

**Article X. — ON A COLLECTION OF BIRDS FROM
CHAPADA, MATTO GROSSO, BRAZIL, MADE BY
MR. H. H. SMITH.**

By JOEL ASAPH ALLEN.

PART III.—PIPRIDÆ TO RHEIDÆ.

(Concluded from Vol. IV, p. 350.)

133. *Metopia galeata* (Licht.).—This species is evidently abundant and resident at Chapada throughout the year. It is represented in the collection by a series of 127 specimens, taken as follows: January, 4; February, 8; March, 6; April, 11; May, 8; June, 13; July, 15; August, 9; September, 31; October, 11; November, 6; December, 5. The adult males number 45, and some were taken in each month; the young males in transition dress number 24, some of which were taken in each month except March and July; 15 are young males nearly in the dress of the female, of which none were taken from October to January, inclusive; the remaining 43 are females, and include specimens taken in every month except January.

The September and October specimens may be considered as representing the dress of the breeding season, and as such will be made the standard of comparison for those of other seasons. The adult males are everywhere deep lustrous velvety black with a bluish tinge, except on the interscapulars, back of the neck, cap and frontal crest, which parts are intense lustrous scarlet. The scarlet feathers, however, are pure white at base, and the white basal portion is separated from the scarlet apical portion by a narrow band of deep yellow. The adult females are nearly everywhere deep green, somewhat lighter, or more yellowish green, below. A few specimens, sexed by the collector as females, have a faint reddish shade over the portion colored scarlet in the adult male, and are of a brighter or more golden green below. These occur at all seasons, and are, I suspect, really young males of the year, since they pass into a stage in which this phase of plumage is more or less mixed with scattered red feathers on the head and back and with black feathers on the throat and breast.

Young males present every transition between these last and males in which the black of the body is more or less mixed with green, while the red is perfectly developed. A large proportion of the young males, however, are in a patchy, transition stage, in which the red of the upper parts varies from nearly the full amount to merely a few perfect glossy scarlet feathers (differing in structure from the green feathers), scattered among the interscapulars and over the nape and cap, with more or less black over the basal portion of the quills and greater wing-coverts, and numerous black feathers scattered through the green clothing plumage of the body. Some show considerable admixture of black with little or no red ; others more red and less black.

This patchy condition seems to have no relation to season, as every stage is found throughout the year ; it is, however, evidently due to age, as doubtless the male does not acquire perfect dress till at least the third year. The only specimens which give clear evidence of being in molt when taken are a few collected in November, December, January and February.

It is of interest to observe that the amount of black at the base of the quills of the tail and wings, and on the greater wing-coverts and on the upper tail-coverts, varies with the amount of black and red in the body plumage. In what seems to be the second stage, or second year, the wing quills and rectrices¹ are green, or blackish merely at the base ; in the next stage the tail-feathers are all black for their basal half, and some of them black or blackish for their whole length on the inner vane, and some of the middle lateral ones almost wholly so on both vanes. At this stage the peculiar glossy red feathers have become usually more or less prevalent. With the increase in the amount of black on the remiges and rectrices the greater coverts come out black, either all or in part ; sometimes only one or two are black and the rest green, or the greater part may be black and the others green.

The appearance of some of the parti-colored black and green rectrices is suggestive of a gradual change of green to black without molt ;¹ but that this is not so is shown in molting birds

¹ That such a change of color does occur, in cases perfectly parallel with the present, has been stated of late in several quarters, to be either a fact or a highly probable supposition ; it is hence desirable to call special attention to the matter in this connection. (Cf. Keeler, *Evol. of Colors in N. Am. Birds*, 1893, p. 134. Dr. L. B. Bishop advocated the same theory in reference to the European Kestrel before the Linnæan Society of New York at its meeting of April 5, 1893.)

where the partially grown rectrices (the basal portions still in their sheaths) are green apically and black basally, or all black, as the case may be in different feathers, just as in specimens taken months after the completion of the molt.

In birds that require several years for the acquisition of the adult breeding dress, the various transition stages present usually various degrees of combination of adult and juvenile tints, resulting in many singular effects, not only as regards the plumage as a whole, but as regards the appearance of individual feathers. Sometimes individual feathers present intermediate phases of coloration between the earlier and the final stages; or at one, or even two molts before the final stage is reached, feathers like those of the adult dress become prematurely developed, as in the case of the present species.

134. *Pipra fasciata* d'Orb. & Lafr.—The series of 51 specimens consists of 28 adult males, 19 adult females, and 4 young males, nearly in the dress of the female, with slight traces of red feathers coming in. Each month of the year is represented except September and December, as follows: January, 1; February, 5; March, 11, of which 10 are adult males; April, 7, of which 4 are adult females; May, 4; June, 3, all females; July, 4; August, 4, of which 3 are males; September, 0; October, 2; November, 10, of which 8 are males; December, 0.

135. *Heteropelma flavicapillum* Sc.—The series of 65 specimens represents every month of the year, and the two sexes are about equally represented.

The coloration is remarkably constant at all seasons, the only very appreciable difference being in respect to the crest, which is much more developed and much brighter in color in the males than in the females. It doubtless varies somewhat with age, as many specimens sexed as males have the crest scantily developed and dull greenish yellow instead of deep lustrous golden as in the adult males.

This series should represent the *Heteropelma chrysocephalum* Pelzeln, in which case I am unable to distinguish it from *H. flavicapillum* of the Brazilian coast. I have, however, for comparison only two Bahia specimens, and a larger series might show slight average differences at present inappreciable.

136. *Tityra cayana brasiliensis* (Sw.).—A single female, taken at Chapada in September, 1882.

137. *Tityra personata semifasciata* (Spix).—Chapada, 8 specimens, Sept.—Nov., 1882, and Jan.—Feb., 1883.

138. *Tityra inquisitor* (Licht.).—Corumba, Feb. 26, 1886, ♂ ad.; Chapada, ♂ ad., May 16, 1885, and ♂ juv., Sept. 1, 1885.

139. *Hadrostomus atricapillus* (Vieill.).—The 13 specimens of this species were collected as follows; January, 2 females; February, 2 males; July, 1 male; September, 1 male; October, 1 female; November, 3 males and 2 females; December, 1 female. This shows that the species is present at Chapada from September till February, and that it may occur in other months.

140. *Pachyrhamphus viridis* (Vieill.).—Represented by a single specimen, ♂ ad., taken at Corumba, March 18, 1886.

141. *Pachyrhamphus polychropterus* (Vieill.).—Chapada, 4 specimens, as follows: ♂ ad., Aug. 16; ♂ juv., May 4; 2 females, March 14 and April 17.

142. *Pachyrhamphus atricapillus* (Gm.).—Chapada, one specimen, ♂ ad., May 23.

143. *Attila validus* Pelzeln.—One specimen, ♂ ad., Nov. 11, 1882. Marked "Rare" on the label.

This seems to agree very well with the description of *A. validus* by Pelzeln (Orn. Bras., p. 95) and Sclater (Cat. Bds. Brit. Mus., XIV, p. 364), except that the cap is apparently of a darker, more dusky gray—a feature, however, which is variable in other gray-capped species of the group.

144. *Geobates pœcilopterus* (Wied.).—Five specimens, January, July and September.

145. *Casiornis rubra* (Vieill.).—The series of 23 specimens indicates that the species is present, but probably not abundant, at Chapada throughout the year. Each month is represented by from one to four specimens, except March, June and October.

There is apparently no very appreciable amount of sexual variation in color. There is, however, some seasonal variation, through fading, as the season advances. In fresh plumage the

chestnut color above is a little brighter and more rufous, and the belly is more strongly tinged with yellowish than towards the close of the breeding season.

146. *Furnarius albogularis* (Spix).—The 8 specimens were taken : 1 in March, 2 in April, 1 in May, 1 in June, 1 in July, and 2 in October.

147. *Furnarius leucopus* Swain.—One specimen, ♀ ad., Corumba, April 8, 1882.

148. *Lochmias nematura* (Licht.).—Twelve specimens, taken as follows : January, 1 ; February, 0 ; March, 1 ; April, 0 ; May, 1 ; June, 2 ; July, 1 ; August, 0 ; September, 2 ; October, 1 ; November, 2 ; December, 1. It is therefore probably resident throughout the year. The whole series is very uniform in coloration.

149. *Synallaxis azaræ* d'Orb.

Synallaxis azaræ D'ORBIGNY, Ois. 1833-44, p. 246. (Types examined.)—

ALLEN, Bull. Am. Mus. Nat. Hist. II, 1889, p. 243.

