, Dr. H. C. Yarrow, 1874.

NEPHELOPSIS OBSCURA Verrill.

Nephelopsis obscura VERRILL, Am. Jour. Sci., iii, 135, 1872.—*Id.*, Syn. N. A. Fresh Water Leeches, in Rep. U. S. Com. Fish & Fisheries, 1874, 674.

Body much elongated in extension, depressed posteriorly, distinctly annulated, a little rugose anteriorly in contraction. Length, in extension, 4 to 5 inches; breadth, 0.25 to 0.35 of an inch. Head obtusely rounded

in front. Ocelli eight; two pairs on the first ring near the front, the inner pair larger, well separated; two pairs on the sides of the buccal segment, small, distant, the upper pair a little below the level of the outer pair of anterior ones. Inner surface of the upper lip very rugose, the sulcations and folds diverging outwardly. Mouth large; folds of the oesophagus broad, prominent, the outer end pointed, triangular. Anal orifice large, with raised borders, situated on the dorsal surface a little in advance of the posterior sucker, which is large, rounded, the disk expanded, and considerably larger than the pedicel. Clitellus much thickened; male organ short; protruded as a low, truncate cone, with disk-shaped end. When examined by transmitted light, a row of eleven rather large, translucent, pyriform spots may be seen midway between the dark intestine and the flattened margin, which appeared to correspond with the testicles. Color, above and below, dull dark brown, umber-brown, or fuscous, usually with numerous obscure, narrow, longitudinal stripes of lighter and darker brown.

Var. b, maculata.—Form and size nearly as described above. Color of preserved specimens greenish-yellow or clay-color, with small irregular spots of black scattered over the back; lower surface nearly plain clay-color. Ocelli, eight, but often not very distinct in preserved specimens.

Three small, acute, triangular lobes above, and alternating with the upper ends of the oesophageal folds. A specimen from Fire Hole Basin was much darker; the black blotches being larger and more or less confluent.

Wisconsin to Colorado.

Var. b, San Luis Valley, Colorado, common, Lieut. W. L. Marshall, expedition of 1873.

This species was first taken in Wisconsin in May, 1870, when numerous egg capsules were also found attached to the stones along the shores. These were yellowish in color, broad-oval or elliptical, terminating in a point or mucro at each end, flat below, smooth and slightly convex above, with a thin margin. They were 5^{mm}.5 to 8^{mm} long by 3^{mm}.5 to 4^{mm} broad. Each one contained from five to ten eggs, or young leeches; some of the latter were already leaving the capsules; these were 5^{mm} or more in length, and even at this age, though pale in color, they had the characteristic form of the adult, and the eight ocelli were distinctly visible.

NEPHELIS QUADRISTRIATA Grube.

Nephelis quadristriata GRUBE, Famil. des Annel., 110, 149.—DIESING, Sitzungsberichte der kais. Akad. der Wiss., math.-naturwiss. Classe, xxxiii, 1859, 496.—VERRILL, *op. cit.*, iii, 1872, 133.—*Id.*, Syn. N. A. Fresh Water Leeches, in Rep. U. S. Com. Fish & Fisheries, 1874, 675.

Body, in extension, 2 to 4 inches long by 0.12 to 0.25 of an inch broad, slender subterete, tapering to the anterior end; in contraction broader and somewhat depressed posteriorly; the sides rounded. Posterior sucker large, nearly as wide as the body, to which it is broadly attached. Mouth rather large, suborbicular; the upper lip a little expanded, rounded in front, wrinkled within, smooth externally, and not distinctly annulated. The œsophagus has the three longitudinal folds slightly prominent, rounded at their anterior ends. Six ocelli were all that could be distinguished; of these, those of one pair, situated on the front of the first segment, are much the largest; two pairs, much smaller and inconspicuous, are placed well apart on the sides of the buccal segment. Anal orifice large, with a raised border, situated a little in advance of the posterior end of the back.

Color above brownish-black, dark brown, fuscous, or dark cinereous, with four longitudinal rows of irregular, nearly confluent, black spots, intermingled with light brown or grayish spots, which often also form the centers of the black spots. Lower surface plain brown or fuscous, usually a little lighter than the back.

Var. b.—Back with a light reddish or brownish median stripe, and a broad band of blackish on each side, often more or less interrupted with lighter mottlings.

Massachusetts to Nebraska, Colorado, and California.

Var. a., San Luis Valley, Colorado, Lieutenant W. L. Marshall, (also *var. b.*); Campo, Southern California, Dr. E. Palmer.

CLEPSINE Savigny.

Clepsine SAVIGNY.—VERRILL, Syn. N. A. Fresh Water Leeches, in Rep. U. S. Com. Fish & Fisheries, 1874, 677.

This genus is very abundantly represented in our waters, both in individuals and species. All of these species are apt to be quite variable in character in different localities as well as at different periods of growth.

Most of the species are elegantly and some are quite brilliantly colored, but the colors are often quite variable in the species, and cannot be relied upon for distinguishing them without other characters of more importance. The body is always depressed and much flattened; it is broadest posteriorly, but the outline varies extremely, according to the state of contraction or extension. They are most frequently found adhering to the under surfaces of floating logs and old pieces of boards, or beneath the loosened bark of submerged branches and trunks of decaying trees. Occasionally they adhere to the lower surface of larger leeches, turtles, or other animals, but they probably never suck blood. They have a slender exsertile proboscis, by means of which they feed upon insect larvæ, small worms, and especially upon *Physa*, *Limnæa*, and other small univalve mollusks, &c. When disturbed, these species curl themselves up after the manner of "pill-bugs" and certain insect larvæ. The eggs, when laid, are retained in a cluster beneath the expanded and concave posterior portion of the body, which is arched over them, and kept in continuous undulatory motion during the period of incubation. The young, when hatched, adhere in a group to the posterior part of the lower surface of the body of the parent by means of their posterior sucker, and before quitting the parent usually present the essential characters, and often nearly the pattern of color of the adult, though paler.

SECTION A.—Ocelli 2, separate or confluent.

SUBSECTION a.—Back smooth.

CLEPSINE MODESTA Verrill.

Clepsine modesta VERRILL, *op. cit.*, 1872, 129, f. 2; v, 1873, 388.—VERRILL, Syn. N. A.

Fresh Water Leeches, in Rep. U. S. Com. Fish & Fisheries, 1874, 679.

Clepsine submodesta NICHOLSON, Canadian Jour., 1873.

Body in extension elongated, tapering and very slender anteriorly, broader and obtusely rounded posteriorly. Length, about 1.5 inches in extension. Back smooth, faintly annulated, translucent. Head small, obtuse, whitish. Ocelli two, black, near together. The general color above is usually pale purplish-brown or purplish flesh-color, with minute specks of brown and very small round spots of dull yellow and often of light green; margins and a median dorsal line pale. Acetabulum moderately large, whitish. Auditory vesicle placed near the head, small, rounded, slightly

prominent, conspicuous, deep brown, surrounded by a whitish circle. Lower surface pale purplish. The attached young, about 0.3 of an inch long in extension, were slender, whitish, and subdiaphanous, with the brown intestine showing through posteriorly.

Connecticut to Florida; Nebraska to California, and Arizona.

White Mountains, Arizona, H. W. Henshaw; Beaver Creek, Utah, Dr. H. C. Yarrow; Julian, Southern California, Dr. E. Palmer.

SUBSECTION *b*.—Back papillose.

CLEPSINE ORNATA Verrill.

Clepsine ornata VERRILL, Am. Jour. Sci., iii, 1872, 130.—*Id.*, Syn. N. A. Fresh Water Leeches, in Rep. U. S. Com. Fish & Fisheries, 1874, 680.

The specimens of this species originally described, although found carrying young, were probably immature. Specimens of much larger size, and having more numerous papillæ, have since been obtained. They are so different as to be easily mistaken for another species, but their young have been found to agree with the original description. It is probable that this and other species of *Clepsine* begin to breed long before they become full grown, and that they live several years. The following is the original description:—

“Body somewhat depressed, rather broad and obtusely rounded posteriorly, in extension tapering, but not slender anteriorly, about 1.25 inches long. In contraction elliptical, and about 0.20 inch broad in the middle. Back with a median papillose dorsal carina, and two similar ones midway between it and the margins. Head broad, acuminate, whitish in front and at the margins. Ocelli united into a single, small, transverse spot, situated at the edge of the white area. Acetabulum moderately large, round; about half of its breadth exposed behind the end of the body.

“A dark green line passes along the median carina, interrupted anteriorly by several transverse orange vittæ, and farther back by some pale orange spots; the first of the transverse spots or vittæ is pale orange, and is just behind the white area of the head; this is followed by a transverse greenish-brown one, which is succeeded by a longer transverse orange one; farther back is another transverse vitta, or band, of the same color. The posterior part of the back and upper side of acetabulum

are flesh-color, specked with pale orange and purplish. The papillæ of the lateral carinæ are partly orange and partly brown. The margin is pale purplish, with conspicuous squarish spots, alternately bright green and orange. The rest of the upper surface is variegated with bright green and pale brown, and specked with darker brown. Lower surface pale green, with a median light line; the margins colored as on the upper side.

"The attached young, June 6, were about 0.12 of an inch long, and very slender in extension. Anteriorly, they were purplish-red, with bright red specks, and with a median row of red points, while several median white spots occupied the positions of the large transverse orange spots of the adults. Posteriorly the branched lobes of the intestine gave a greenish color to the body. Ocelli closely united into a transversely triangular or bilobed spot of bright red."

West River, near New Haven, Conn., on the lower sides of submerged wood and pieces of boards.

Var b, stellata.—Body broad-oval in contraction; moderately elongated in extension; strongly annulated; in extension about 1.25 to 1.50 inches long and 0.20 to 0.30 broad; in contraction about 0.40 long, but sometimes larger than this; head obtuse in front; ocelli more or less confluent into a conspicuous transversely triangular or bilobed eye, usually surrounded by a white area; back moderately convex, with numerous quite small papillæ, forming a transverse row on each annulus. Along the middle of the back there is a longitudinal row of somewhat larger and more prominent, yet small, conical papillæ, and two similar rows exist on each side between the median row and the margins. The larger papillæ are usually tipped with white; color above variegated dark greenish-brown, with a median line and marginal spots.

The surface is covered with brown and green stellate specks, and sometimes with some orange-colored ones; the green ones generally prevailing toward the margins. Along each edge and around the acetabulum, there is a series of flesh-colored, pale yellowish, or light orange, semicircular spots; head with a transverse median spot of white. A pale yellow or white transverse line crosses the neck. The dark green, brown, or blackish median dorsal line is scarcely interrupted. One or two longitudinal rows

of flake-white often extend along each side of the median line on the papillæ, and similar white specks are often scattered over the back; lower surface brownish, with stellate specks of green; near the margin like the upper surface.

Several of the specimens, preserved in alcohol during the breeding season, have a reproductive orifice at the summit of a rather large conical prominence, and situated apparently at about the seventeenth annulus behind the mouth. On each side, farther back and midway between the median line and the margins, there is a longitudinal row of about ten pit-like depressions extending back to near the posterior sucker.

Some of the specimens, which were quite dark colored when caught, in April and early in May, carried large clusters of bright deep yellow eggs, and others were just laying. These dark colored specimens were kept until July 17. By that time they had become much lighter, the yellow, pale orange, and greenish hues prevailing, though stellate specks of dark green and brown were still present.

Var. c, rugosa.—Larger than the preceding; strongly annulated, each annulation with a row of twenty to thirty, or more, larger, conspicuous, rough, conical papillæ, with many unequal smaller ones between them in several irregular rows, or scattered. Ocelli very close together, but separated by a narrow light line, in adult preserved specimens; united in the attached young. The color, in alcoholic specimens, is yellowish-green, variegated with blotches of dark brown; margin of body and acetabulum with semicircular, pale orange spots, covering the width of about two annulations, and separated by narrower greenish-brown spots about half as wide; head with a light longitudinal vitta. The attached young have three dorsal longitudinal rows of small papillæ, the median one double posteriorly, and a few others scattered over the surface between.

The most papillose specimens were collected by Dr. Elliott Coues, on the Northwest Boundary Commission. This may prove to be a distinct species, but this is rendered improbable on account of the close agreement of the attached young with the ordinary varieties.

Var. d.—The largest specimen that I have seen belonging apparently to this species was over three inches long in extension, and upward of half

an inch wide. The body was strongly annulated, with crenulated margins; on each annulation there was a transverse row of numerous small but conspicuous papillæ. Ocelli united. The color was dark olive and fuscous-brown on the back, with a row of small, semicircular, light yellowish spots along each margin at every third annulation; head with an interrupted pale yellow vitta; ventral surface striped with olive-green and dull grayish.

This specimen was taken, without eggs or young, near New Haven, about the first of May.

Var. e.—Other somewhat similar specimens, from the same locality, were 3 inches long in extension and 0.5 to 0.75 broad; in contraction, 1.5 long and 1 inch broad. Body much depressed, with thin margins, obtuse anteriorly. Back covered with numerous small, unequal, conical, or rounded verrucæ, arranged in transverse rows of twenty or more on each annulation. Ocelli black, very closely approximate. Head, in front of ocelli, brownish-white, with lateral brown spots; behind the ocelli with a short, median, orange-brown stripe. General color of body dark greenish-brown. The ground color is brown, varied with very numerous minute, stellate specks of dark green; toward the lateral margins of the body and edges of the acetabulum the color is lighter orange-brown, with fewer green specks; and a marginal series of roundish, pale brown spots extends along each side and around the acetabulum; beneath pale bluish, with sixteen to twenty stripes of green.

On the lower side, the dark brown viscera show very distinctly, through the integuments, eleven branches or lobes on each side; these are elongated, well separated, with few short, open branches; the anterior ones are but little shorter, and are not crowded. In this respect, this species is very distinct from *C. picta*, in which the branches are twenty or more on each side, short, much branched, crowded, the anterior ones becoming much smaller and more crowded.

Connecticut to Nebraska, Colorado, and New Mexico.

Var. b, No. 183, San Ildefonso, New Mexico, 1874, Dr. H. C. Yarrow.

