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A SYNOPSIS OF THE GENUS ARREMONOPS.

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The genus *Arremonops* was instituted by Mr. Ridgway some years ago (Man. N. Am. Birds, ed. 2, 1896, 385, 434, 605) for the so-called Texas Sparrow, *Embernagra rufivirgata* of Lawrence, and its conspecifics. The name was chosen because of the evident relationship between the forms in question and the members of the genus *Arremon*—a relationship so close, indeed, that Mr. Ridgway was obliged to admit that he “found it difficult to discover reasons for separating them generically from the latter” group, although the propriety of removing them from *Embernagra* was obvious enough. In his “Birds of North and Middle America” (Vol. I, p. 37) he was still unable to assign any structural characters whereby to distinguish the group from *Arremon*, and quite frankly based it on pattern of coloration. Taking this as a criterion, *Arremonops* is a natural and sufficiently compact group, its members agreeing in having the upper parts plain olive green, the pileum striped with black or brown, and the under parts whitish, with the sides and flanks shaded with olivaceous, grayish, or buffy. The discrimination of the several forms, on the other hand, is a matter of no small difficulty, not only because of their general resemblance in form and in details of coloration, but also by reason of the subtle nature of their differential characters, which are brought out plainly enough, however, when series of specimens are compared. In the present paper we recognize seven species and eight additional subspecies, one of which is described as new. The genus divides up into two groups, according to the color of the pileum and crown-stripes. The first group, composed

of *A. conirostris*, *A. striaticeps*, and *A. chloronotus*, ranges from the Guiana frontier of Venezuela westward to Colombia and Ecuador, and thence northward through Central America to the Isthmus of Tehuantepec. The second group comprises *A. tocuyensis*, *A. verticalis*, *A. superciliosus*, and *A. rufivirgatus*; this group, while not known to go beyond the arid coast region of Venezuela, extends considerably farther north, one form passing the Mexican boundary and entering Texas. This one form belongs to the Lower Austral Zone, but all the others are strictly birds of the Tropical Zone wherever found, and most of them are more or less characteristic of certain faunal areas commonly recognized. With the exception of the single form occurring in Texas, little appears to be known of their habits; they would seem, however, to be birds of the more open country, where there are bushes and shrubbery, rather than of the deep forest. *A. conirostris*, described by Bonaparte in 1850, is the oldest known form of the genus, and was referred at the time to *Embernagra*, as were also all the other related forms discovered up to the founding of the genus *Arremonops*. Several of the forms have been very imperfectly understood, and some involved in considerable confusion, mainly owing to lack of sufficient material. We have been fortunate in having had access to good series of specimens, the Carnegie Museum series alone numbering 190 skins, while the authorities of the American Museum of Natural History, the Museum of Comparative Zoology, the U. S. National Museum, and the Bureau of Biological Survey have very generously placed additional material in this group at our disposal, for which courtesy we wish to express our thanks. As in other recent papers by the writer, Mr. Ridgway's "Color Standards and Color Nomenclature" has been adopted as a reference work in dealing with this phase of the study. Measurements, where given, are in millimeters, and the length of the bill is that of the exposed culmen. A full synonymy is omitted, but the first reference under each name is given in every case.

The key which follows is the result of an attempt to arrange the various forms in what appears to be their natural order, but it must be understood that the characters are in large measure comparative rather than absolute, and depend for their value on what is shown by a series of specimens.

Key to the Species and Subspecies of *Arremonops*.