Synallaxis cinereus WIED, Beitrag. Naturg. Bras. III, ii, 1831, p. 685 (in part. Cf. this Bull. II, 1889, p. 243).

Synallaxis frontalis PELZELN, Sitz. d. k. Ak. Wien, XXXIV, 1859, p. 117 ; *id.* Orn. Bras. i, 1868, p. 35.—SCLATER, Cat. Bds. Br. Mus. XV, 1890, p. 39. And of most recent writers.

In the present series of 36 specimens every month of the year is represented except November, although December and March have each but one. There are several young specimens, partly or wholly in first plumage, the youngest being little more than half-fledged, taken April 20, 1885.

There is apparently no sexual variation in size or coloration among adults. The seasonal variation consists mainly in the amount of silvery white tipping the feathers of the blackish throat patch ; in fresh plumage the black is nearly concealed, but becomes prominent as the silvery tips of the feathers wear away. In the same way the frontal band is more or less concealed in fresh plumage by a slight tipping of ferruginous.

The frontal band is ordinarily broad and well defined, but in quite a proportion of the specimens it is much narrowed by the extension forward of the ferruginous cap, which in a number of examples nearly reaches the base of the bill, while in one (No.

33,725, ♀ ad., July 3) it extends entirely to the bill, as in *S. ruficapilla*. That it is not this species is shown by its small size, and especially by the very small size of the bill, and the absence of a yellowish superciliary border to the cap behind the eyes.

There is also considerable variation in the color of the tail among adult birds, there being quite generally a dusky shade on the inner vanes of the middle pair of rectrices, extending sometimes for nearly an inch and covering nearly the whole width of the vane apically; in others there is merely a trace of dusky, or it may be wholly absent.

Young birds in first plumage are very unlike the adults. There is no rufous cap, the whole upper surface being uniform, and of a shade closely approaching that of the back in the adult. The wings and tail are of a dull, somewhat olivaceous brown, and the lower surface is more silky, and a little paler buff on the flanks. The dusky throat patch is clearly traceable below the surface. With the first molt rufous feathers begin to appear on the crown and among the wing-coverts, and the dull brown quills are replaced by the rufous quills of the adult. The buffy white covering of the edge and inside of the wing gives place to the more rusty tint of the mature plumage.

Nests and eggs were taken in October, December and January, and young birds hardly able to fly in April, implying a long breeding period.

150. *Synallaxis scutata* *Scl.*—Seven specimens, as follows : May, 3; June, September, October and November, each 1.

151. *Synallaxis cinnamomea* *Pelzeln.*—Corumba two specimens—♂ ad., March 1, ♀ ad., April 1, 1886.

152. *Synallaxis torquata* *Wied.*—One specimen, ♂ ad., Dec. 5, 1882.

153. *Phacellodomus ruber* (*d'Orb. & Lafr.*).—Corumba, one specimen, ♂ ad., April 7, 1886.—Compared with the type of the species in the Lafresnaye Coll. in the Museum of the Boston Society of Natural History.

154. *Phacellodomus rufifrons* (*Wied.*).—Three specimens, Dec. 5, 1883—two adult males and one three-fourths grown

young. The young bird, still in first plumage, does not differ appreciably in coloration from the adults.

Mr. Sclater (Cat. Bds. Brit. Mus., XV, 1890, p. 83) credits a specimen of *P. rufipennis* to the Smith Collection. If there is no mistake as to the source, it was apparently the only specimen of this species in the Chapada Collection—at least none came into the possession of this Museum.¹

155. *Homorus cristatus* (Spix).—Corumba, 2 specimens, Feb. 27 and April 8, 1886.

156. *Philydor rufus* (Vieill.).—Each month of the year is represented by a series of 18 specimens, of which 4 were taken in February, 2 in May, and 3 in November, each of the other months being represented by a single specimen.

157. *Xenops rutilus* Licht.—A series of 15 specimens represents every month of the year except March and October. Apparently not numerous at any season, the largest number of specimens for any one month being 3, in January. The series is very uniform in coloration.

158. *Sclerurus umbretta* (Licht.).—Abrilongo, 1 specimen, ♂ ad., Feb. 8, 1885.

159. *Sittasomus chapadensis* Ridgw.

Sittasomus chapadensis RIDGW. Proc. U. S. Nat. Mus. XIV, 1891, p. 509.

Sittasomus olivaceus SCLATER, Cat. Bds. Brit. Mus. XV, 1890, p. 119, in part; not *S. olivaceus* WIED=*S. erithacus* (LICHT.).

Represented by 18 specimens, taken as follows: January, 2; February, 0; March, 2; April, 2; May, 1; June, 6; July, 2; August, 1; September, 1; October, 2. February, November and December are unrepresented; one third of the whole number were taken in June. The series is very uniform in coloration.

This species is very distinct from *S. erythacus* (Licht.), as pointed out by Mr. Ridgway (l. c.).

160. *Dendroornis d'orbignyanus* Puch. & Lafr.—Two specimens, ♂ ad., July 26, 1883, and “♀?” Sept., 1883.

¹ It may be here stated that Mr. Smith sold to Messrs. Salvin and Godman a considerable number of supposed duplicates before the ‘Chapada Collection’ (or the principal part of it) was purchased by the Museum.

Identified as this species by Mr. D. G. Elliot (Auk, VII, 1890, p. 183). I had previously determined them to be *D. guttata*. The two specimens differ a little in size, and especially in the color of the bill, which is much yellower in the July specimen than in the other. The plumage is also a little brighter and fresher in this example, as would be expected from the season. While I provisionally adopt this identification, it seems not unlikely that it may be found necessary to refer both *D. d'orbignyanus* and *D. rostrispallens* to *D. guttata*. Only a large increase of material will enable one to reach satisfactory conclusions in respect to these difficult birds.

161. *Xiphicolaptes major castaneus* Ridgw.

Xiphicolaptes major castaneus RIDGW. Proc. U. S. Nat. Mus. XII, 1889, p. 16.

Piedra Blanca, Bolivia, ♂, April 20, 1886, in freshly-molted plumage. Type of the subspecies (l. c.).

162. *Picolaptes bivittatus* (Licht.).—Piedra Blanca, Bolivia, ♂, April 21, 1886; Corumba, Matto Grosso, Feb. 4 and 26, 1886; Chapada, January, April, May and December; in all, 12 specimens.

Several of the specimens are stained beneath, apparently from contact with burnt wood. In other respects the coloration is quite uniform, although some of the January and February specimens are in molt. They vary, however, considerably in size, and especially in the length of the bill, as shown by the following measurements of the 12 specimens:

Wing, 3.52–4.00 in., averaging 3.70; tail, 3.20 to 3.63, averaging 3.40; exposed culmen, 1.03 to 1.30, averaging 1.15. There is apparently no sexual variation in size.

163. *Xiphorhynchus rufodorsalis* Chapman.

Xiphorhynchus rufodorsalis CHAPMAN, Bull. Am. Mus. Nat. Hist. II, 1889, p. 160.

Corumba, one specimen, Feb. 26, 1886, type of the species (l. c.).

164. *Dendrocolaptes picumnus* Licht.—Three specimens, July, September and October.

165. *Dendrocolaptes pallescens* Pelz.—Two specimens, Piedra Blanca, Bolivia, April 20 and 23, 1886.

166. *Thamnophilus major* Vieill.—Corumba, Abrilonga, and Chapada—19 specimens, 12 adult males, 1 young male, and 6 adult females, taken as follows: January, 2; February, 5; March, 1; April, 1; August, 2; September, 3; November, 3; December, 2.

167. *Thamnophilus ambiguus* Swain.—This species is represented by 27 adult males and 34 adult females, the number taken during each month ranging from about four to seven, except that only one was taken in December.

The males are very uniform in coloration, the chief variation being obviously due to age, a few of the younger males being slightly tinged, both above and below, with buffy olive, and lacking the white edging on the middle of the central pair of tail feathers—both evidently features of immaturity.

The females are more variable, but the differences appear to be more individual than seasonal. The color below varies from pale buff to strong cinnamon. The cap varies from strong cinnamon to deep chestnut, with a corresponding variation in the depth of color in the brown of the back.

The only other specimen of this species available for comparison is a single male from Bahia, which is very much darker, both above and below, and with less white on the wings and tail, than any of the males in the Chapada series. Should this difference prove constant it would be quite proper to separate the coast and interior forms as well-marked geographical races.

Doubtless *Thamnophilus sticturus* Pelzeln (Orn. Bras., pp. 76 and 144) is referable to *T. ambiguus*, the alleged differences being quite within the range of individual variation shown by the present series.