Var. d, No. 154 B, Taos, New Mexico, Dr. H. C. Yarrow, 1874.

Clepsine papillifera Verrill, *op. cit.*, p. 683, is a closely allied species, and undoubtedly occurs with the preceding in the region explored, though it

was not collected. It has been found in Connecticut, Florida, Michigan, Nebraska; and in Southern California at Larkin's Station and Warner's Branch, August, 1875, by Dr. Edward Palmer. The specimens from the last named locality have a median dorsal carina bearing a row of small papillæ, and there is a less distinct row on each side of the back. The ocelli are well separated. The exerted proboscis is slender, cylindrical, and equal in length to the breadth of the body. In alcohol, the upper surface is longitudinally striped with lighter and darker brown.

The specimen from Larkin's Station is also longitudinally striped; but there are six rows of rounded, yellowish spots along the back, and there are two rows of inconspicuous papillæ between the median one and the margins.

SECTION D.—Ocelli 8.

SUBSECTION *a*.—Back smooth.

CLEPSINE OCCIDENTALIS Verrill.

Clepsine occidentalis VERRILL, Syn. N. A. Fresh Water Leeches, in Rep. U. S. Com. Fish & Fisheries, 1874, 685.

Body rather stout; in contraction thick and convex; about 0.75 of an inch long and 0.30 broad, tapering to both ends. Ocelli eight; those of the second and third pairs largest; those of the third farthest apart; those of the fourth small and near together. Dorsal surface smooth, with faint indications of small, low papillæ anteriorly. Acetabulum small. Color, in alcohol, yellowish-brown, with fine transverse lines of darker.

San Luis Valley, Colorado, H. W. Henshaw, 1873.

Two other species of *Clepsine* have been found in Colorado:—

CLEPSINE PALLIDA Verrill.

Clepsine pallida VERRILL; *op. cit.*, 684, f. 2 *b* (not *a*, as there indicated by error).

This species has six ocelli and a smooth dorsal surface, generally marked by two dorsal dark lines near the median line of the back. It has been found in Connecticut, and also in Colorado near Long's Peak, at about 9,000 feet elevation (Geol. Surv. of Terr.)

CLEPSINE ELEGANS Verrill.

Clepsine elegans VERRILL, *op. cit.*, 684, f. 2 a.

This species also has six ocelli, but the back has several more or less distinct rows of small papillæ. The color is variable, and there are often longitudinal dark lines, as in the preceding species, and sometimes there are yellow spots on the back in rows. The anterior ocelli are generally nearer together than the rest.

Connecticut; Lake Ontario; Lake Oconomowoc, Wisconsin (I. A. Lapham); Northwest Boundary Survey; Colorado (Geol. Surv. of Terr).



R. Ridgway, del.

T. Sinclair & Son, lith. Phila.

FIG. 1. THRYOTHORUS BEWICKI, VAR. LEUCOGASTER. AD.
FIG. 2. COTURNICULUS PASSERINUS VAR. PERPALLIDUS. AD.



R. Ridgway. del.

PYRANGA ÆSTIVA VAR. COOPERI. ♂

T. Sinclair & son lith. Phila.



R. Ridgway, del.

T. Sinclair & Son, Phila.

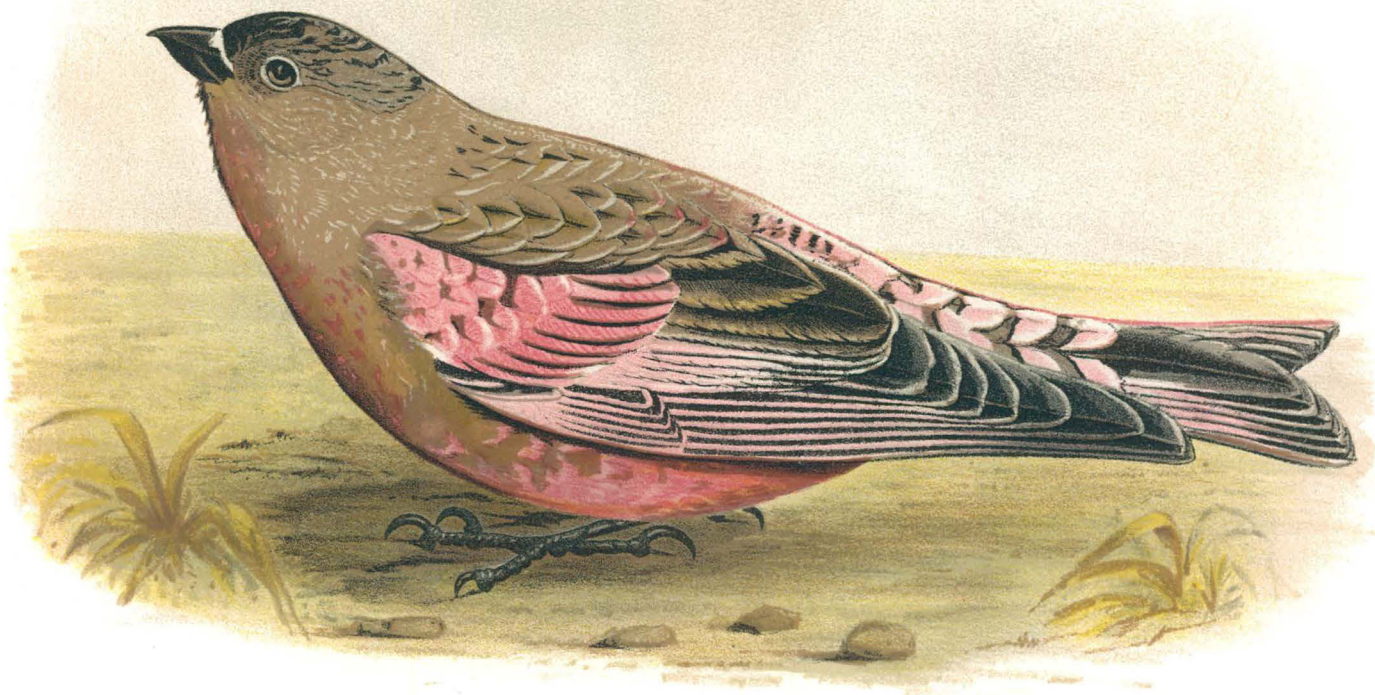
PYRRHULOXIA ÆSTIVA VAR. COOPERI. ♀



R. Ridgway, del.

T. Sinclair & Son Lith. Phila.

FIG. 1. CHRYSOMITRIS PSALTRIA VAR. ARIZONÆ. ♂
FIG. 2. CHRYSOMITRIS PSALTRIA. ♂



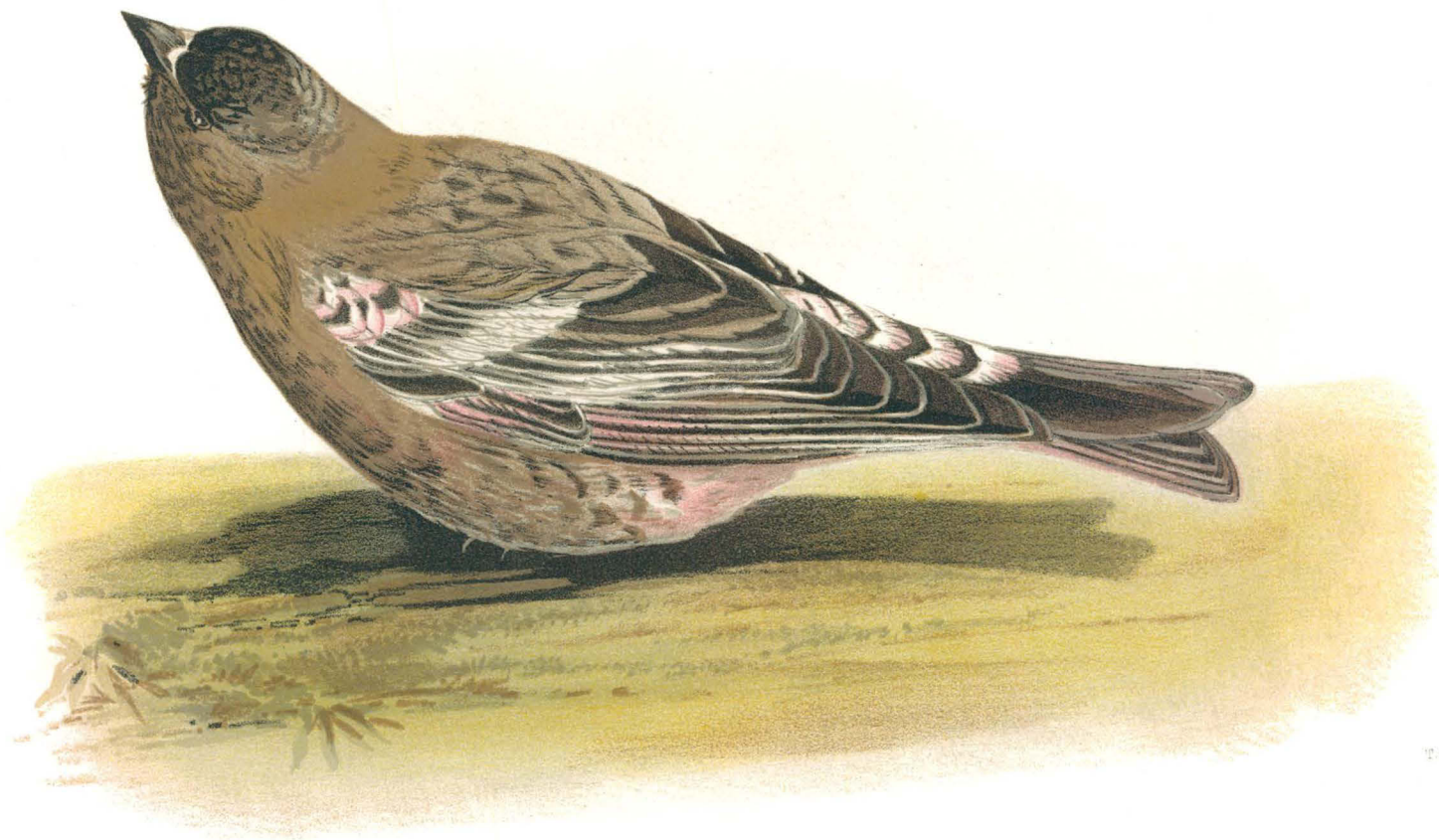
R. Ridgway, del.

T. Sinclair & Son, Lith. Phila.

LEUCOSTICTE AUSTRALIS. ♂

VOL.V. ZOÖLOGY.

PLATE VI



R. Ridgway, del.

LEUCOSTICTE AUSTRALIS. ♀

T. G. S. & Son lith. Phila.



R. Ridgway, del.

T. Sinclair & Son Lith. Phila.

FIG. 1. ZONOTRICHIA LEUCOPHRYS, VAR. CAMBELI. AD.
FIG. 2. ZONOTRICHIA LEUCOPHRYS, VAR. INTERMEDIA AD.



R. Ridgway, del.

T. Sinclair & Son Lith. Phila.

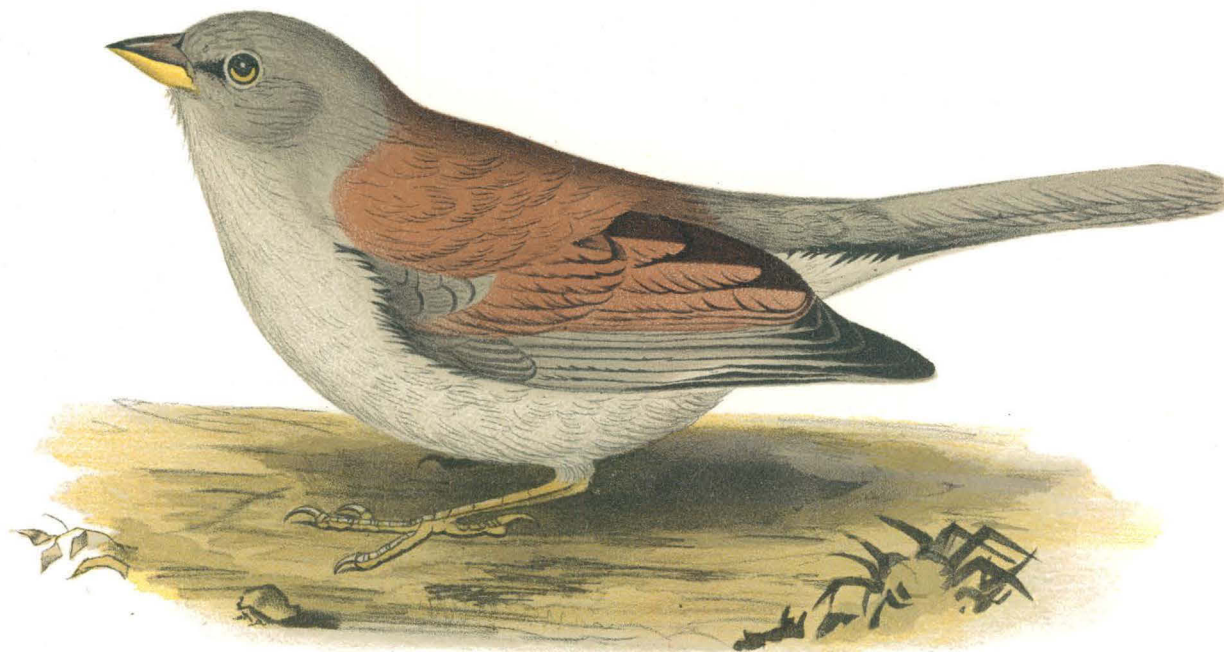
JUNCO OREGONUS, VAR. ANNECTENS ♂ AD.



R. Ridgway del.

T. Sinclair & Son. Col. Phila.

JUNCO CINEREUS, VAR DORSALIS, ♂ AD.



R. Ridgway, del.

T. Sinclair & son, Lith. Phila.

JUNCO CINEREUS, AD.



K. Ridgway, del.

POOSPIZA BELLI VAR. NEVADENSIS AD.