- A. Pileum purer gray (neutral gray to pale neutral gray); lateral crown-stripes purer black.
 - a. Above duller green; flanks washed with grayish or buffy.....
(*Arremonops conirostris*).
 - b. Tail below dull brownish olive; outermost primary margined with grayish or whitish.
 - c. Above darker, more yellowish olive, washed with grayish; wings externally dark citrine; gray of head deeper (neutral gray).....*Arremonops conirostris umbrinus*.
 - c'. Above brighter, more citrine, washed with grayish; wings externally pyrite yellow; gray of head lighter (light neutral gray).....*Arremonops conirostris conirostris*.
 - b'. Tail below dark citrine; outermost primary margined with yellowish green.....*Arremonops conirostris inexpectatus*.
 - a'. Above purer green; flanks washed with olive green.
 - b. Larger; wing of male over 70 mm.....(*Arremonops striaticeps*).
 - c. Gray median crown-stripe wider than black lateral crown-stripes.....*Arremonops striaticeps chrysona*.
 - c'. Gray median crown-stripe not wider than black lateral crown-stripes.
 - d. Above duller, more brownish olive green; head paler gray.....*Arremonops striaticeps striaticeps*.
 - d'. Above brighter, purer olive green; head darker gray.
 - e. Below darker and more distinctly bicolor; flanks with more greenish wash.....
Arremonops striaticeps richmondi.
 - e'. Below paler and more uniform; flanks with less greenish wash.....*Arremonops striaticeps centratus*.
 - b'. Smaller; wing of male under 70 mm.....*Arremonops chloronotus*.
- A'. Pileum duller gray, buffy gray, or olivaceous; lateral crown-stripes more or less brown, at least posteriorly.
 - a. Lateral crown-stripes black, becoming brownish on the nape, or black and brown streaked.
 - b. Above more grayish; superciliaries and median crown-stripe pale mouse gray.....*Arremonops tocuyensis*.
 - b'. Above more greenish; superciliaries and median crown-stripe light grayish olive.....*Arremonops verticalis*.
 - a'. Lateral crown-stripes wholly brown.
 - b. Lateral crown-stripes rich brown, in strong contrast with the buffy grayish median stripe.....(*Arremonops superciliosus*).
 - c. Above more olivaceous green; below more shaded with buffy.
 - d. Lateral crown-stripes darker (deep carob brown); buffy of under parts darker.....
Arremonops superciliosus superciliosus.

- d'. Lateral crown-stripes lighter (carob brown); buffy of under parts purer.....
Arremonops superciliosus sumichrasti.
- c'. Above more grayish green; below less shaded with buffy
Arremonops superciliosus sinaloæ.
- b'. Lateral crown-stripes dull brown, in slight contrast with the olivaceous median stripe.....(*Arremonops rufivirgatus*).
- c. Above darker olive green; breast and sides paler buffy grayish; bill stouter....*Arremonops rufivirgatus crassirostris.*
- c'. Above paler olive green; breast and sides deeper buffy grayish; bill weaker....*Arremonops rufivirgatus rufivirgatus.*

***Arremonops conirostris umbrinus*, subsp. nov.**

Type, No. 90,509, Collection Carnegie Museum, adult male; Santa Elena, Merida, Venezuela, August 11, 1922; M. A. Carriker, Jr.

Subspecific characters.—Similar to *Arremonops conirostris conirostris*, but decidedly darker throughout, the top and sides of the head neutral gray, and the upper parts in general, wings, and tail dark yellowish olive.

Range.—Humid Tropical Zone of the Lake Maracaibo region, western Venezuela.

Remarks.—The characters applying to this form hold good in a series of twenty-one specimens from several localities in the region south of Lake Maracaibo. Probably it extends all around the lake, except to the northward, its range thus coinciding with that of several other forms which have been described from this region, and which have similarly undergone modification upon entering the Humid Tropical Zone.

***Arremonops conirostris conirostris* (Bonaparte).**

A[rremon] conirostris BONAPARTE, *Consp. Avium*, I, 1850, 488 ("Brazil" [= "Bogotá," Colombia, fide Hellmayr and von Seilern]).

Arremonops venezuelensis RIDGWAY, *Auk*, XV, (May 13), 1898, 228 (Puerto Cabello, Venezuela).

Arremonops conirostris canens BANGS, *Proc. Biol. Soc. Washington*, XII, (June 3), 1898, 140 ("Santa Marta," Colombia).