168. *Thamnophilus radiatus* (Vieill.).—This species is represented by 68 specimens, of which 37 are adult males, 3 young males in transition plumage, and 28 adult females. They were collected as follows: January, 4; February, 3; March, 3; April, 7; May, 2; June, 6; July, 11; August, 13; September, 6;

October, 9; November, 4; December, 0. A set of eggs was taken Oct. 26.

The males in transition plumage were taken Feb. 20, Aug. 17, and Oct. 20. Another somewhat immature male was taken June 28.

The adult males present a wide range of what appears to be purely individual variation, especially in respect to the relative width of the light and dark cross-bars, both above and below. In the darkest specimens the white cross-bars above are about one-fourth to one-third the width of the black interspaces; below the black bars are rather more than half the width of the white interspaces. From this there is an insensible gradation to the other extreme, in which the white and black cross-bars above are about equal, while below the black bars form very narrow black cross-lines, which are more or less obsolete or discontinuous across the middle of the belly. These are winter (June and July) specimens. They grade insensibly into the darker phase. The width of the white tail markings varies coincidentally with the varying width of the cross-bars of the general plumage. Several specimens show more or less *white* at the *base of the central crest feathers*—suggesting a close alliance with the *T. doliatus* group.

The females also vary greatly in intensity of coloration, both above and below, the palest females being many shades lighter than the darkest ones.

There is also a considerable range of variation in size, but it does not appear to be distinctly correlated with the variation in coloration, the light birds being sometimes large and sometimes small, and conversely.

The *Thamnophilus radiatus* group has a wide distribution, ranging from Central America to Paraguay. In connection with the large Chapada series I have taken occasion to examine somewhat into the status of its various components, and having had access to the types of *T. albicans* Lafresnaye and *T. nigricristatus* Lawrence, I venture to add a few remarks on the general subject. I am, however, unacquainted with *T. radiatus* Vieill., as restricted by Berlepsch (J. f. O., 1887, p. 17), unless it is represented by the very light specimens in the Chapada series.

Thamnophilus nigricristatus Lawrence is the large, very dark, northern form occurring at Panama ; it constitutes one extreme of the series, of which the restricted *T. radiatus* forms the other. *T. nigricristatus* appears to become somewhat lighter and smaller in Colombia, constituting the *T. albicans* of Lafresnaye, the types of which I am unable to distinguish from many of the specimens in the Chapada series. Just how *T. subradiatus* Berlepsch differs from *T. albicans* I am unable to decide, as the name was merely given "for the species from the Upper Amazon," as distinguished from "*T. albicans* from Bogota." Mr. Sclater makes *T. subradiatus* a subspecies of *T. nigricristatus*, but refers to the latter not only Panama specimens but others from Sta. Marta and Bogota ; while to his *T. albicans* are referred other Bogota skins. Under *T. subradiatus* are placed not only his Peruvian series, but a pair of birds that originally formed a part of the present Chapada series ! *T. capistratus* Lesson (not "Lafresnaye"—cf. Rev. Zool., 1840, p. 226), based on a specimen from "Brazil," is kept also apart as a southeast Brazil species. Two Lafresnaye specimens of *T. capistratus* (in Coll. Boston Soc. Nat. Hist.) appear scarcely to differ subspecifically from *albicans*. There is a little less white on the forehead, and there is rather less than the usual amount of white on the tail, yet not less than in many of the Chapada specimens.

In view of the wide range of variation shown by the Chapada series of nearly *thirty* adult males, I may be unduly conservative in estimating the value of the slight differences shown by individual specimens from distantly separated localities. I must, however, for the present refer all of the Chapada series to *T. radiatus*. Part probably represent '*subradiatus*,' and part '*albicans*,' with many 'intermediates.'

In the absence of satisfactory material from other localities for comparison with the Chapada series, it is impossible to reach other than tentative conclusions regarding the forms entitled to recognition in the *T. radiatus* group. The following arrangement expresses my present views in the case :

1. *Thamnophilus radiatus* (*typicus*).—Paraguay and southern Bolivia, and probably the extreme southeastern portion of Brazil.

2. *Thamnophilus radiatus capistratus*.—Eastern and central parts of Brazil.
3. *Thamnophilus radiatus albicans*.—Northern South America, from Peru and northern Bolivia northward.
4. *Thamnophilus radiatus nigricristatus*.—Panama.

I am unable to see how *T. subradiatus* can well be different from *T. albicans*.

At any locality a wide range of variation in coloration will doubtless be found to obtain, so that none of the forms can be sharply defined.

169. *Thamnophilus ruficapillus* Vieill.—One specimen, female, Oct. 13, 1885.

170. *Dysithamnus mentalis* (Temm.).

Myiothera mentalis TEMM. Pl. Col. 179, fig. 3.

Dysithamnus¹ mentalis BURMEISTER, Syst. Uebers. Th. Bras. III, 1856, p. 82.

—SCLATER, Cat. Bds. Brit. Mus. XV, 1890, p. 221. Also of most recent authors.

Myiothera poliocephala WIED, Beitr. Naturg. Bras. III, ii, 1831, p. 1098. (Types examined.)

Thamnophilus olivaceus TSCHUDI, Faun. Per. p. 174, pl. xi, fig. 1 (♂ juv.).

Dysithamnus olivaceus CARANIS, Wieg. Arch. 1847, i, p. 278; and of subsequent writers.

Dysithamnus semicinereus SCLATER, P. Z. S. 1855, pp. 90, 147, pl. xcvi; and of later writers.

Dysithamnus affinis PELZELN, Orn. Bras. 1869, pp. 80, 149.

Dysithamnus tamhillanus TACZ. Orn. Pér. II, 1884, p. 30.

This species is represented by 68 specimens, of which 25 are adult males, 6 young males in transition plumage, and 37 females. They were taken as follows, each month of the year being represented: January, 1; February, 13; March, 5; April, 6; May, 7; June, 9; July, 6; August, 8; September, 5; October, 3; November, 4; December, 1.

The adult males vary considerably in general coloration, particularly above, but mainly in respect to the depth or intensity of the slaty tints; those in fresh plumage are generally more olive than those taken later in the season. The amount of white on the throat and breast is somewhat variable; in some specimens the throat is mottled white and gray, lightest medially; in others white

¹ Spelled *Dasythamnus*.

prevails, in others gray; and the same is true in a general way for the breast. Generally the gray and white produce a clouded effect, without forming any clearly defined markings. The middle of the belly is more or less clearly whitish, shading laterally into gray, and posteriorly into olivaceous; flanks more or less strong olivaceous. At the lower posterior corner of the auriculars is usually a narrow line of silvery white feathers, readily distinguished, however, only in specimens which have the plumage smooth and in good condition. There is a tendency to the same mark in some of the females. The amount of white tipping the wing-coverts also varies, the greatest amount of white being sometimes on the outer row and sometimes on the middle row; sometimes there are two well-defined narrow wing-bars, and sometimes one or the other is obsolete.

The females are more variable than the males, the dorsal region varying from tawny olive to dark greenish olive, while the color of the head varies proportionally in intensity. In fresh plumage the whole lower surface is often strongly washed with yellowish olive, passing into brownish olive on the flanks and to olive brown on the breast. In other specimens taken at the same season the whole middle of the abdomen is nearly pure white, and there is much white on the throat, while the color of the olive is less yellow.

Young males appear to be at first like the females, passing into the adult male dress by a single molt. Several young males, taken in May, are in transition plumage, the head being mixed slaty and brown, and the back partly olive and partly gray.

Thamnophilus olivaceus Tschudi (= *Dysithamus olivaceus* Cab.) seems to be beyond question a young male. The description and figure might well have been taken from a specimen like No. 33,880 of the Chapada series.

In view of the large amount of what seems to be individual and seasonal variation (perhaps partly due to age), I have adopted for this species the earliest name given to any member of the *mentalis* group, being unable to distinguish clearly more than a single species. Possibly with more material it might be feasible to recognize several geographical forms, but at present I fail to recognize any

differences by which the few Guatemala, Costa Rica and Bogota specimens at hand can be distinguished from the Chapada series. *Dysithamnus affinis* Pelz., based on a pair of birds from Villa Barra, Matto Grosso, agrees with average specimens from Chapada, so far as can be judged by Pelzeln's description; while *D. tambillanus* Tacz., from Tambillo, Peru, appears to agree with the Chapada specimens having a minimum amount of olivaceous. Apparently the most distinct local form represented by the material before me is the series recently collected by Mr. Chapman in the Island of Trinidad, these specimens differing from all of the others in the almost entire absence of olive from the lower back and rump, and its great reduction on the lower flanks and crissum. Slightly immature specimens would, however, not be readily separable from adults from other localities.