T. Sinclair & Son, Lit. Phila.



CYANOCITTA ULTRAMARINA, VAR. ARIZONÆ AD.

R. Ridgway del.



R. Ridgway, del.

T. Sinclair & Son lith Phila.

PERISOREUS CANADENSIS VAR. CAPITALIS AD.

VOL.V. ZOÖLOGY.

PLATE XIV.



R. Ridgway, del.

MYIODYNASTES LUTEIVENTRIS, ♂.

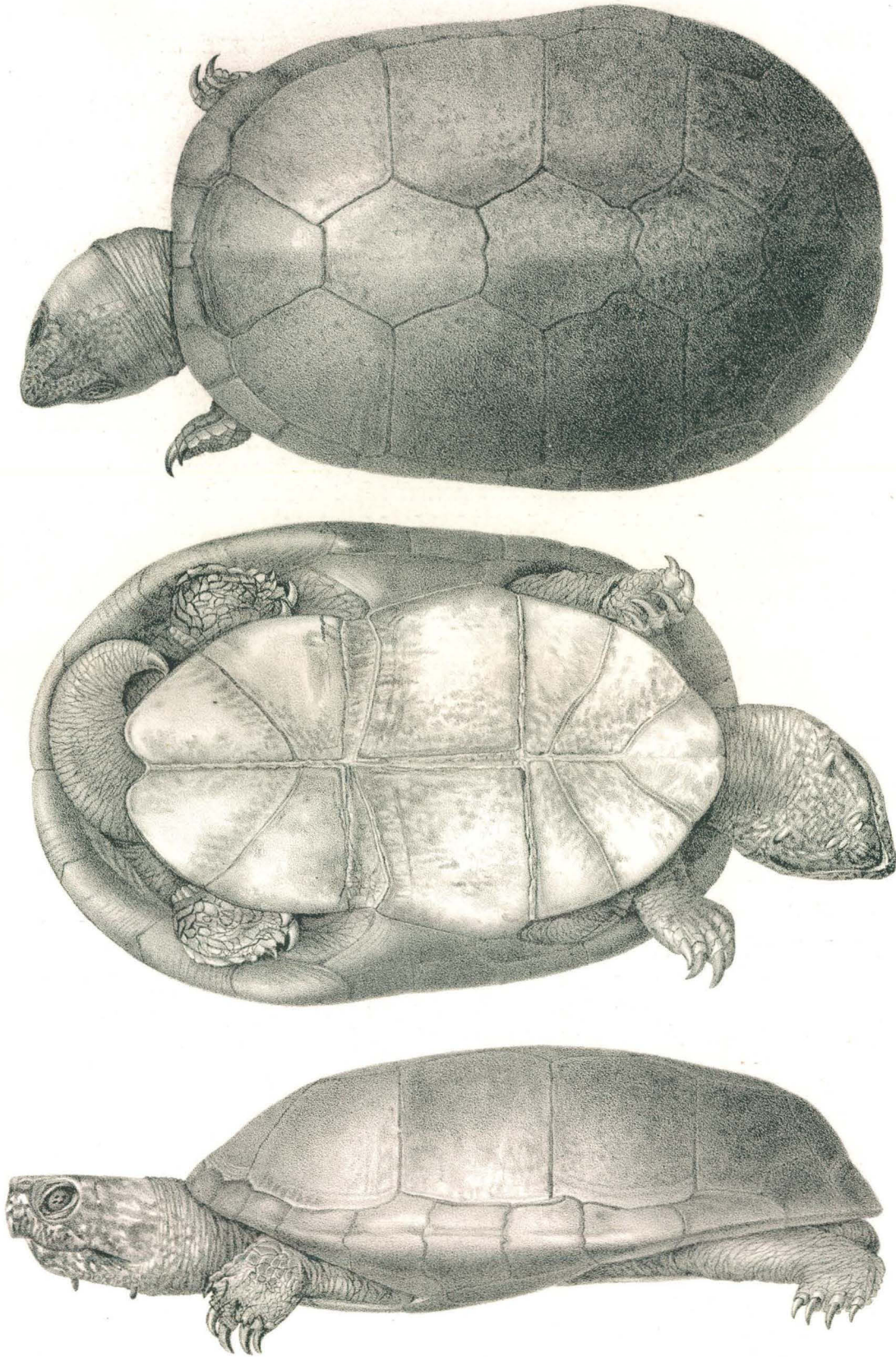
T. Sinclair & Son Lith. Phila.



R. Ridgway. del.

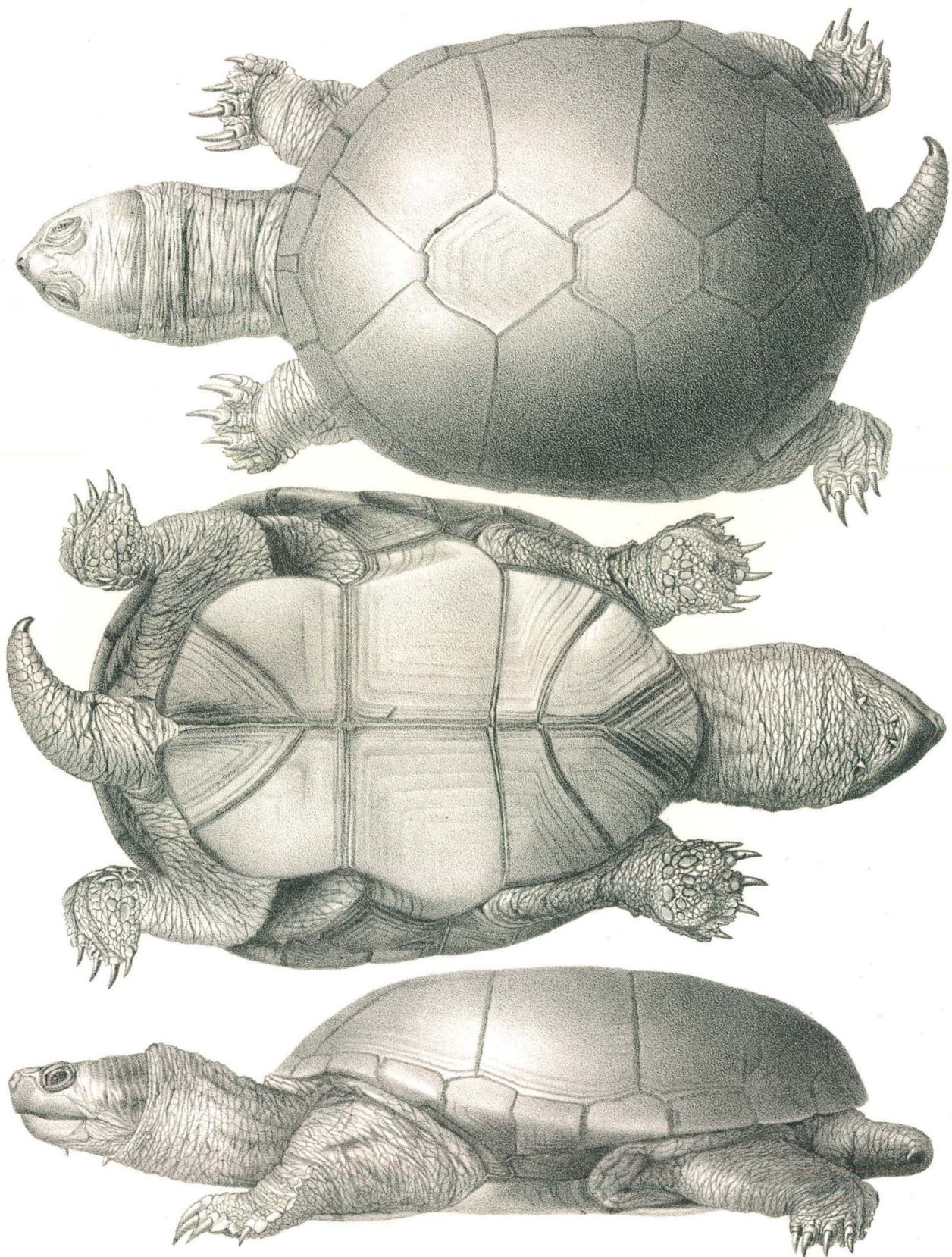
ASTURINA NITIDA VAR-PLAGIATA.

T. Sinclair & Son Lith. Phila.



T. Sinclair & Son, Ill. Phila.

FIG. 1. 2. 3. CINOSTERNUM HENRICI.



T. Sinclair & Son Lith. Phila.

FIG. 1. 2. 3. CINOSTERNUM FLAVESCENS.



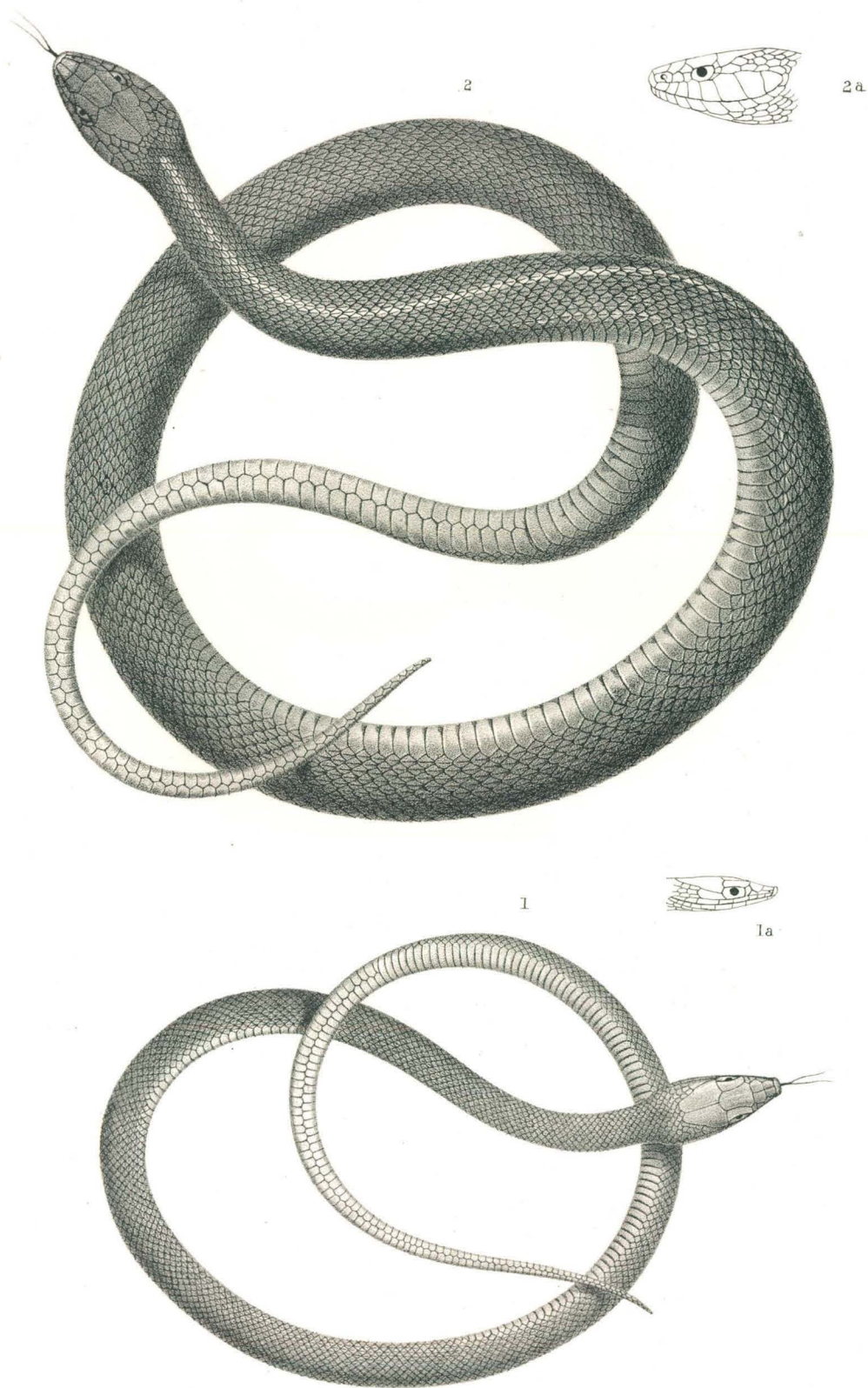
T. Sinclair & Son Lith. Phila.

FIG.1 and 1a. *CONTIA ISOZONA*. FIG.2 and 2a. *GYALOPIMUM CANUM*.
FIG.3 and 3a. *CHILOMENISCUS EPHIPPICUS*. COPE.



T. Sinclair & Son Lith. Phila.

FIG.1 and 1a-2. OPHIBOLUS PYRRHOMELAS. COPE.



T. Sinclair & Son, Lith. Phila.

FIG. 1 and 1a. *CHILOPOMA RUFIPUNCTATUM*.
FIG. 2 and 2a. *EUTANIA VAGRANS ANGUSTIROSTRIS*.