Range.—Venezuela (except region around Lake Maracaibo) westward to the Magdalena and Sinu Valleys in Colombia, in the Tropical Zone, and southward along the eastern base of the Andes to about 4° north latitude.

Remarks.—After extended comparison of an ample series we are unable to appreciate any decided or constant differences between specimens from various parts of the range of this, the typical form, such variations as there are being mainly attributable to season and individual. Specimens from the Guiana frontier and the Caura Valley in Venezuela are not certainly distinguishable from others coming from the Santa Marta region and Magdalena Valley in Colombia, and these in their turn are not to be told from birds from the base of the Eastern Andes at Buena Vista and Villavicencio, which may be considered topotypical, if we accept Messrs. Hellmayr and von Seilern's designation of a type-locality. A series from farther north

along the east base of the range, in the State of Boyaca, however, have the under parts in general more grayish, and the flanks and crissum less buffy; they thus tend in the direction of *umbrinus*, although cut off therefrom by the Andes of Venezuela.

Bonaparte attributed his *Arremon conirostris* to Brazil, which was of course a mistake. Slater recorded it from Colombia, and its range was presently extended to include Venezuela also. Mr. Ridgway, misled by the treatment of other authors, unfortunately applied Bonaparte's name to the Panama bird subsequently called *Embernagra striaticeps* by Lafresnaye, and re-described the present species as *Arremonops venezuelensis*. A few weeks later Mr. Bangs made a similar mistake, comparing his new form *canens* from the Santa Marta region of Colombia with what he supposed was typical *conirostris*. His type-specimen, which we examined at one time, is an unusually large and richly colored individual, but is approached by others from within the range of *conirostris*. Although the writer called attention to the status of these names some ten years ago (*Annals Carnegie Museum*, VIII, 1912, 199), he was uncertain as to the proper application of the name *conirostris*, mainly because of its assigned type-locality, but with this point cleared up there can be no reasonable doubt but that *venezuelensis* and *canens* will both fall as synonyms of *conirostris*.

Arremonops conirostris inexpectatus Chapman.

Arremonops conirostris inexpectata CHAPMAN, *Bull. Am. Mus. Nat. Hist.*, XXXIII, 1914, 18† (below Andalucia, Eastern Andes, Colombia, altitude 3,000 feet).

Range.—Known only from the type-locality, near the headwaters of the Magdalena River, Colombia.

Remarks.—This form differs from typical *conirostris* chiefly in the brighter coloration of its wings and tail, the other characters ascribed to it failing to hold good in a series. The tail is fully as yellowish green (nearest dark citrine) as in *A. striaticeps chrysoma*, while the wings, at least in fully adult birds, are as brightly yellow. The upper parts in general, however, are yellowish olive, almost as in *umbrinus*, with much grayish wash. The bill is dark colored throughout. The form thus stands midway in its characters between *conirostris* and *chrysoma*, but not in its geographical range. So far as known it is confined to the region at the headwaters of the Magdalena River in Colombia, while typical *conirostris* occupies the valley of that stream lower down. Dr. Chapman remarks that this is the only known case in which a species common to both these respective regions has developed a geographic variant in the former section. *A. striaticeps chrysoma*, on the other hand, occupies the Pacific slope of Ecuador and Colombia, and does not even enter the Cauca Valley. Intergradation between *chrysoma* and *inexpectatus* is thus virtually out of the question, at least in this particular part, and we are left to conjecture why a form with such characters should have been developed in a region having no other peculiar forms.

Arremonops striaticeps chrysoma (Sclater).

Embernagra chrysoma SCLATER, Proc. Zool. Soc. London, 1860, 275 (Babahoyo, Ecuador).

Range.—Pacific slope of Ecuador and Colombia, in the Tropical Zone.