171. *Herpsilochmus longirostris* Pelzeln.—The series of 47 specimens includes 23 adult males, 3 young males, and 21 females, and represents every month in the year, having been collected as follows: January, 1; February, 8; March, 4; April, 6; May, 10; June, 6; July, 1; August, 2; September, 3; October, 2; November, 1; December, 3.

The adult males vary greatly in coloration, particularly in the amount of spotting, both above and below. In some there is no trace of either black or white in the dorsal area; in some there is more or less concealed black, but no white; in others there is very little white; generally there is both black and white, the white being concealed, and the black frequently showing as well defined streaks on the surface. Below there is generally more or less dusky clouding on the breast, though sometimes so faint as to be barely perceptible; at other times it is well defined, and sometimes takes the form of sharply defined black streaks.

The females vary more or less in intensity of coloration, most noticeable below, where the breast varies from pale cinnamon to deep rusty brown.

A young male (taken Jan. 8) is partly in first plumage; the portions remaining of the first plumage indicate that the young bird is at first dark rusty brown above and yellowish brown below. The second plumage is essentially that of the adult, except that

the black feathers of the cap are all edged more or less with bright rust color, and there is a slight buffy wash below and on the edges of the remiges, as shown in a specimen taken Feb. 18.

Pelzel's *H. atricapillus* is probably not different from his *H. longirostris*. The alleged differences in size and in the length of the bill are without significance in the light of the variations shown in the present large Chapada series, as already detailed. I am, however, unable to account for his female, which he describes as being similar to the male, but with a longitudinal white stripe on the pileum (!), with the underparts strong yellowish brown. For this reason I take the name *H. longirostris* in preference to *H. atricapillus*, although the latter stands first on the page (Orn. Bras., pp. 80 and 150). Natterer obtained both species, it will be observed, at Porto do Rio Parana, as well as further westward in Matto Grosso, hence, if distinct, they occur together over a wide area.

172. *Formicivora rufa* (Wied).

Myiothera rufa WIED, Beitr. Naturg. Bras. III, ii, 1831, p. 1095. (♀—type examined.)

Formicivora rufa MÉNÉTRIÉS, Mém. Acad. St. Pétersb. sér. vi, Sci. Nat. I, 1835, p. 497, pl. ix, fig. 1.—SCLATER, P. Z. S. 1858, p. 240.—ALLEN, Bull. Am. Mus. Nat. Hist. II, 1889, p. 253.

Thamnophilus rufater D'ORB. & LAFR. Syn. Av. i, p. 12 (Mag. de Zool. 1837). (♂ and ♀.)

Formicivora rufatra D'ORB. Voy. Ois. 1833-44, p. 180.—SCLATER, P. Z. S. 1858, p. 239; *ibid.* Cat. Bds. Brit. Mus. XV, 1890, p. 250. Also of most recent writers.

Three adult males, May 22, Aug. 5, and Dec. 8; 1 young male, March 20; 1 adult female, May 24.

As I have previously stated (l. c.), Wied's name *rufa*, based on the female, has six years' priority over *rufatra* of d'Orb. & Lafr.

173. *Cercomacra cærulescens* (Vieill.).—Cachoeira, two specimens, Jan. 29.

174. *Myrmiceza atrothorax* (Bodd.).—Two adult males, May 25 and June 4; two adult females, May 25 and June 6.

175. *Corythopsis calcarata* (Wied).—This species is represented by 18 specimens, taken as follows: January, 1; February, 2; March, 2; April, 2; May, 2; June, 1; August, 1; September, 1; November, 6.

A young bird in first plumage taken Nov. 6, with the quills of the wings and tail only about two-thirds grown, differs little in coloration from the adults; the olive of the upper surface is a little more tawny, and the pectoral band is a little duller black and faintly tinged with olive. There seems to be no sexual difference in coloration among the adults.

176. *Glaucis hirsuta* (Gm.).—One specimen, ♂ ad., Sept. 7, 1885.

177. *Phaëthornis pretii* (L. & D.).—Eight specimens, taken as follows: January, 1; July, 2; August, 3; September, 1; October, 1. Also nest and eggs, taken Oct. 9.

178. *Pygmornis chapadensis*, sp. nov.

Similar to *P. longuemareus* but much paler in all parts. The bronzy green of the back is much paler; the rump and upper tail-coverts are rusty buff instead of rufous; the middle tail-feathers are more attenuated, their basal portion lighter bronze green and less dusky, and the light apical portion longer and whiter; the lower parts are strong buff rather than rufous; the chin is only slightly dusky instead of blackish; the lower tail-coverts are buff instead of white, and the outer vanes of the outer tail-feathers are strong rusty-buff, which color also occupies the apical portion of the inner vanes. Bill dusky, the lower mandible whitish for the greater part of its length. Wing, 1.20 in.; tail, 1.75; bill, 1.10.

Type, and only specimen, No. 34,078, ♂ ad., Chapada, Matto Grosso, Brazil, March 12, 1883, Coll. H. H. Smith.

This species finds its nearest ally in *P. longuemareus*, of Cayenne and Trinidad, from which I should hardly dare to separate it on the basis of a single specimen were it not that its habitat is so far removed from the known range of *P. longuemareus*. The pale rump and upper tail-coverts, the buff instead of white lower tail-coverts, and the very differently colored tail, are the important points of distinction.

179. *Eupetomena macroura* (Gm.).—Nine specimens, taken as follows: February, 1; May, 4; August, 1; September, 2; November, 1.

180. *Lampornis violicauda* (Bodd.).—One male, March 7; one female, August.

181. *Petasophora serrirostris* (Viell.).—Represented by a series of 36 specimens, taken from April 24 to Sept. 24.

182. *Heliomaster furcifer* (Shaw).—One adult male, Aug. 8; two young males, April 5 and June 21; two adult females, May 21 and 29.

183. *Thalurania eriphile* (Less.).—Of the series of 25 specimens all but three are males, and most of them are adult. They were taken as follows: January, 3; February, 2; March, 1; May, 4; July, 5; September, 11; October, 1.

184. *Heliactin cornuta* (Wied).—One adult male, Aug. 21, and two females, one each in July and August.

185. *Calliphlox amethystina* (Gm.).—The 7 specimens include two adult males (taken May 20), two females (May and October), and three young males (May and October).

186. *Lophornis magnifica* (Viell.).—Three males, April and August.

187. *Chrysuronia ruficollis* (Viell.).—Two males and two females, June.

188. *Chrysolampis moschitus* Linn.—One male, August. The specimen is labeled, "Chapada, Matto Grosso, Aug., 1882." This locality seems to be rather beyond its usually recognized habitat.

189. *Agyrtria brevirostris affinis* (Gould).—Of the 32 specimens, 19 were taken in September, 4 in October, 3 in July, and 2 each in January, May and June, and 1 each in February and April.

190. *Polytmus thaumantias* (Linn.).—Three specimens, January and May (females), and June (male).

191. *Chlorostilbon pucherani* (Bourc.).—Five males and two females, July, August and September.

192. *Hemiprocne zonaris* (Shaw).—Four specimens, June, August and October.

193. *Cypseloides senex* (Temm.).—One specimen, female, with nest, Nov. 4, 1882.

194. *Caprimulgus parvulus* Gould.—One male, Sept. 8; two females, Oct. 5 and 6.

195. *Nyctidromus albicollis derbyanus* (Gould).—The series of 26 specimens was taken as follows: January, 0; February, 2; March, 1; April, 2; May, 1; June, 1; July, 4; August, 3; September, 1; October, 2; November, 3; December, 6. The two sexes are equally represented.

This series presents a wide range of color variation, but may be roughly separated into two sets, a gray phase and a red phase, the latter represented by 12 specimens, the former by 14. The gray phase may be separated into a dark gray series and a light gray series, with various intermediate specimens connecting the two. The same is also true of the red phase. These intermediate specimens form also a connecting series between the red and gray phases.

The females average smaller than the males, but a large female is frequently as large as a small male. In the females the wing varies from 6.15 to 6.75 in., averaging 6.38; the tail from 5.50 to 6.60, averaging 6.20. In the males the wing varies from 6.40 to 7.15, averaging 6.55; the tail from 6.40 to 7.20, averaging 6.75. The wing averages *longer* than the tail in the females, and *shorter* than the tail in the males.