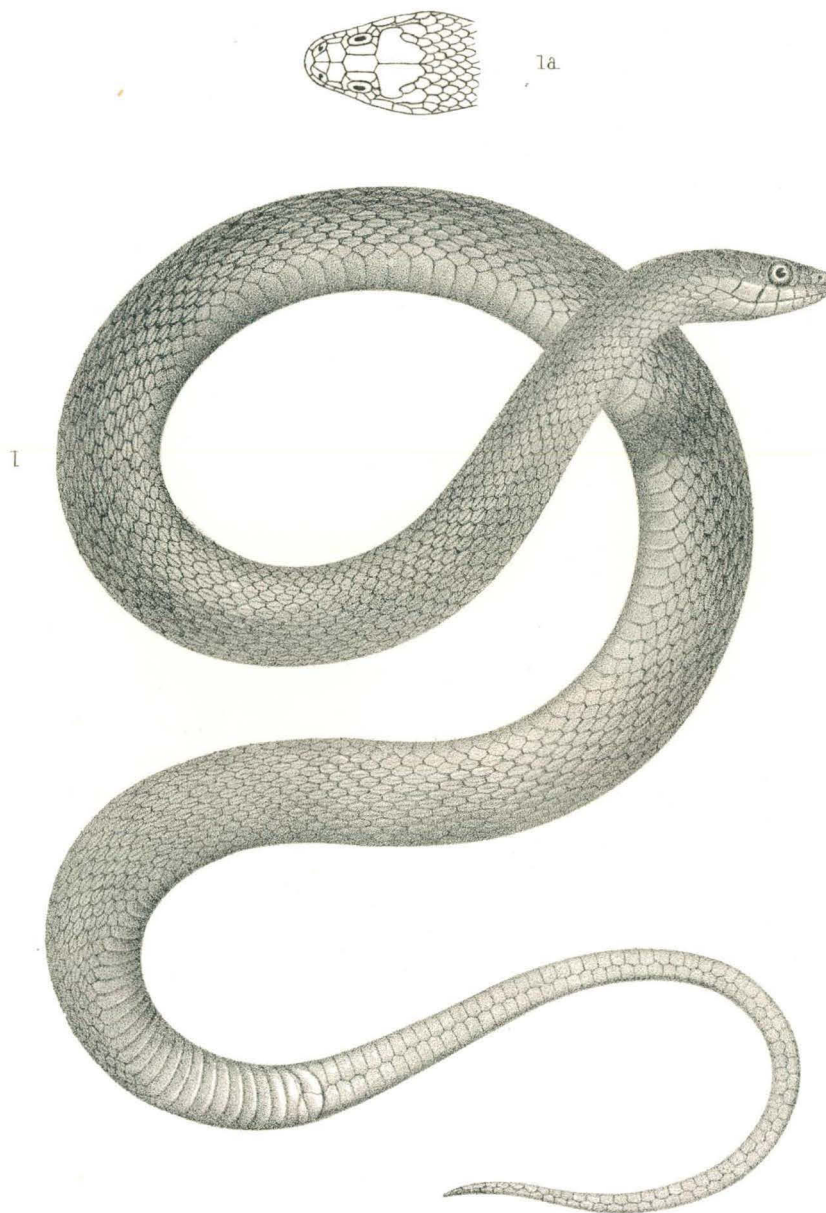


FIG. 1 and 1a. TROPIDONOTUS VALIDUS.

T. H. J. & S. H. J. 1880.



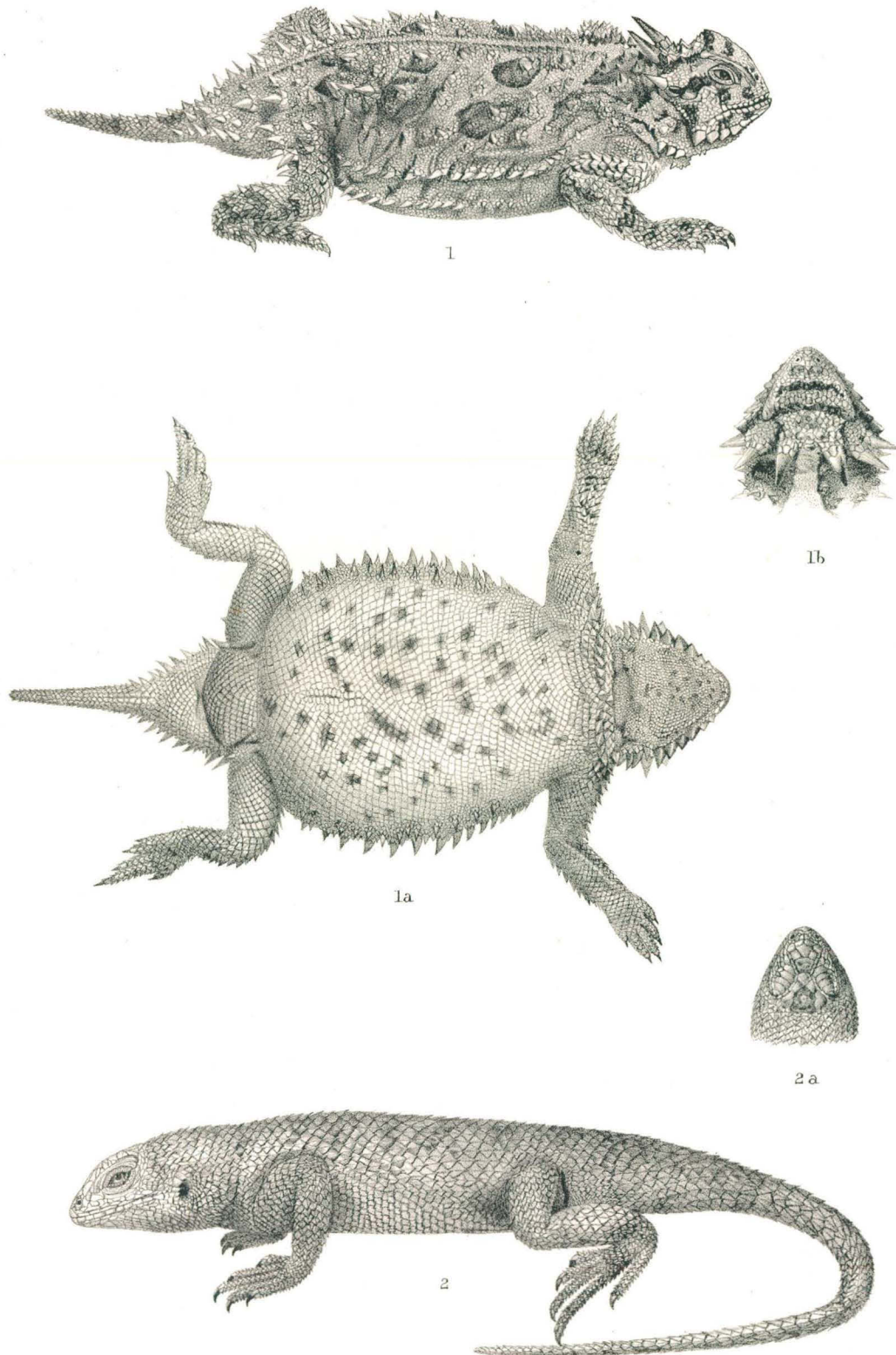
T. Sinclair & Son Ed. Pitt.

FIG. 1 and 1a. CROTALUS PYRRHUS. COPE.



T. Sinclair sculp. lith. Phila.

FIG 1 and 1a. SCELOPORUS CLARKII, VAR.
FIG. 2. 2b. and 2c. SCELOPORUS JARROVII.



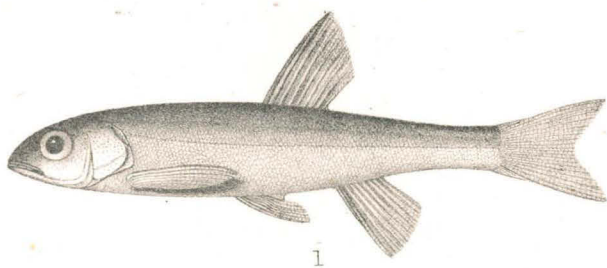
T. Sinclair & Son, Lith. Phila.

FIG. 1-1a and 1b. PHRYNOSOMA. PLANICEPS.
FIG. 2. and 2a. SCELOPORUS. SMARAGDINUS.

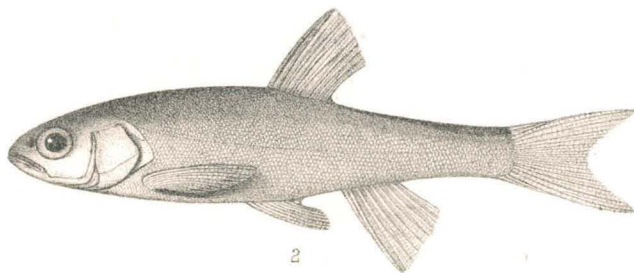


T. Sinclair & Son, Lith. Paris

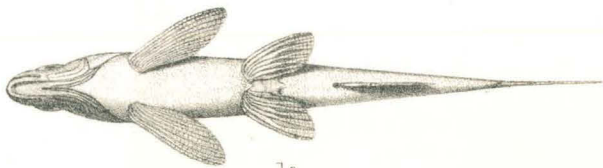
FIG. 1-2 and 3. *RANA ONCA*. FIG. 4 and 5. *BUFO PICTUS*.
FIG. 6, 7 and 8. *SPEA STAGNALIS*.



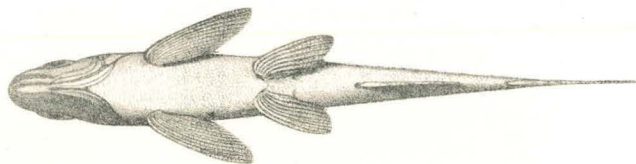
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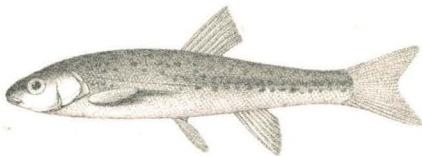
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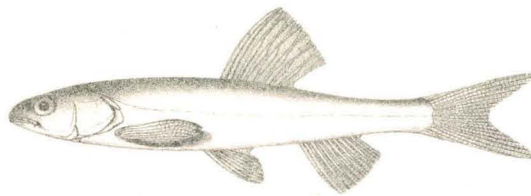
1a



2a



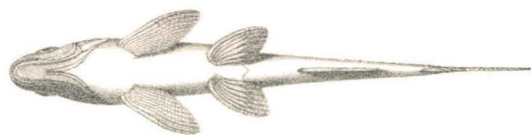
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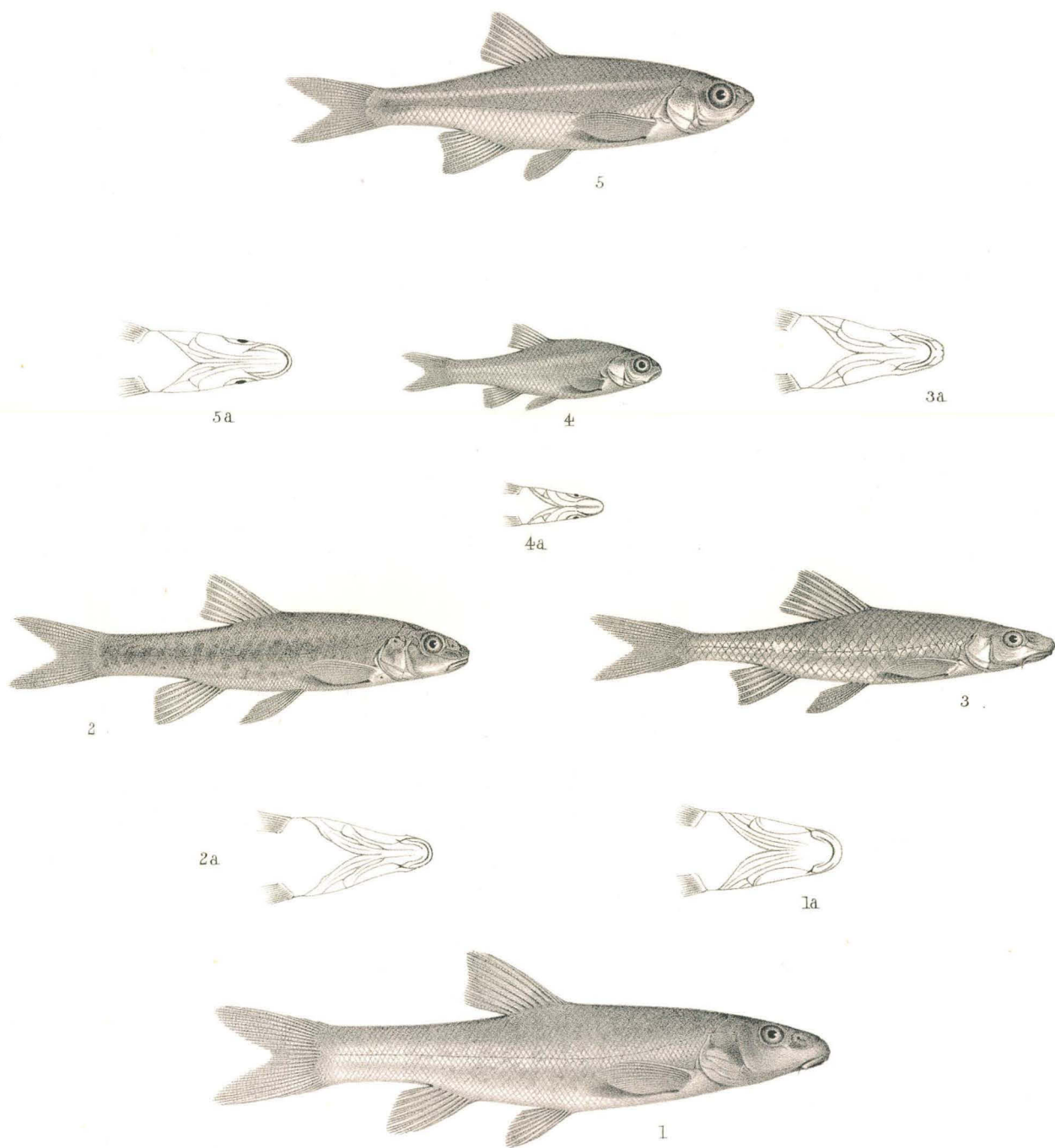
4a