Remarks.—For a long time it was supposed that this bird was confined to western Ecuador, whence it was first made known by Sclater over sixty years ago. Dr. Chapman's researches in Colombia led to its discovery in the extreme southwestern part of that country, and still more recently Mr. Carriker has found it at Sautata, in the valley of the lower Atrato River, indicating that it probably occurs in the intervening region as well. Specimens from this part are absolutely identical with a series from Ecuador, and show no approach whatever to the characters of *conirostris*. This Atrato record tends to close the gap between *chrysoma* and *striaticeps*, while at the same time suggesting that these two forms are specifically distinct from *conirostris*, which has been traced as far west as the Rio Sinu. The color-pattern is the same in both groups, but the colors themselves are different, being much more intense in *chrysoma*, especially on the back, wings, and tail; the size is larger in the latter also. The back in *chrysoma* is a uniform clear green (between warbler green and dark citrine), while the edge of the wing and the under coverts are lemon chrome; there is always more or less greenish wash on the flanks, and the tail below is decidedly greenish.

Arremonops striaticeps striaticeps (Lafresnaye).

Embernagra striaticeps LAFRESNAYE, Rev. et Mag. Zool., 1853, 61 (Panama).

Range.—Panama (exact limits of range unknown).

Remarks.—When Mr. Ridgway described his *Arremonops richmondi* from Nicaragua in 1898 he compared it with Panama specimens, which he inadvertently referred to *conirostris*, at the same time describing the latter under a new name, *venezuelensis*. This latter error we discovered and corrected some years ago, but the full implication of the error, so far as the Panama form was concerned, seems to have escaped notice. Panama specimens differ from Costa Rican just as Mr. Ridgway says, *i. e.*, in being duller, more brownish olive green above, with paler grayish head, and paler, more whitish, less grayish under parts. The black stripes of the pileum average narrower also. Compared with *chrysoma* of western Ecuador and Colombia, they have the crissum paler, more buffy, less yellowish, and the flanks and tibiae with less yellowish green wash; the dark stripes on the pileum are wider, leaving the median gray crown-stripes narrower. These three forms are evidently conspecific, and will take for their specific name *striaticeps* of Lafresnaye, based on the bird of Panama.

Arremonops striaticeps richmondi Ridgway.

Arremonops richmondi RIDGWAY, Auk, XV, (May 13), 1898, 228 (Greytown, Nicaragua).

Range.—Southern Honduras (Segovia River) to Chiriqui.

Remarks.—In this form the gray of the head and under parts is deeper,

and the black crown-stripes are decidedly wider than in *striaticeps* or *chrysona*; the green of the upper parts is purer, less brownish in tone than in the former, and rather deeper than in the latter. Specimens from the Caribbean slope of Costa Rica are perhaps a trifle darker than those from the Pacific slope of that country, with the crown-stripes a little broader; they thus verge toward the Panama race. The name was based on Nicaragua specimens, and the form ranges north to the Segovia River, Honduras. Chiriqui specimens have not been examined in this connection, but are referred here on geographical grounds. Nearly all the published references pertaining to this form appear under the specific name *striaticeps*, with which it was confused until discriminated by Mr. Ridgway in 1898.

***Arremonops striaticeps centratus* Bangs.**

Arremonops conirostris centratus BANGS, Bull. Mus. Comp. Zool., XXXIX, July, 1903, 156 (Ceiba, Honduras).

Range.—Known only from the type-locality, on the north coast of Honduras.

Remarks.—This proves on examination of the type-series (three specimens) to be a rather poor form, scarcely worthy of formal recognition, additional specimens being needed to confirm its validity. In describing it Mr. Bangs must have compared it with true *striaticeps* from Panama, instead of with *richmondi* from Nicaragua and Costa Rica, to which form it is certainly very close. There is practically no difference in the color of the upper parts between *centratus* and *richmondi*, except that the slight brownish wash on the inner remiges, evident in most specimens of the latter, appears to be wanting. The under parts are a little paler and more uniform (not darker, as intimated in the description), while the flanks have less greenish wash and the crissum rather less buffy. The size averages a little smaller too, the bill tending to be shorter in proportion, but in some specimens of *richmondi* it is fully as small.