Nyctidromus albicollis (Gm.) was originally based on Latham's White-throated Goatsucker from Cayenne. Specimens from Cayenne and the equatorial parts of tropical America are, as noted by Mr. G. B. Sennett (Auk, 1888, p. 46), much smaller than those from Mexico and Texas on the one hand, and from southern South America on the other, and also somewhat different in coloration; although in this latter respect there is everywhere so wide a range of individual variation that it is difficult at present to define the color characteristics peculiar to different geographical areas. Having had an opportunity to go over the large amount of material brought together by Mr. Sennett (*cf.* Auk, 1888, p. 46), I quite agree with him in the desirability of separating the species into at least three races, which may be designated as follows:

1. *Nyctidromus albicollis* (Gm.).—Equatorial America.

2. *Nyctidromus albicollis merrilli* Sennett. — Southern Texas and northern Mexico.
3. *Nyctidromus albicollis derbyanus* (Gould). — Southern Brazil and Bolivia.
196. *Hydropsalis torquata* (Gm.). — One male, May 5; one female, June 5.
197. *Hydropsalis furcifera* (Vieill.). — One female, July 6.
198. *Chordeiles virginianus* (Gm.). — One female, Sept. 26.
199. *Chordeiles pusillus* Gould. — Four specimens, April, June and August.
200. *Podager nacunda* (Vieill.). — Five specimens, August, September and November.
201. *Lurocalis nattereri* (Temm.). — One male, Sept. 26.
202. *Nyctibius jamaicensis* (Gm.). — One specimen, male, August 31.
203. *Ceryle torquata* (Linn.). — One female, Jan. 18.
204. *Ceryle amazona* (Lath.). — Three specimens, November.
205. *Ceryle americana* (Gm.). — Three specimens, two males and one female, September, October and December.
206. *Ceryle superciliosa* (Linn.). — One female, without date.
207. *Momotus momota subrufescens* (ScL.). — The series of 24 specimens, 13 males and 11 females, was taken as follows: January, 1; February, 8; March, 1; April, 1; May and June, 0; July, 2; August, 1; September, 2; October, 2; November, 5; December, 1.

There is much individual variation in coloration shown in the present series, but no very obvious sexual variation in this respect. The size of the black patch on the crown is twice as large in some specimens as in others; in some the hind neck is strongly washed with chestnut, and generally faintly so, but in several there is no trace of this tint, the whole hind neck being deep green like the back. Below many of the specimens are deep rufescent, others are paler with a strong tinge of green.

In four specimens killed while in molt, the middle tail-feathers are one-half to nearly full grown, with the webs entire, though a little narrower at the point where they are usually denuded. In other specimens the denudation has only slightly advanced, so that in the present series are specimens showing a series of stages from the new feather entirely intact, to those in which the denudation has been completed. In one specimen, in which the middle tail-feathers have scarcely reached full length, five barbs have been plucked from the inner vane of the right feather; in another of corresponding stage of tail growth, four or five barbs have been plucked from the outer vane of each feather, and others have the appearance of having been nearly severed. In another eleven barbs are missing from the outer vane of the right feather, while one is left alone about midway the gap. In another three or four barbs are missing from the outer vane of both feathers; in another the outer vane of the right feather is denuded for an inch and the opposite vane of the same feather for about three-fourths of an inch, while the other feather is denuded in the same way—the outer side more than the inner—but for a shorter distance. In another specimen both vanes of each feather are about equally denuded, the bare space being a little less than three-fourths of an inch. In another the bare space is about one inch on the right feather, with a few barbs left scattered at intervals, while on the opposite feather the bare space is less and is longer on the outer vane than on the inner vane. Another is denuded for about half an inch on both vanes of the left feather, and on the right feather for an inch on the outer and half an inch on the inner. Another is denuded for half an inch on both vanes of both feathers. These specimens, and others like them, were taken in February and March. In the November specimens the two vanes of both central rectrices are evenly denuded for a space of about an inch and a half, the bare space beginning about an inch and a half from the tip of the feather.

It would thus seem that the central tail-feathers have both webs intact when first developed; that the process of denudation begins about as soon as the feathers have reached their growth, and that the denudation proceeds very gradually and unsymmetrically, being pushed faster on the outer vane than on the

inner, and that several weeks may elapse before the denudation is completed. Some of the isolated barbs left temporarily in the denuded spaces obviously show hard treatment, as if they had been rumpled and twisted in an unsuccessful effort to remove them. Finally, that in this species at least, the barbs are forcibly removed by the birds themselves in an attempt to make the feathers conform to a definite fashion. Quite similar conditions are also shown by a large series of *Momotus cæruleiceps* in the collection of Mr. George B. Sennett.

The genus *Momotus*, as treated recently by Mr. Sclater (Cat. Bds. Brit. Mus., XVII, 1892, pp. 318-330, pll. ix-xi), contains 11 species, one of which has the entire crown blue (*M. cæruleiceps*), and two have the whole top of the head and nape chestnut (*M. mexicanus* and *M. castaneiceps*), while the remaining eight have the centre of the crown black bordered with blue. Of these, one (*M. swainsoni*, confined apparently to the islands of Trinidad and Tobago) has the whole lower parts deep cinnamon rufous. The remaining seven form a very closely-related group, extending from southern Mexico south over the greater part of South America to southern Bolivia and southern Brazil. Two may be separated rather sharply from the rest on the ground of size and general coloration, namely :

Momotus lessoni, ranging from southern Mexico to Veragua and Costa Rica. This is a small form (the smallest of the black-crowned group), with the chin and throat generally clear bluish green, and the general plumage a deeper, purer green (frequently bluish green below) with less of the rufescent tinge both above and below than in the more southern forms. It apparently intergrades in Costa Rica with *M. subrufescens*; and Mr. Sclater (l. c., p. 326) gives a list of "intermediate specimens between *M. lessoni* and *M. cæruleiceps*!"

Momotus æquatorialis, from "Ecuador and Colombia." This is a large form (the largest of the black-crowned group), of much the same general color as *M. lessoni*, but with less of the bluish shade on the throat, and lacking the terminal black bar to the tail, more or less distinctly developed in *M. lessoni* and all the other members of the black-crowned group. It is, however, a

very much larger bird than *M. lessoni*, with the tail three to four inches longer.

Next to *M. æquatorialis* in size and coloration is *M. momota*, of northeastern South America and the Lower Amazonian region. In general coloration it closely resembles *M. æquatorialis*, but differs from it in having the tail narrowly tipped with black, and in the presence of a distinct nuchal band of chestnut. It also appears to average somewhat smaller.

The remaining four species—namely, *M. subrufescens*, *M. nattereri*, *M. microstephanus* and *M. bartletti*—belong strictly to the *M. momota* group, as well also as Mr. Sclater's provisionally designated *M. parensis* (l. c., p. 320, in text), and *M. argenticinctus* (l. c., p. 326, in text). They may include several recognizable geographical forms, but even this seems uncertain (except on general grounds), in view of the wide range of variation shown in the Chapada series and the character of the alleged differences by which these several species are supposed to be distinguishable. On the basis of the wide extent and the diverse physical conditions of the different parts of the general habitat of the group, it is probable that different regions are inhabited by forms separable as subspecies, on the basis of average differences in size and coloration. On the other hand, it is extremely improbable that these various forms will be found to be more than rather unstable intergrading geographical races. For instance, I have before me specimens from Panama, Costa Rica, Santa Marta, Bogota and Bolivia, which I am unable to distinguish in any way from specimens in the Chapada series. In fact, Mr. Sclater gives the habitat of *M. subrufescens* as "From Panama to Colombia and Venezuela, south to Matto Grosso," and at the same time refers part of the Chapada specimens (he appears to have had nine from the Chapada series) to his *M. nattereri*; to which latter he also refers specimens from as distant points on either side of Chapada as Pernambuco and Bolivia, and from as far north as Chamicuro, Upper Amazon.

As already said, the size of the black coronal spot, the presence or absence of an incipient nuchal crescent of rufous, or the entire absence of rufous on the sides and back of the neck, the exact shade of the cobalt band surrounding the coronal spot,

and particularly the breadth and tint of its nuchal portion, the presence or absence of an ochraceous shade over the mantle and hind neck, and the color of the lower parts in respect to the prevalence of a greenish or an ochraceous suffusion, are all features that vary through wide limits in specimens taken at the same locality and practically at the same date. Hence I believe it will far better reflect the facts of the case if for the present we consider *M. nattereri*, *M. microstephanus* and *M. bartletti* as probably synonyms of *M. subrufescens*, and the latter as a subspecies only of *M. momota*. In all probability *M. lessoni* and *M. æquatorialis* are also only subspecies of the *M. momota* group.