3a

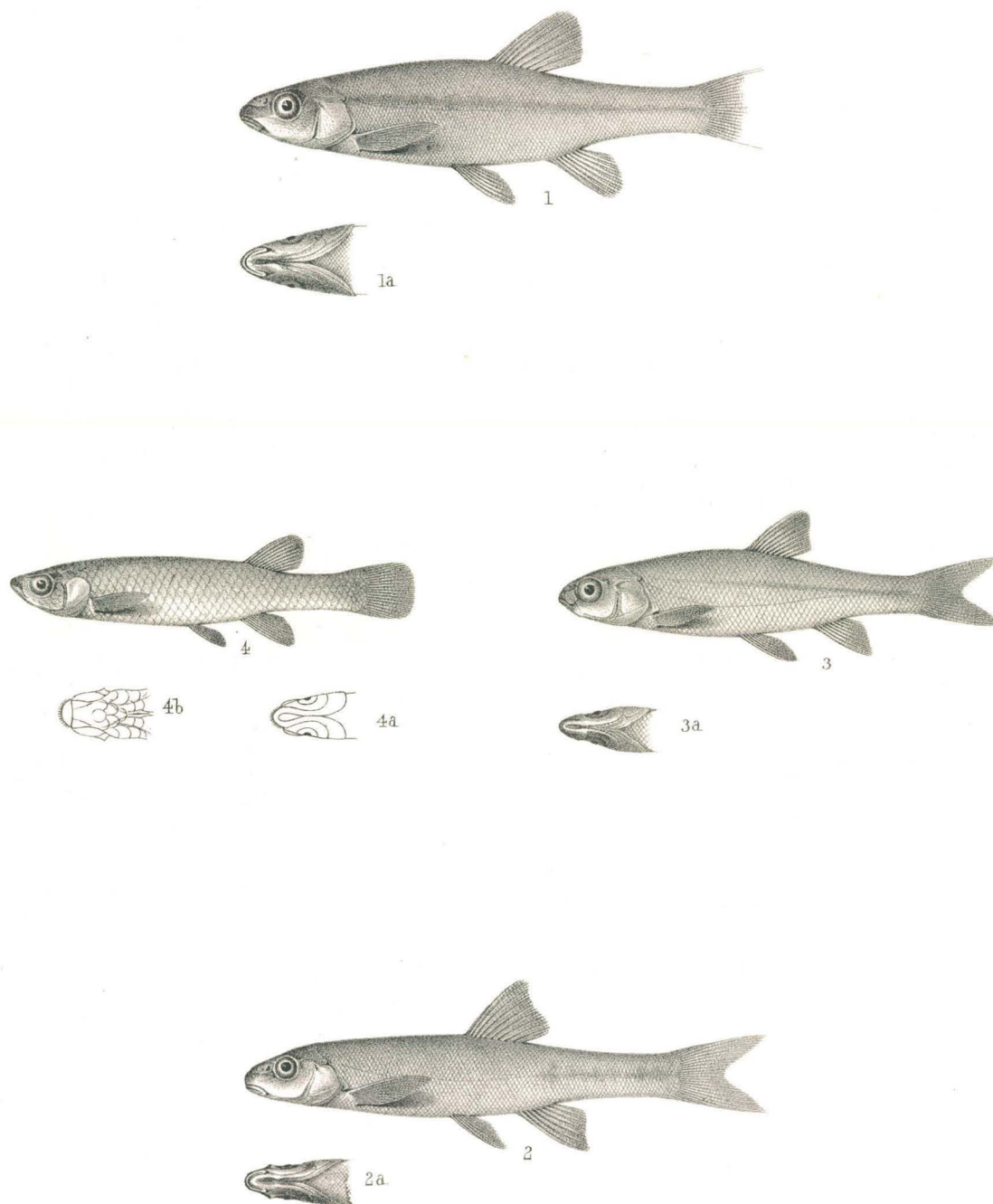
T. Sinclair, & son Lith. Phila.

FIG.1 and 1a. LEPIDOMEDA JARROVII. FIG.2 and 2a. LEPIDOMEDA VITTATA.
FIG.3. and 3a. PLAGOPTERUS ARGENTISSIMUS. FIG.4 and 4a. APOCOPE VULNERATA.



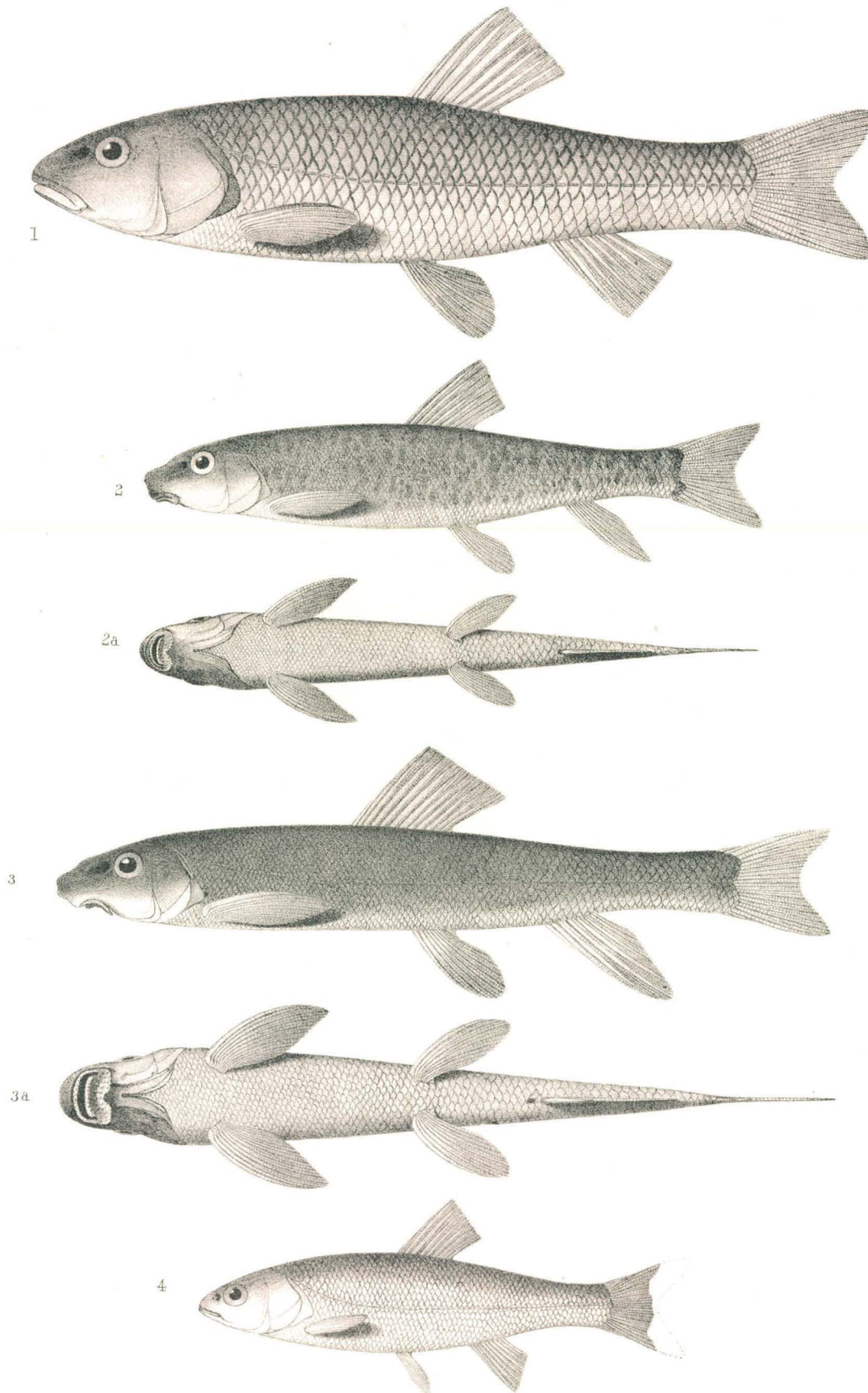
T. Sinclair & son. En. Grav.

FIG. 1 and 1a. RHINICHTHYS MAXILLOSUS. FIG. 2. and 2a. APOCOPE COUESI.
 FIG. 3 and 3a. CERATICHTHYS STERLETUS. FIG. 4 and 4a. GILA PHLEGETHONTIS.
 FIG. 5 and 5a. GILA TÆNIA.



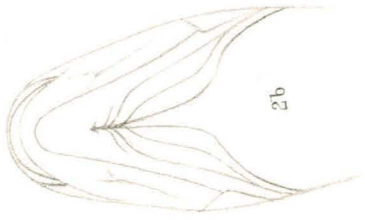
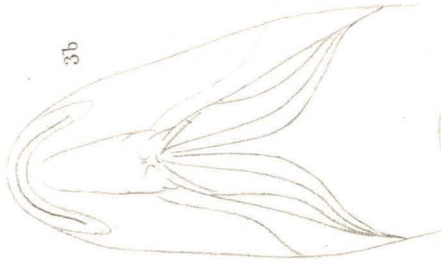
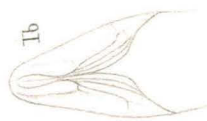
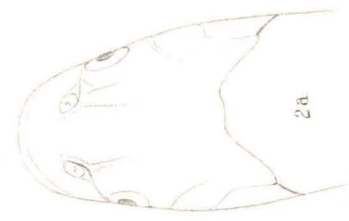
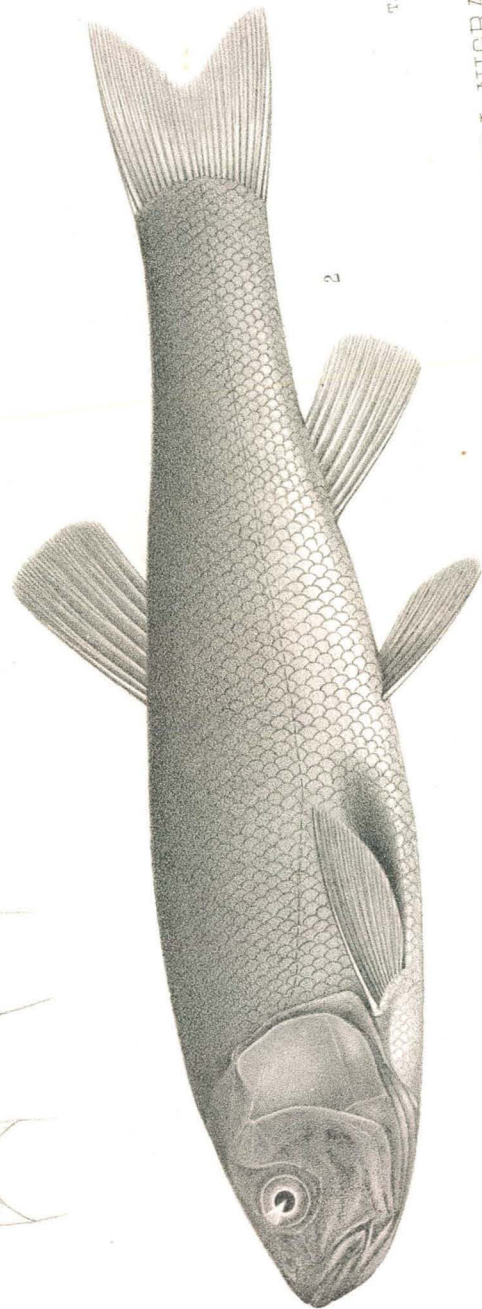
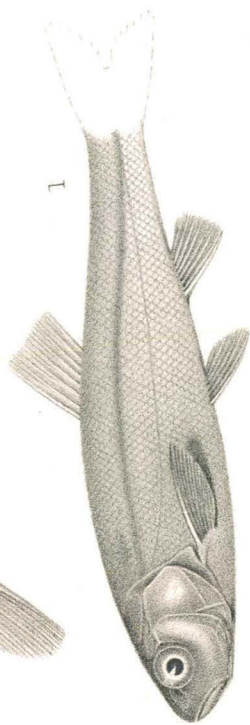
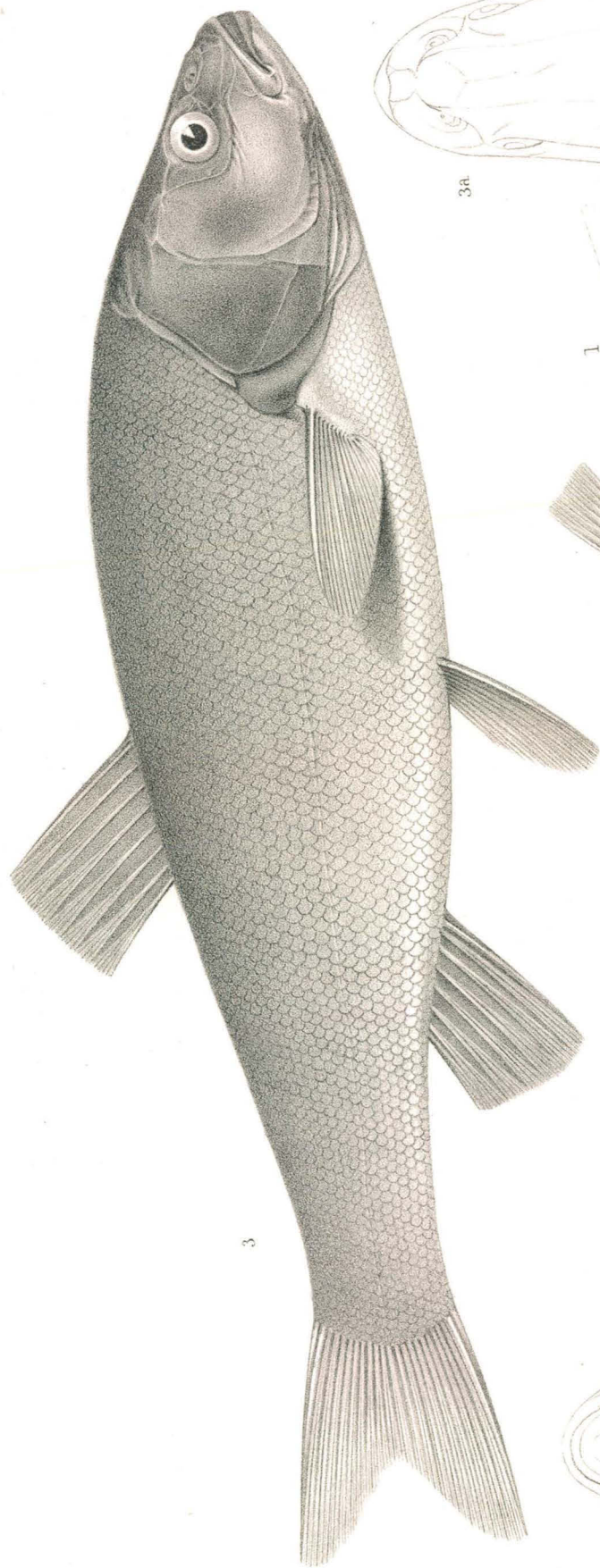
T. Sinclair & Son Del.