***Arremonops chloronotus* (Salvin).**

Embernagra chloronota SALVIN, Proc. Zool. Soc. London, 1861, 202 (Chocutum, Vera Paz, Guatemala).

Range.—Northern Honduras, north and west to the Isthmus of Tehuantepec, in the Tropical Zone.

Remarks.—The relationships of this form are clearly with the *striaticeps* group, the range of which it approximates on the south. It is in fact merely a smaller and little darker edition of *A. striaticeps richmondi*, and might indeed be considered as conspecific with that bird. The bill is relatively as well as absolutely shorter than in *richmondi*, however, and the black stripes on the pileum are narrower, and in some specimens indistinctly streaked with brownish. It was discovered by Salvin during his ornithological explorations in Guatemala, and has subsequently been traced into Honduras, British Honduras, and the southeastern States of

Mexico, not entering the Pacific drainage, however, nor going much if any above 2000 feet elevation.

Arremonops tocuyensis Todd.

Arremonops tocuyensis TODD, Ann. Carnegie Mus., VIII, 1912, 198 (Tocuyo, Lara, Venezuela).

Range.—Arid coast region of Venezuela and Colombia, from the State of Lara to the Goajira Peninsula.

Remarks.—*Arremonops tocuyensis* is a very distinct species, belonging to that section of the genus in which the pileum is paler gray, and the stripes tend to be brown or brownish. It has nothing to do with *A. conirostris*, although their respective ranges certainly approximate each other very closely, if indeed they do not actually overlap. It is apparently most closely related to *A. verticalis* of Yucatan, from which it differs in rather smaller size, relatively stouter bill, grayer, less greenish coloration, and blacker head-stripes. These latter are black in front, but more or less mixed with brown posteriorly. The species was described by the present writer from a single specimen taken by Mr. M. A. Carriker, Jr., at Tocuyo, a point located west of Barquisimeto, in the State of Lara, Venezuela. The same party subsequently secured a series at Riohacha, in the Goajira district of Colombia, while Mr. George K. Cherrie has found it in the Paraguana Peninsula of Venezuela. These records enable us to predicate its range as the Arid Tropical Zone in the region around the Gulf of Maracaibo.

Arremonops verticalis (Ridgway).

[*Embernagra rufivirgata*] *γ. verticalis* RIDGWAY, Proc. U. S. Nat. Mus., I, 1878, 248, 249 (Merida, Yucatan).

Range.—Northern Yucatan and Campeche, Mexico.

Remarks.—Originally described by Mr. Ridgway as a race of *A. rufivirgatus*, this form is now considered to be specifically distinct, differing in its darker crown-stripes, grayer head, and whiter under parts. From *A. chloronotus*, with which it was at one time confused, it is still more different. Its relationships appear to lie with *A. tocuyensis*, despite the gap existing between their respective ranges. It occupies a comparatively restricted area in northern Yucatan, and has been traced southward into Campeche by Messrs. Nelson and Goldman.

Arremonops superciliosus superciliosus (Salvin).

Embernagra superciliosa SALVIN, Proc. Zool. Soc. London, 1864, 532 (Bebedero, Costa Rica).

Range.—Northwestern Costa Rica, in the region around the Gulf of Nicoya.

Remarks.—In its broad and rich dark brown crown-stripes this form possesses a good distinctive character. It was originally compared with *A. chloronotus*, but is obviously much more closely related to *A. rufivirgatus*, which may be considered its Gulf coast representative, the two agree-

ing well in size and proportions, although sufficiently different in details of coloration. True *superciliosus* is confined to the Pacific slope of Costa Rica, in the region around the Gulf of Nicoya.

***Arremonops superciliosus sumichrasti* (Sharpe).**

E[mbernagra] sumichrasti SHARPE, Cat. Birds Brit. Mus., XII, 1888, 762, in text ("Huamela," *i. e.*, Huamelula, Oaxaca, Mexico).