208. Trogon variegatus *Spix*.—Ten specimens, eight males and two females—January, February, May, June, July, October, November and December.

209. Colaptes campestris (*Viell.*).—The 26 specimens represent every month in the year except May and June, and include three birds in first plumage taken in November.

Young in first plumage differ very little in coloration from adults, except in respect to the yellow, which is much paler and less extended in area, and in having the feathers of the malar region deep black, instead of tipped with white or red, as in the adults.

210. Chloronerpes chrysochlorus (*Viell.*). — One male, Corumba, Feb. 26; one female, Piedra Blanca, April 20.

211. Chrysophilus icteromelas (*Viell.*).—One male, June 11; one female, December.

Doubtless a large series of specimens from numerous localities would show that several of the currently recognized species of this group, allied to the present form, would indicate their real status to be simply that of geographical races or subspecies.

212. Leuconerpes candidus (*Otto*). — The 8 specimens representing this species were taken as follows: in April, 2; May, 1; July, 2; September, 1; November, 2.

The females not only lack the lemon-yellow nuchal crescent, but have also rather less yellow on the abdomen. A young male

in first plumage, with the quills not fully grown, differs from the adult males in having the black of the dorsal plumage a little duller and the lemon-yellow of the abdomen less extended and of a lighter or clearer yellow.

213. *Melanerpes cruentatus* (Bodd.).—Of the 8 specimens of this species 5 were taken in February, 2 in September, and 1 in October.

Nearly all have the sides of the abdomen more or less strongly tinged with yellow.

214. *Dryobates cancellatus* (Wagl.).—Two adult females, May 22 and Sept. 23.

215. *Dendrobates olivinus* (Malh.).—This species is represented by 32 specimens, 23 males and 9 females, taken as follows : January, 4 ; February, 8 ; March, 4 ; April, 3 ; May, 0 ; June, 2 ; July, 1 ; August, 4 ; September, 4 ; October, 0 ; November, 1 ; December, 1.

The coloration varies much even among adults of the same sex. A few specimens, perhaps young birds, of each sex have faint whitish shaft stripes on the interscapulars, and generally the dorsal plumage is crossed by faint yellowish cross-bars, but occasionally both shaft-streaks and cross-bars are nearly or wholly obsolete. A few specimens in high plumage have the scapulars and interscapulars faintly tinged with red. Below the general color varies from dull olivaceous brown, with very little or no shading of green, to strong greenish olive brown, with the narrow transverse bars varying from whitish to olivaceous. Two young males (probably birds of the year) have the whole top of the head bright red.

216. *Celeus lugubris* (Malh.).—Piedra Blanca, Bolivia, 2 adult males, April 20 and 21, and 1 adult female, April 20 ; Chapada, 1 adult female, April 22 ; 1 young female(?), March 14.

The first four of the five specimens above enumerated—two males and two females—are apparently adult, and agree with Malherbe's description of his *C. lugubris*. The posterior upper tail-coverts in all are deep chestnut brown, plain in three of them, in the other (a young female) broadly barred with black. The tibial plumes are dusky in all, slightly varied with yellow.

The fifth specimen (No. 34,294) has the appearance of an immature bird, the plumage of the lower parts being heavily edged with deep chestnut brown; the dorsal plumage in much lighter, with the yellow cross-bands much broader; the yellow of the head is of a duller, more creamy tint; the tibial plumes are *wholly yellow*, as are also all of the upper tail-coverts, while the lower tail-coverts are ferruginous barred with black. The outer vanes of the inner primaries, and the apical half of both vanes of the secondaries, are uniform ferruginous, less dark than in the other specimens, and entirely without the broad blackish cross-bars seen in the others. My impression is that this is a young bird, and that the others are adult, in which case Mr. Hargitt (Cat. Bds. Brit. Mus., XVIII, p. 425) has reversed the characters of the adult and young in his account of the species; his account being also at variance with Malherbe's, as regards the characters of the adult and young.

217. *Cerchneipicus occidentalis* Hargitt.—One female, May 19.

218. *Campephilus trachelopyrus* (Malherbe).—One ♂ ad., May 19; one ♀ ad., March 30.

219. *Campephilus melanoleucos* (Gm.).—Three males and one female, November, 1882.

220. *Ceophlæus lineatus* (Linn.).—The 8 specimens, 4 ♂ and 4 ♀, were taken as follows: February, 2; March and April, 1 each; July, 2; August, 2; September, 1.

The specimens present wide variation in respect to the color of the lower parts, due mainly to accidental staining. In freshly-molted birds the light bars of the lower plumage are probably nearly pure white, but soon the light color becomes soiled or tinged more or less with a buffy or creamy tint, varying in amount in different specimens. A female (No. 34,184), taken Sept. 4, has all of the white areas, including the stripes on the head, neck and scapulars, deeply stained with rust-color, most deeply on the ventral surface, sides of the neck, throat and edge of the wings, and palest on the posterior part of the scapular stripe. A July male is similarly stained, but not quite so uni-

formly nor to so great a degree; several other specimens show the same staining on the bend of the wing and irregularly over the ventral surface.

221. *Picumnus guttifer* Sundev.—This species is represented by a fine series of 37 specimens, consisting of 19 males, 13 females, and 5 young, taken as follows: January, 7; February, 3; March, 2; April, 2; May, 3; June, 4; July, 2; August, 5; September, 5; October, 1; November, 1; December, 2.

The adults appear to differ very little in coloration, except in the markings of the head, the males having the feathers of the crown broadly tipped with bright red, and the females with circular spots of clear white. The young during the first year appear to have the crown plain brown, without spots. Three young males are just acquiring the red spots on the crown; in one there are merely a few spots of red; in another half the spots are red and the rest orange-red; in the third the spots are mainly yellow, mixed with a few red and orange-red spots.

In young birds the markings, particularly below, are less sharp than in the adults, and the general plumage is slightly more suffused with buffy.

222. *Rhamphastos toco* Müll.—Five specimens—Feb. 19 and Oct. 7-31.

223. *Pteroglossus castanotis* Gould.—Nearly every month in the year is represented by the series of 25 specimens.

The principal variation in coloration is in respect to the amount of chestnut on the throat, sides of the neck, nape and crown, which varies exceedingly in different specimens.

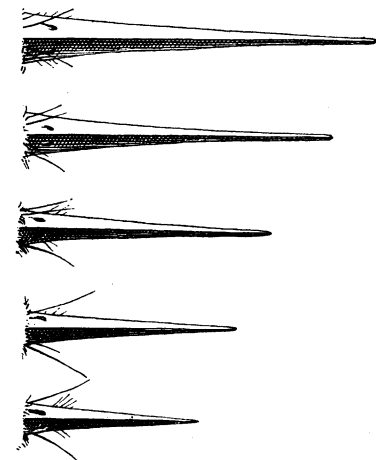
In some the nuchal band is very narrow, and there is merely a trace of a chestnut coronal spot; in others the whole nape is chestnut, this color extending forward to become confluent with a large coronal spot of the same color, which occupies nearly the whole top of the head. In the same way it extends from the sides of the neck so as to cover not only the chin and upper throat but the lower throat and extreme upper part of the breast, leaving only a rather narrow pectoral area of black. This variation is doubtless largely due to age, the younger birds having much the most chestnut.

The bill also varies much in color, in the prominence of the serrations, and especially in size. Birds that are obviously rather young have the serration the least developed, and the colors paler and less strongly contrasted. The bill, measured in a straight line from the posterior angle of the lower mandible to the tip of the upper, varies from 3.60 to 4.75 in. While there is much purely individual variation, the smallest bills belong to what are unmistakably young birds.

224. *Galbula rufoviridis* Cab.—The 32 specimens representing this species were taken as follows: January, 3 ♂; February, 1 ♂; March, 1 ♂, 1 ♀; April, 3 ♂, 3 ♀; May 4 ♂, 1 ♀; June, 1 ♀; July, 3 ♀; August, 1 ♂, 1 ♀; September, 3 ♂; October, 0; November, 4 ♂; December, 0. The 11 females were

all taken between March and August, while no males were taken in June and July, which seems to be a rather singular seasonal distribution of the sexes.

In fully adult individuals there is very little sexual variation in color, aside from the throat, which is white in the male and pale rufous in the female. There is a large amount of variation in the color of the upper parts, which in some specimens is vivid metallic golden green, when held in 'position C,'¹ and in others, when held in the same position, purplish coppery bronze. Others (generally specimens obviously in molt) present a



EXPLANATION OF FIGURES.