FIG 1 and 1a. APOCOPE VENTRICOSA. FIG. 2 and 2a. APOCOPE HENSHAVII.
 FIG. 3 and 3a. MYLOLEUCUS PAROVANUS. FIG. 4-4a and 4b. HAPLOCHILUS FLORIPINNIS.



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FIG. 1. *CERATICHTHYS BIGUTTATUS*. FIG. 2 and 2a. *PANTOSTEUS JARROVII*.
FIG. 3 and 3a. *PANTOSTEUS PLATYRHYNCHUS*. FIG. 4. *SIBOMA ATRARIA* VAR. *LONGICEPS*.



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FIG. 1-1a and 1b. *GILA ARDESIACA*. FIG. 2-2a and 2b. *GILA GULA*. FIG. 3-3a and 3b. *GILA NIGRA*.

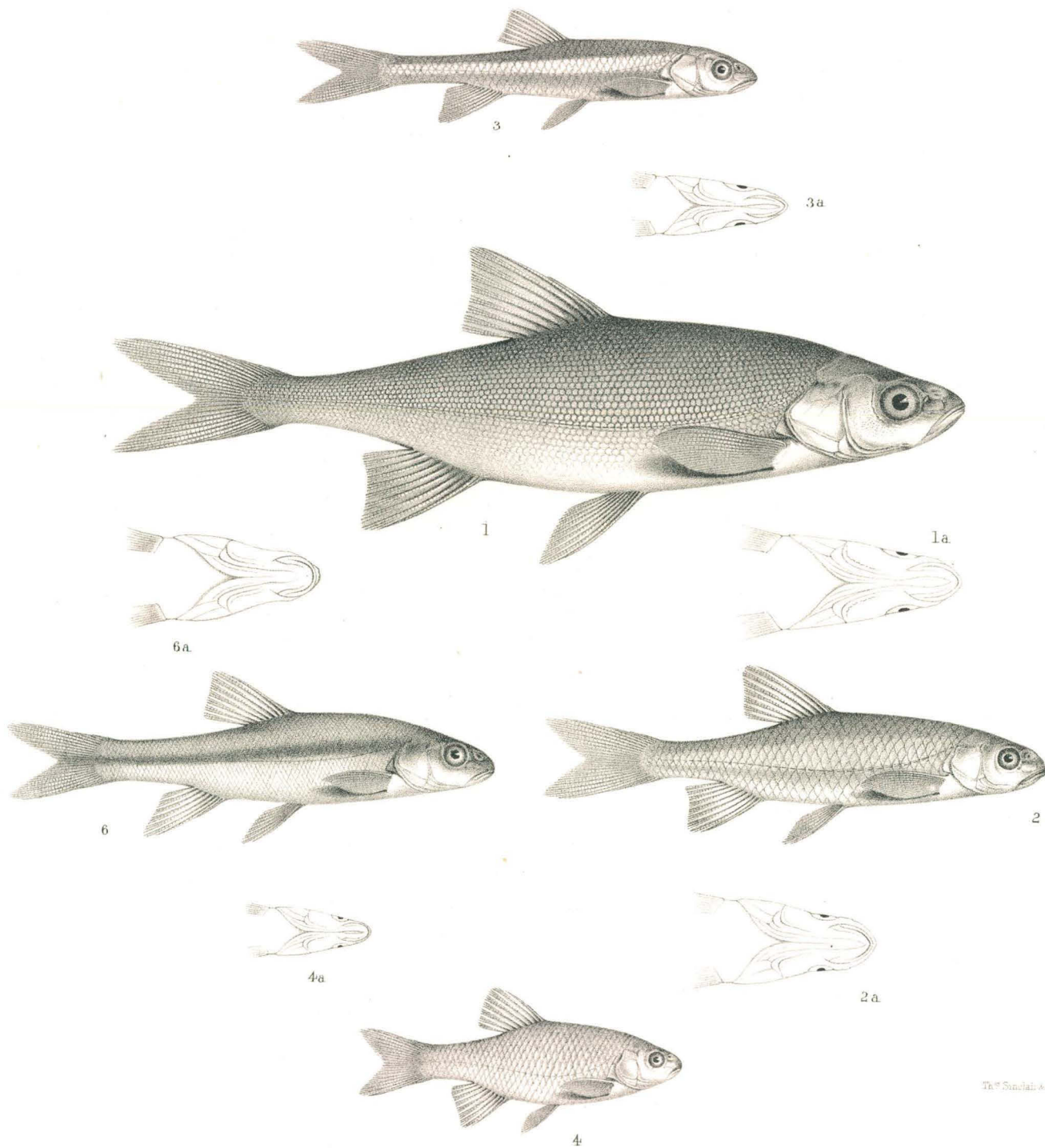
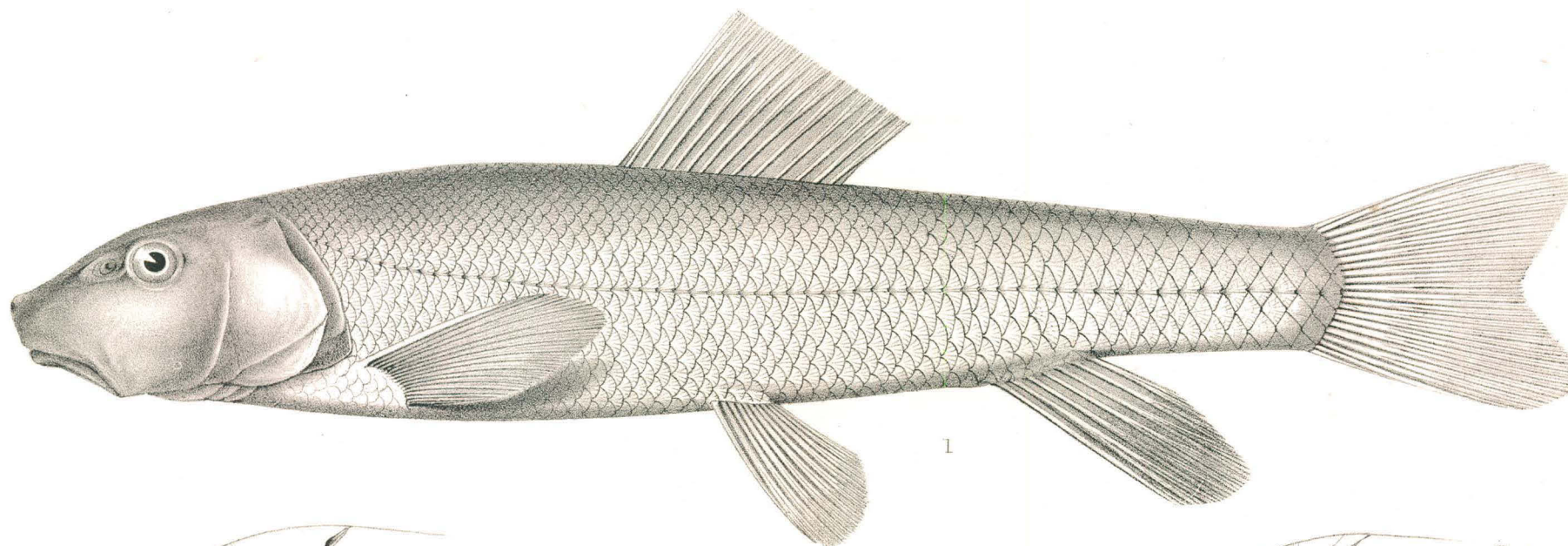
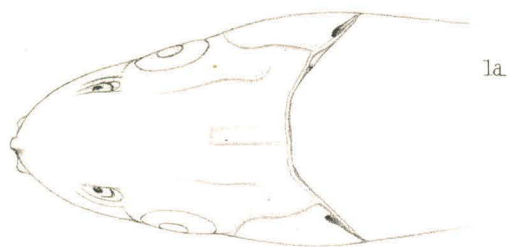


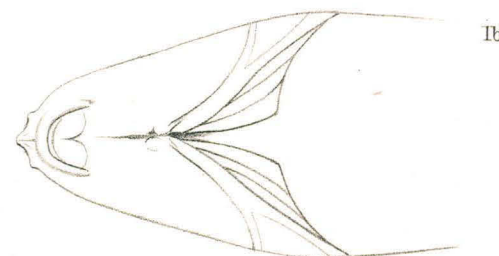
FIG.1 and 1a. GILA SEMINUDA. FIG.2 and 2a. ALBURNELLUS SIMUS
FIG.3 and 3a. ALBURNELLUS JEMEZANUS. FIG.4 and 4a. HYPHILEPIS IRIS. &
FIG.6 and 6a. HYBORHYNCHUS SIDERIUS.



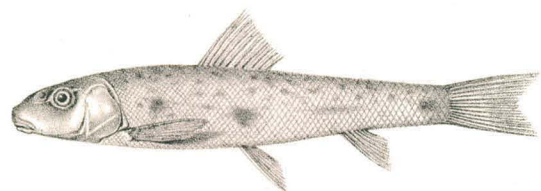
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1a



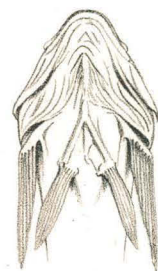
1b



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2b



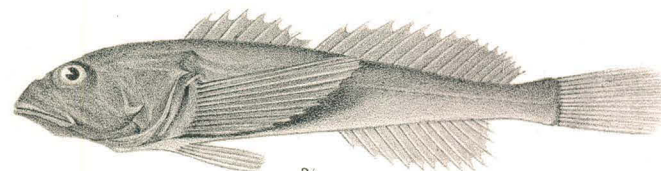
3b



2a



3a



3

Thos. Sinclair & Son, Lith. Phila.

FIG. 1-1a. and 1b. CATOSTOMUS FECUNDUM. FIG. 2-2a. and 2b. MOXOSTOMA TRISIGNATUM.
FIG. 3-3a and 3b. URANIDEA WHEELERI.

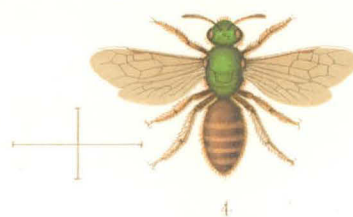
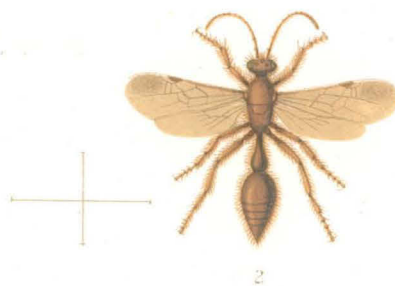
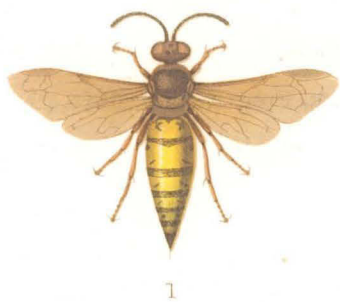


FIG. 1. STIZUS NEVADENSIS. ♂ FIG. 2. AGAMA ALBIPES. ♂
FIG. 3. HALICTUS TRIZONATUS. ♀ FIG. 4. AGAPOSTEMON MELLIVENTRIS. ♀
FIG. 5. MELECTA THORACICA. ♀