Range.—Pacific coast region of southern Mexico, from Chiapas to Colima.

Remarks.—This race differs from the typical one in the slightly more greenish, less grayish color of its upper parts, in the more decidedly buffy suffusion of the under surface, and in particular by the lighter color of the crown-stripes, which are nearer chestnut brown than carob brown. Some individual specimens, it is true, are scarcely to be told apart, but in series the differences between the two are sufficiently obvious. No form of this species is known to occur between western Costa Rica and the western border of Chiapas, and if this gap in the range is actual and not merely apparent it is not surprising to find that racial differences are involved. The present form was provisionally described by Sharpe in 1888, on the basis of a single specimen collected by Sumichrast, and the separation was later confirmed by Mr. Nelson (Auk, XV, 1893, 157), after examining a series.

***Arremonops superciliosus sinaloæ* Nelson.**

Arremonops superciliosa sinaloæ NELSON, Proc. Biol. Soc. Washington, XIII, 1899, 28 (near Mazatlan, Sinaloa, Mexico).

Range.—Coast region of western Mexico, in southern Sinaloa and Tepic.

Remarks.—*Arremonops superciliosus sinaloæ* is the northern representative of *A. s. sumichrasti*, inhabiting the Arid Tropical Zone in Sinaloa and Tepic. It differs from that form in its paler, duller coloration, the upper parts in general, and the median crown-stripe in particular, being more tinged with gray, while the lateral crown-stripes are paler (Mars brown) and narrower. There is less buffy suffusion on the lower parts also, but this may be seasonal, in part at least, in so far as the specimens at hand are concerned, which were all collected in the months from April to July. There is a specimen of this form in the collection of the Academy of Natural Sciences of Philadelphia, recorded by Baird under "*Embernagra*" *rufivirgata*, three (the type-series) in the collection of the Biological Survey, and two in the collection of the American Museum of Natural History, received from J. H. Batty. So far as we are aware these are the only known specimens.

***Arremonops rufivirgatus crassirostris* (Ridgway).**

[Embernagra rufivirgata] β. crassirostris RIDGWAY, Proc. U. S. Nat. Mus., I, 1878, 248, 249 (Mexico; exact locality not stated).

Range.—Coast region of eastern Mexico, in the States of Vera Cruz, Puebla, and Oaxaca.

Remarks.—This is a dark, richly colored form, readily separable from true *rufivirgatus* by its pronounced greenish upper parts (between dark citrine and medal bronze) and strongly buffy brown shaded under parts. The bill, too, is obviously stouter, which character led Baird to apply the specific name as a manuscript designation to Mexican specimens in the National Museum collection, which name was adopted and formally published by Mr. Ridgway in 1878. According to Sumichrast it ranges up to 1200 meters in the State of Vera Cruz, but nothing is on record concerning its habits.

***Arremonops rufivirgatus rufivirgatus* (Lawrence).**

Embernagra rufivirgata LAWRENCE, Ann. Lyc. Nat. Hist. N. Y., V, 1851, 112, pl. 5, fig. 2 ("Rio Grande" [=Brownsville], Texas).

Range.—Northeastern Mexico, in States of Tamaulipas, San Luis Potosi, and Nuevo Leon, north to San Patricio County, Texas, in the Lower Austral Zone.

Remarks.—The original description of this bird was based on specimens collected by Capt. J. P. McCown, U. S. A., while stationed on the Texan frontier. Baird recorded it from Nuevo Leon, Mexico, some years later, and in more recent years it has been determined to be a common and characteristic bird in what has been called by Allen the Tamaulipan Fauna, extending north to Corpus Christi, Texas. Merrill was the first author to give an account of its nesting, and his account has been confirmed by Sennett and others. Intergradation between the present race and *crassirostris* takes place in southern Tamaulipas, also in Nuevo Leon and San Luis Potosi, but Texan specimens are very distinct from that form, being much paler and grayer, and with a smaller and slenderer bill.