Variation of bill in *Galbula rufoviridis*.

1. No. 34,380, ♂ ad., Jan. 6.
2. No. 34,408, ♂ ad., Nov. 16.
3. No. 34,381, ♂ ad., Jan. 17.
4. No. 58,636, ♂ (juv. ?) (adult as regards plumage), Jan. 16.
5. No. 34,409, ♂ (juv. ?) Nov. 16.

mixed plumage, some of the feathers being green and the others bronze, and in some instances the new feathers are deep purplish bronze. In different specimens, also, the bronzy tint varies from golden bronze to purplish bronze.

¹ Cf. Garrod, P. Z. S., 1882, pp. 419, 420.

The bill varies exceedingly in respect to both length and slenderness, ranging from 1.25 to 2.25 in. in length, as shown in the accompanying figures, drawn natural size. The five specimens here figured are all males, and apparently adult, so far as can be determined by the plumage. The two shortest billed specimens have the extreme tip of the bill whitish, recalling the whitish knob often seen on the tip of the bill in newly-hatched birds. Presumably some of the variation here shown is due to age, but it is doubtless mainly purely individual.

225. *Brachygalba melanosterna* (Cab.).—Of the 26 specimens representing this species all were taken between the first of January and the first of August, as follows: January, 8; February, 5; March, 5; April, 0; May, 4; June, 0; July, 4. The February and March specimens were taken at Abrilongo (12 miles from Chapada), and the rest at Chapada.

The general coloration is quite constant; the variation shown seems to be wholly independent of sex, and not very clearly connected with season, specimens presenting the widest and perfectly parallel variations having been taken in both January and July. In none of the specimens is the bill wholly white; in those with the whitest bills the basal half of the upper mandible is dusky; in the other extreme the whole bill is black except the basal third or fourth of the lower mandible, which is whitish. In many of the specimens the whole upper mandible and the apical half of the lower is black. The bill varies comparatively little in size.

The chin is always white or whitish, passing into buff on the upper throat, and then into rufescent dusky on the lower throat. The abdomen is occasionally nearly pure white, but is usually more or less buffy, in some specimens strongly so. The "smoky brown" cap has the feathers usually more or less edged with lighter, this lighter edging varying from buffy white to deep ferruginous. In specimens having the cap rufous there is generally also more or less rufous on the throat, and the white of the abdominal area is tinged rusty.

226. *Bucco maculatus striatipectus* (ScL.).—Three specimens—Corumba, 2 ♂, March 12; Chapada, 1 ♀, July 20.

227. *Bucco chacuru* Vieill.—The series of 20 specimens was collected as follows: February, 1; March, 3; April, 1; May, 2; June, 1; July, 1; August, 2; September, 6; November, 1; December, 2. It is thus probably present at Chapada in small numbers throughout the year.

In fresh plumage the breast, and sometimes the middle of the belly, is quite strongly tinged buff, which mainly disappears in the breeding season, probably from fading; the dorsal surface is also light reddish brown, varied with narrow blackish cross-bars, but later the brown becomes duller and darker, and the blackish basal portions of the feathers become more prominent, from the wearing away of the apical brownish portions. There thus results a large amount of seasonal variation, due to fading and abrasion. The sexes appear to be indistinguishable in coloration.

228. *Monasa nigrifrons* (Spix).—A series of 11 specimens, of which 8 were taken in February, 2 in June, and 1 in January.

Two of the February specimens have the general plumage dull gray, tinged more or less with rusty, the chin, forehead and cheeks being mainly of this color.

229. *Chelidoptera tenebrosa brasiliensis* (ScL).—This species is represented by 14 specimens, of which 7 were taken in January, 1 in April, 1 in May, 1 in June, 2 in September, 1 in October, and 1 in November. They present a wide range of variation in coloration, which is quite independent of season or locality. The lower breast is generally more or less mixed cinereous and black, varying on the one hand to nearly pure cinereous and on the other to black. Similarly the abdomen varies from ochraceous to chestnut. An October specimen is as dark as any of the January series; and among the darkest and the lightest both sexes are represented. Some of the dark specimens are as dark as Cayenne examples, and the lighter ones are like Bahia specimens.

Probably northern examples (from Cayenne and Amazonia) will average smaller and darker than southern ones, but the difference is inconstant and only a matter of general average.

230. *Coccyzus melanocoryphus* Vieill.—One specimen, ♂, April.

231. *Coccyzus americanus* (Linn.).—One specimen, ♂, Oct. 28, 1883.

232. *Piaya cayana cabanisi*, subsp. nov.

Pyrrhococcyx macrourus CAB. J. f. O. 1862, p. 168 (Montevideo and southern Brazil. Not *Piaya macroura* GAMBEL, 1849, based on a bird from "Surinam" = *Cuculus cayanus* Linn.).

Pyrrhococcyx macrurus CAB. & HEIN. Mus. Hein. IV, 1862, p. 86.

This is the large southern form of *P. cayana* described by Cabanis as above, but under a preoccupied name.

The 24 specimens representing this subspecies were taken as follows: January, 1; February, 2; March, 2; April, 2; May, 1; June, 3; July, 1; August, 5; September, 2; October, 1; November, 2; and 2 without date. Sexed as males, 11; sexed as females, 10; not marked for sex, 3.

This series is quite uniform in coloration, the variation observable being chiefly seasonal. Birds in fresh plumage (March to August) are of rather lighter, brighter rufous above than those taken toward the close of the breeding season (September to November), which have become, through fading, somewhat duller and paler. In the same way the lower surface of the tail, in fresh plumage, is faintly suffused with dull rufous, except for a broad subapical bar of dull blackish, not sharply defined proximally, where the blackish band shades off into the general color of the lower surface of the rectrices. Later in the season this brownish suffusion becomes less distinct, and in occasional specimens almost disappears, leaving the lower surface of the rectrices, posterior to the apical white spot, blackish with a faint tinge of dull rusty brown.

The bills vary much in size, as regards both length and stoutness, and also in color, particularly in the amount of yellow on the convex portion of the culmen.

The males average slightly larger than the females, but the sexes do not appear to differ at all in coloration. In the males the wing averages 6.00 in., the tail 11.60; in the females the wing averages 5.80 and the tail 11.45.

Authors differ greatly in their treatment of the Cuckoos of the *Piaya cayana* group, some separating them into half-a-dozen species, others regarding them as forming a single species. A

glance at a large series of specimens from a wide range of localities is sufficient to show that neither of these extreme views is tenable, but that several strongly-marked geographical forms can at once be separated. Hence, in order to determine the proper designation of the bird represented by the Chapada series, it has been necessary to review the group, so far as the limited material at command renders possible.

Cuculus cayanus Linn. was based on Brisson's *Cuculus cayanensis*, from Cayenne, which is thus the typical locality for *Piaya cayana* (Linn.). On comparison of specimens from different portions of the general habitat of the so-called *P. cayana*—which extends from southern Mexico throughout tropical America—they are found to differ very markedly in coloration and in size. These differences have attracted the attention of various authors, and numerous supposed species have been named, till the list of synonyms, as compiled by Mr. G. E. Shelley, in his recent Catalogue of the Cuculidæ (Cat. Bds. Brit. Mus., XIX, 1891, pp. 373, 374) numbers not less than fifteen distinct names, aside from various additional orthographic variations. Many of these are of course pure synonyms, or more or less indeterminable, while others are available for the designation of a number of well-marked subspecies or geographic forms.

The most distinct, and geographically the most isolated, member of the group is *Piaya mexicana* Swain., from western Mexico, distinguished by its large size (wing 5.93, tail 11.43), the light sandy rufous tint of the upper parts, and the rufous under surface of the tail, with its rather sharply defined narrow blackish subapical bar. This by many authors is ranked as a well-defined species.

The form differing most from this is the one most closely related to it geographically, and which cuts off *P. mexicana* at the southward from the allied forms of South America, namely, the commonly so-called *P. mehleri* Bon., based on specimens from Santa Fé de Bogota. The Bogota birds, however, do not represent the extreme phase of this form, being much smaller and paler in coloration than specimens from Panama and thence northward to southeastern Mexico. In fact the two phases are so distinct that they may well be recognized as subspecies under the names respectively of *mehleri* Bon. for the Bogota and Napo form, and *ther-*

mophila Scl.¹ for the Central American form. The same general style of bird ranges southward through eastern Peru to central Bolivia, but Yungas specimens are again larger and darker than true *mehleri*, being very closely representative in size and coloration of *thermophila* Scl.