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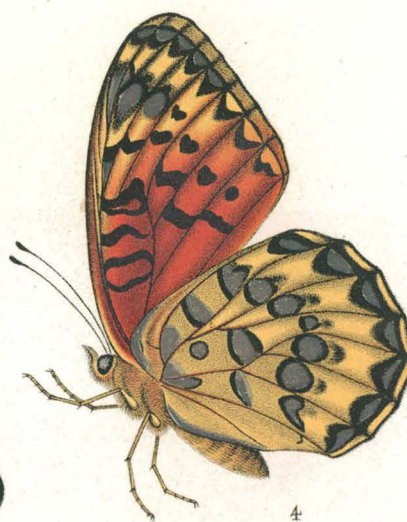
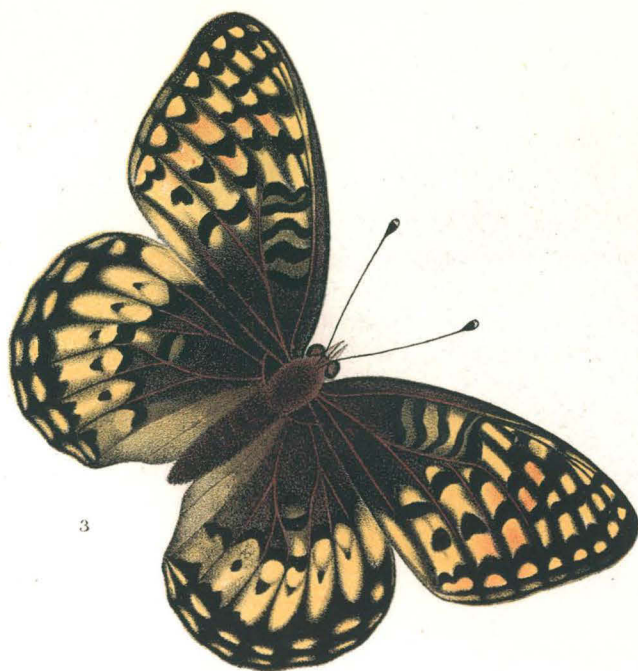
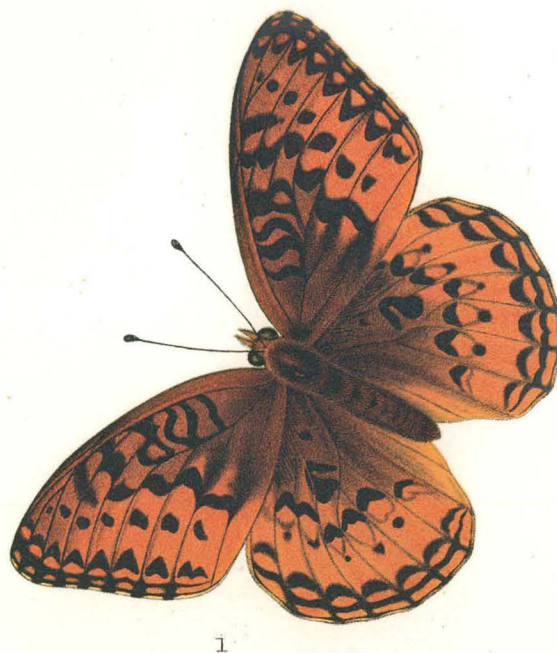
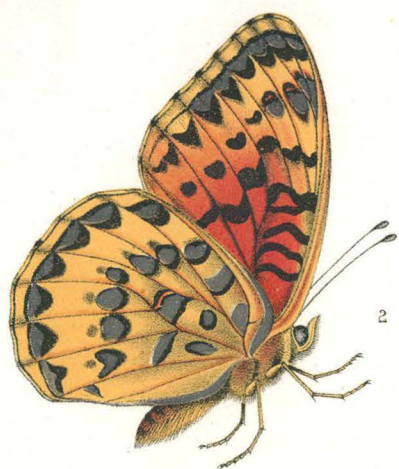
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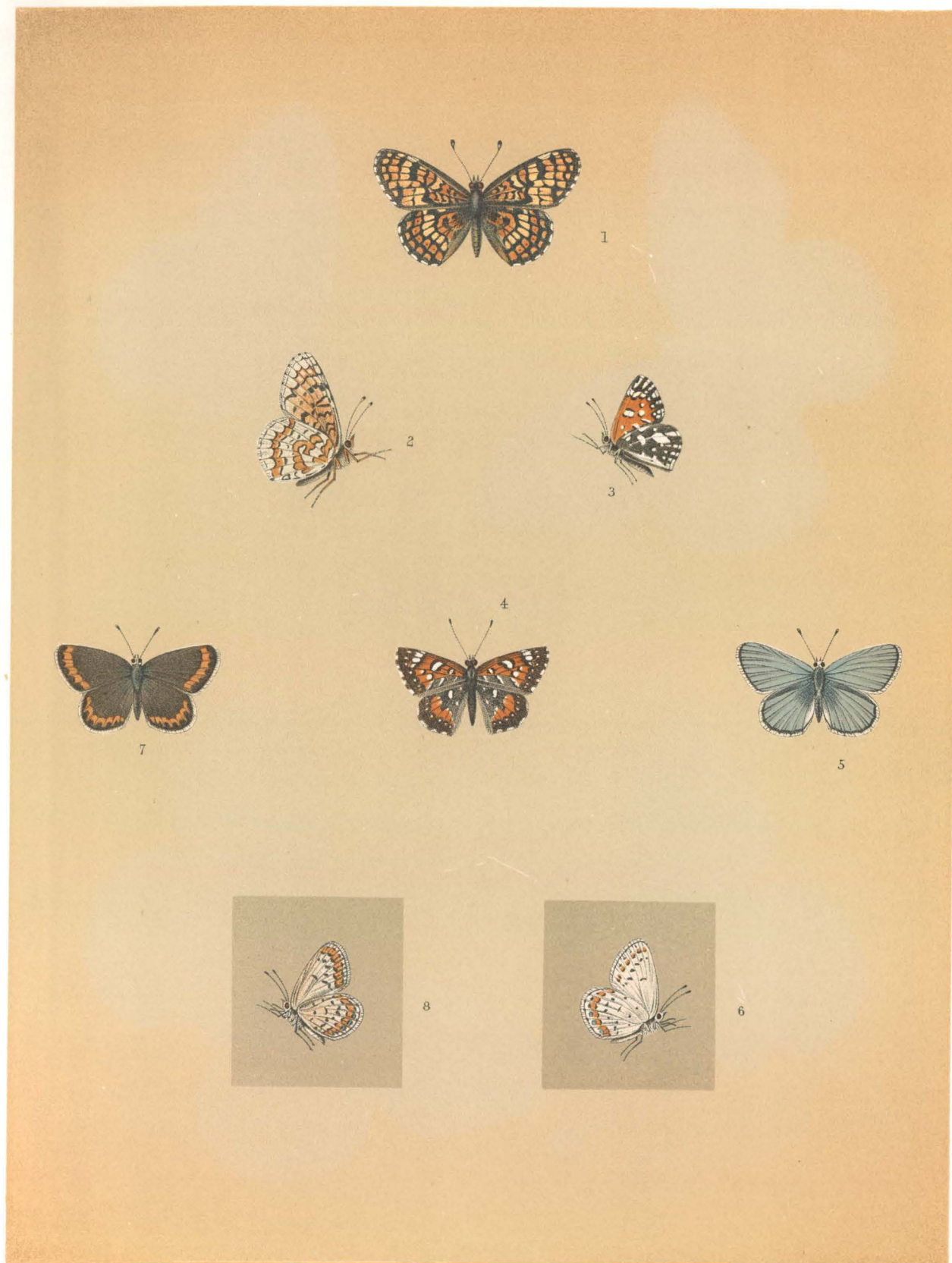
T. Henshaw & Son, San Francisco.

FIG. 1 VESPA OCCIDENTALIS. ♀ FIG. 2 VESPA OCCIDENTALIS. ♂
FIG. 3 NOMIA NEVADENSIS. ♀ FIG. 4 NOMIA NEVADENSIS. ♂
FIG. 5 BOMBUS NEVADENSIS. ♀ FIG. 6 MELISSODES NEVADENSIS. ♂



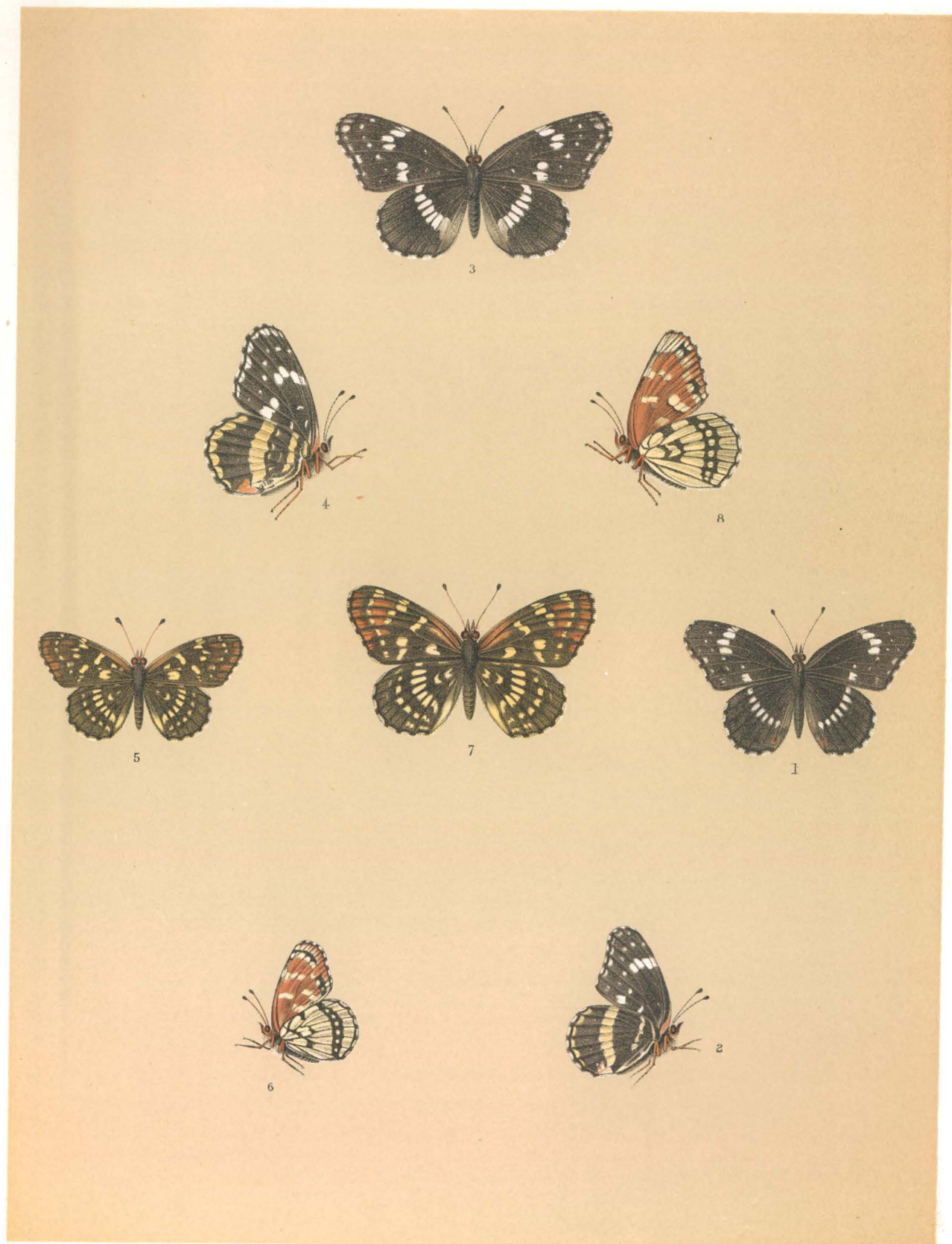
T. Sinclair & son lith. Phila.

FIG. 1 and 2. ARGYNNIS NOKOMIS. ♂
FIG. 3 and 4. ARGYNNIS NOKOMIS. ♀



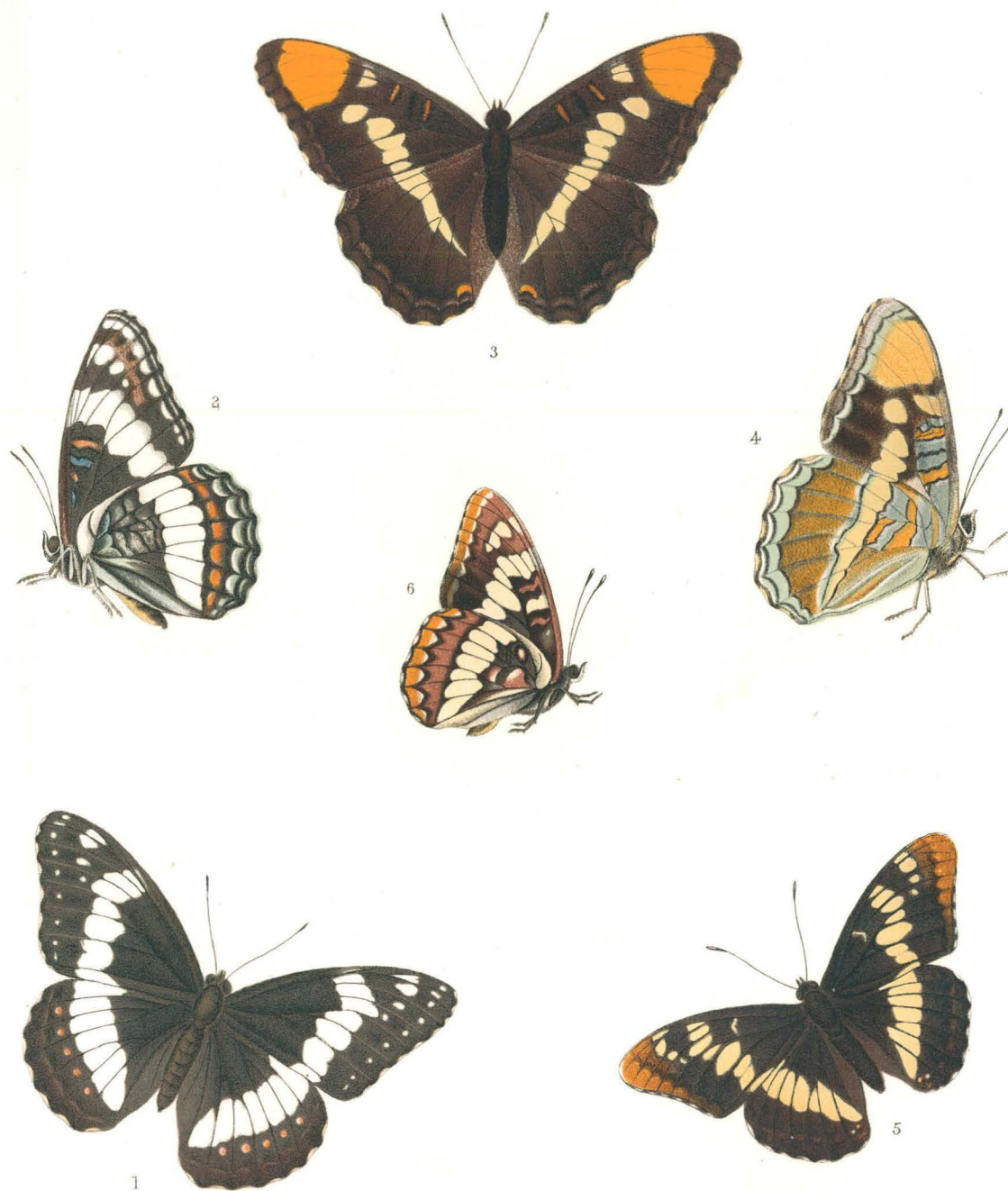
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FIG 1-2. MELITÆA MINUTA ♂ FIG. 3-4. LEMONIAS CYTHERA ♂
FIG. 5-6. LYCÆNA MELISSA ♂ FIG. 7-8. LYCÆNA MELISSA ♀



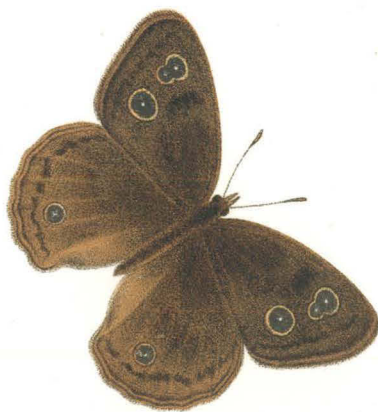
T. Sinclair & Son Lith. Phila.

FIG. 1-2. SYNCHLOE CROCALE ♂ FIG. 3-4 SYNCHLOE CROCALE ♀
FIG. 5-6. MELITÆA LEANIRA ♂ FIG. 7-8. MELITÆA LEANIRA ♀

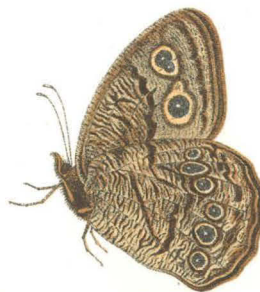


T. Sinclair & son Lith. Phila.

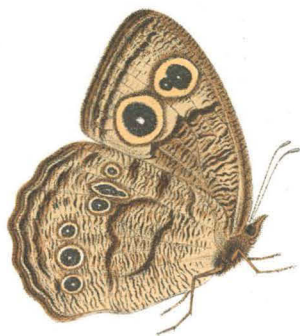
FIG. 1-2. LIMENITIS WEIDEMEYERII ♂
FIG. 3-4. LIMENITIS CALIFORNICA ♂
FIG. 5-6. LIMENITIS LORQUINI ♂



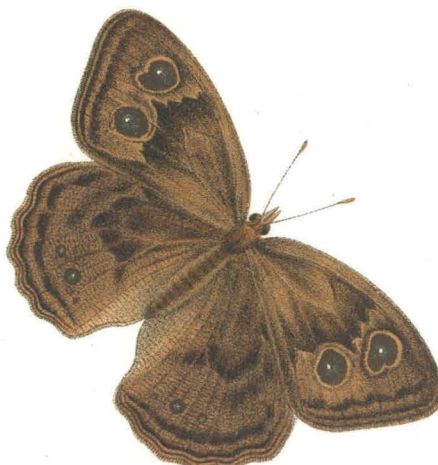
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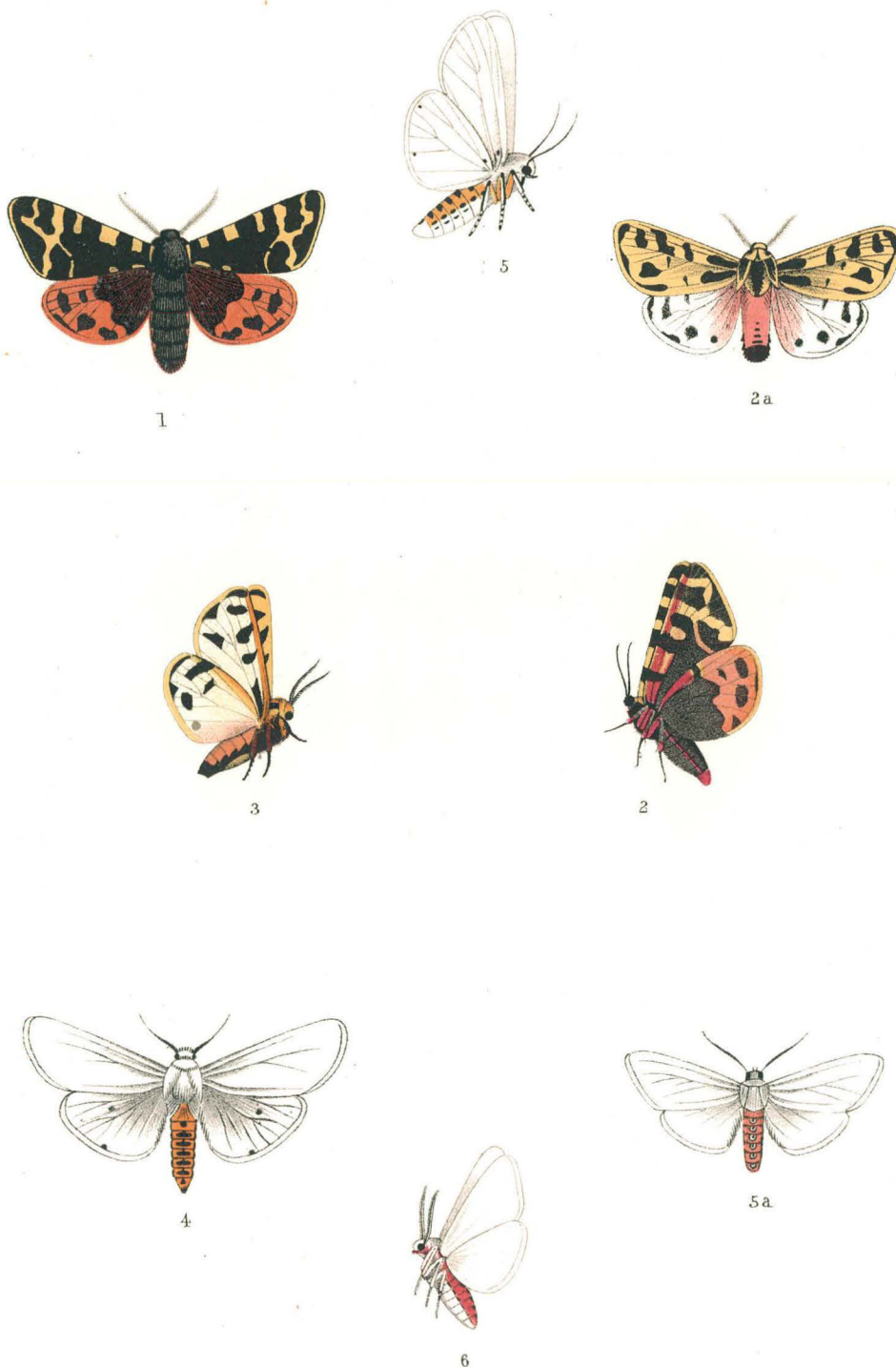
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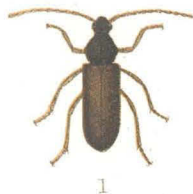
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FIG. 1-2. SATYRUS WHEELERI. ♂
FIG. 3-4. SATYRUS WHEELERI. ♀



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FIG. 1-2. *ARCTIA YARROWII*. FIG. 2a. 3. *ARCTIA DOCTA* VAR. *ARIZONENSIS*.
FIG. 4-5. *LEUCARCTIA ALBIDA*. FIG. 5a. 6. *EUCHÆTES ELEGANS*.



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FIG. 1. CROSSIDIUS INTERMEDIUS. FIG. 2. LYTTA LUGUBRIS.
FIG. 3. BEMBIDIUM NEVADENSIS. FIG. 4. EPICAUTA WHEELERI.
FIG. 5. DASYTES RUFICOLLIS.



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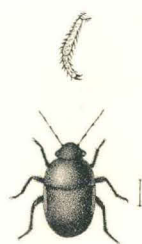
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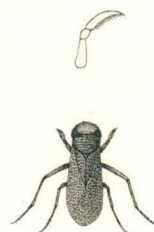
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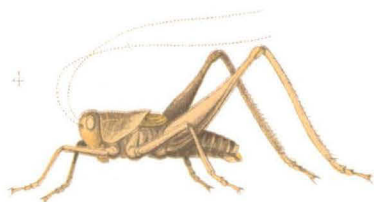
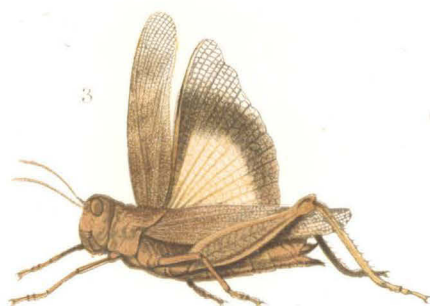
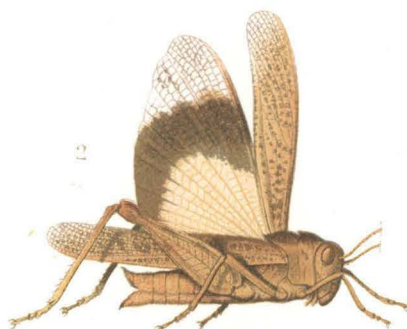
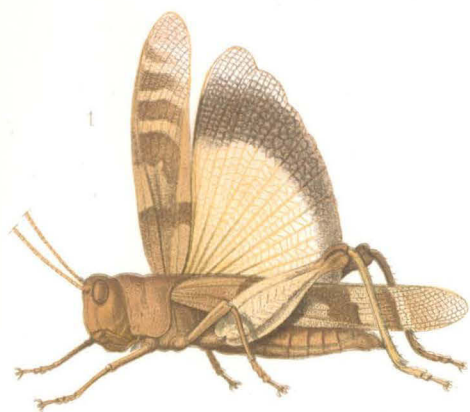
FIG. 1. NYSIUS ANGUSTATUS.
FIG. 2. MEGALONOTUS SODALICIUS.
FIG. 3. CALOCORIS SUPERBUS.
FIG. 4. CALOCORIS PALMERII.
FIG. 5. SCOLOPOCERUS SECUNDARIUS.
FIG. 6. CORIMELANA EXTENSA.

FIG. 7. CORISA DISPERSA.
FIG. 8. DASYCORIS HUMILIS.
FIG. 9. MIRIS INSTABILIS.
FIG. 10. LYGUS ANNEXUS.
FIG. 11. LIODERMA VIRIDICATA.
FIG. 12. HADRONEMA MILITARIS



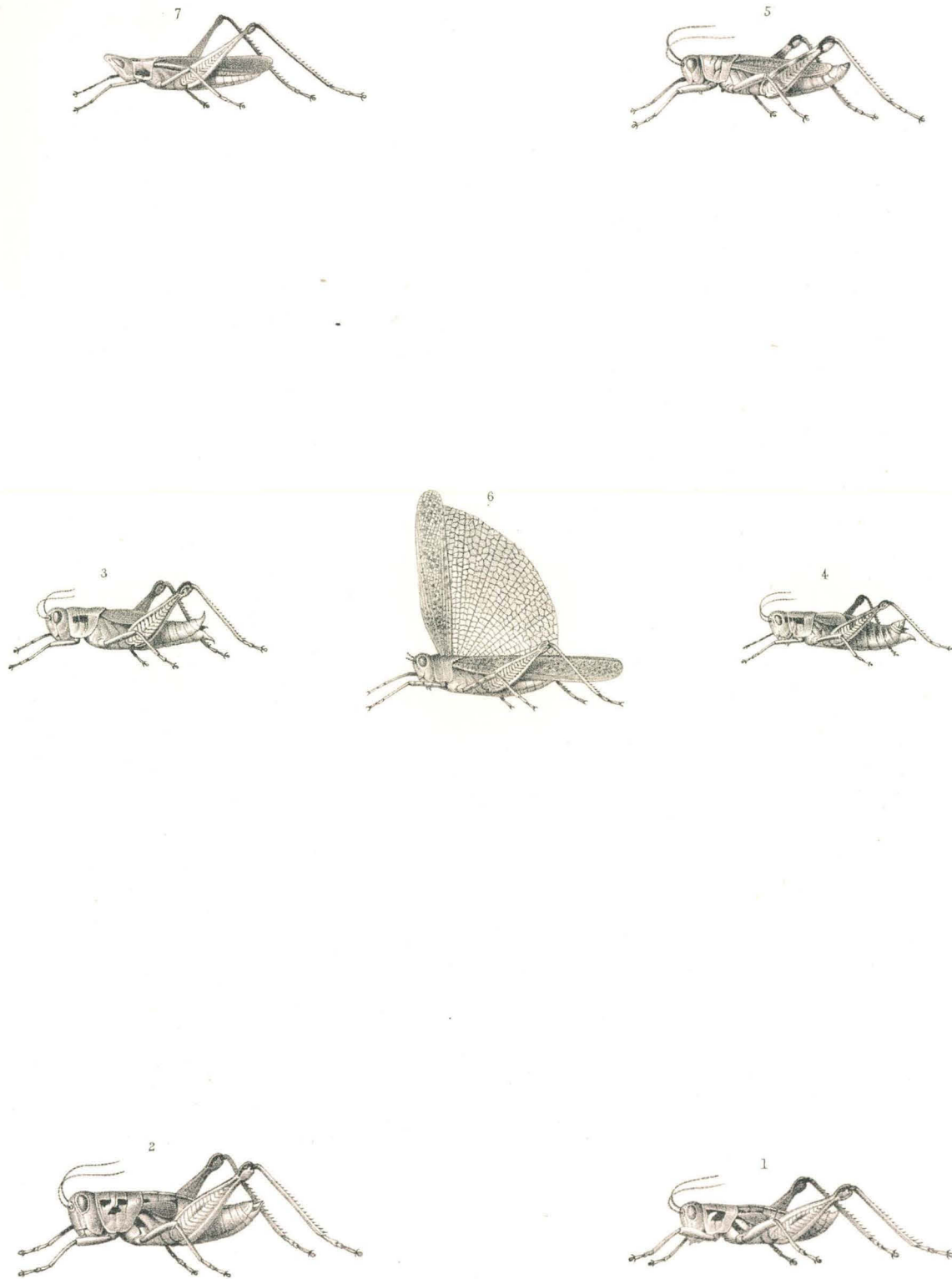
T. Sinclair & Son. Del. Phila.

FIG 1. ACRIDIUM ALBOLINEATUM. FIG.2. ACRIDIUM SHOSHONE.
FIG 3. TOMONOTUS TENEBROSUS. FIG 4. PEDIOSCERTETES NEVADENSIS.
FIG.5. EREMOBIA MAGNA.



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FIG. 1 OEDIPODA WHEELERII. FIG. 2 OEDIPODA UTAHENSIS
FIG. 3 OEDIPODA NEGLECTA. FIG. 4 STEIROXYS HEERMANNII
FIG. 5 GOMPHOCERUS CARPENTERII



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FIG. 1. PEZOTETTIX HUMPHREYSII ♂ FIG. 2. PEZOTETTIX HUMPHREYSII ♀
 FIG. 3. PEZOTETTIX MARSHALLII. FIG. 4. PEZOTETTIX UNICOLOR.
 FIG. 5. CALOPTENUS YARROWII. FIG. 6. OEDIPODA SPARSA
 FIG. 7. SYRRULA FUSCO-VITTATA.

Note — PEZOTETTIX OREGONENSIS and STEIROXYS BILINEATA originally intended for this plate,
 have been replaced by P. HUMPHREYSII and OEDIPODA SPARSA.

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