The true *Piaya cayana* should apparently be restricted to Cayenne, Trinidad, and the immediately adjoining portions of South America. It is a small form, nearly as small as *mehleri*, but very different in coloration, being lighter rufous above and with the crissum and lower parts generally, including the lower surface of the tail, much less dusky.

In northern Brazil, from at least as far south as Bahia northward, is a form slightly larger than true *cayana*, but much paler in coloration, the paler tints extending to all parts of the plumage. This is the form described by Cabanis and Heine (Mus. Hein., IV, 1862, p. 86) as *Pyrrhococcyx pallescens*.

In southern Brazil, Uruguay, and the Argentine Republic, a larger form prevails, recognized by Cabanis (J. f. O., 1862, p. 168) under Gambel's name *macrourus* (= *cayanus* Linn.). This differs little in coloration from *pallescens*, but is on the whole less pale, with the lower surface of the tail more rufescent; it is, however, of much larger size. This form, in fact, is nearly of the size of *P. c. mexicana*, and more nearly approaches it in coloration than any of the several intervening forms.

The equatorial representatives of the *P. cayana* group are thus the smallest, with a decided increase in size both northward and southward. Measurements of a considerable number of specimens (5 or 6 to 12 or more of each form) indicate the following average dimensions for the wing and tail:

<i>Piaya cayana mexicana</i>	wing,	5.93;	tail,	11.55
“ “ <i>thermophila</i>	“	5.75;	“	10.25
“ “ <i>mehleri</i>	“	5.60;	“	9.45
“ “ <i>cayana</i>	“	5.50;	“	9.50
“ “ <i>pallescens</i>	“	5.76;	“	10.50
“ “ <i>cabanisi</i>	“	5.95;	“	11.55

In respect to other names that have been applied to representatives of the *P. cayana* group, probably *Cuculus ridibundus* Gm. (Syst. Nat., I, 1788, p. 414, ex Brisson), given to a Mexican

¹ “Hab. In terra calida reipublicæ Mexicanæ et in Guatemalæ.”—P. Z. S., 1859, p. 368.

Cuckoo, can never be identified, resting as it does on the indefinite accounts of Nuremberg and Hernandez. *Coccyzus macrocercus* Vieill. (Nouv. Dict., VIII, 1817, p. 275) is practically a synonym of *Cuculus cayanus* Linn., as is also *Pyrrhococcyx guianensis* Cab. & Hein. (Mus. Hein., IV, 1862, p. 85). *Piaya viridirostris* Würt. (Naum., II, ii, 1852, p. 55) and Bon. (Consp. Vol. Zygod., 1854, p. 6) is a *nomen nudum*, applied to some Mexican species. Gambel, in 1849 (Journ. Acad. Nat. Sci. Phila., I, p. 215), identified *P. mexicanus* Swain. with *P. cayana* (Linn.), and re-described the latter as *P. macroura* sp. nov. *Piaya nigricrissa* Sclater (P. Z. S., 1860, p. 285), and *Pyrrhococcyx mesurus* Cab. & Hein. (Mus. Hein., IV, 1862, p. 83), are both apparently pure synonyms of *P. mehleri* Bon. *Pyrrhococcyx columbianus* Cab. & Hein. (Mus. Hein., IV, 1862, p. 82) may represent a southern form of *P. mexicana* Swain.

It is not quite clear what should be done with *Piaya circe* Bon. (Consp. Av., 1850, p. 110) "ex Columbia," for which Schlegel (Mus. Pays-Bas, I, 1862, Cuculi, pp. 57, 58) gives the type locality as Caracas, Venezuela. It is a large, strongly-colored bird, with a black crissum and the lower surface of the tail black, as in *thermophila* Sclater. Should they prove to be the same, *circe* will of course take precedence over *thermophila*, it having about nine years' priority.

The following may doubtless be looked upon as fairly distinguishable forms:

1. *Piaya cayana* (typica).—Cayenne, Trinidad, and adjoining portions of eastern South America.
2. *Piaya cayana pallescens*.—Northern Brazil.
3. *Piaya cayana cabanisi*.—Southern Brazil, Uruguay, and Argentina.
4. *Piaya cayana mexicana*.—Southwestern Mexico. (The only specimens I have seen are from the State of Colima.)
5. *Piaya cayana thermophila*.—Southeastern Mexico and southward to Panama. (Perhaps=*P. circe* Bon.)
6. *Piaya cayana mehleri*.—Colombia, Ecuador, eastern Peru, south into Bolivia. (The south Bolivian form may require separation as an additional large southern race of the *mehleri* phase of *cayana*.)

233. *Diplopterus nævius* (Linn.).—Of the 5 specimens representing this species, three were taken in July and one each in February and April. The February specimen is a young bird with the fore neck and breast strongly suffused with rusty buff and narrowly barred with brownish black, and the feathers of the crown broadly tipped with grayish buff.

234. *Dromococcyx phasianellus* (Spix).—Two specimens, —♂ ad., June 19, and a young bird in first plumage, taken Jan. 6.

The young bird in first plumage resembles the adult in general coloration above, except that the wing-coverts have broad shaft-streaks of buff, and lack the light edging seen in the adult. Below the fore neck and breast are dingy brownish olive gray, with a slight wash of buff; middle of throat paler; rest of lower surface soiled yellowish white, tinged on the flanks with gray.

235. *Crotophaga major* Gm.—Two specimens, ♂ and ♀, Oct. 26, 1882.

236. *Crotophaga ani* Linn.—The 19 specimens were taken as follows: March, 6; April, 4; June, 4; July, 1; August, 2; September, 1; November, 1.

237. *Guira guira* (Gm.).—Three specimens—January, September and October.

238. *Ara ararauna* (Linn.).—Two specimens, male and female, May and June.

239. *Ara chloroptera* Gray.—Two specimens, females, April 25 and Oct. 19.

240. *Ara auricollis* (Cass.).—One specimen, April 22.

241. *Ara nobilis* (Linn.).—The series of 14 specimens was taken as follows: January, 1; March, 1; June, 1; July, 5; August, 5; September, 1. Three are young specimens, lacking the red on the carpal edge of the wing.

242. *Conurus leucophthalmus* (Müll.).—Nine specimens, taken as follows: February, 1; March, 1; July, 4; August, 2; October, 1.

243. *Conurus aureus* (Gm.).—Thirteen specimens, taken as follows: January, 2; March, 1; April, 3; May, 3; July, 1; August, 1; October, 2.

244. *Pyrrhura molinæ* (M. & S.).—Two males, Piedra Blanca, Bolivia, April 23, 1886.

245. *Brotogerys chiriri* (Vieill.).—Eleven specimens—February, 4; March, 1; April, 1; May, 5.

246. *Amazona æstiva* (Linn.).—Two specimens, Chapada, ♂ ad., Aug. 1; Piedra Blanca, Bolivia, ♂ ad., April 23.

247. *Pionus menstruus* (Linn.).—Eight specimens—January, 1; February, 1; April, 5; December, 1.

248. *Megascops brasiliensis* (Gm.).—Four specimens—February, 2 (♂ and ♀); July, 1 (♀); August, 1 (♂). The July specimen is very different from the others, being in semi-rufous plumage, about half-way between the ordinary gray phase and the typical red phase.

249. *Glaucidium phalænoides* (Daud.).—This species is represented by 5 specimens, taken as follows: January, 1; March, 2; July, 1; October, 1. Three are in the gray phase and two in the red phase, but no two of them are very nearly alike. One is a dark brown (ferruginous) bird, with the bars of the wing and tail feathers and the shaft stripes on the crown obsolete; another is also ferruginous, but much lighter, with the bars on the quills of both wings and tail much more distinct, and the light shaft-stripes on the crown very distinct and abruptly expanded apically; one of the 'gray' birds is clear umber, with nearly pure white tail-bars, and a few pale rusty shaft-stripes on the front part of the head; another is ferruginous umber, with the very distinct tail-bars edged with rusty, and the whole crown well streaked with very narrow, strictly linear buffy white shaft-stripes; the other is ashy umber above, with a slight suffusion of pale rufous, the tail-bars distinct and pale yellowish white, and the crown very faintly streaked with narrow ashy shaft-lines.

I adopt the name *phalænoides* Daudin as the designation of the species simply from its being the oldest name applicable to the

group, without regard to whether the southern form may or may not be separable as a geographical race, under the name *ferox* Vieill., of which *ferrugineus* Wied is merely the red phase.

250. *Asio mexicanus* (Gm.).—One specimen, ♀ ad., Aug. 3.

251. *Syrnium huhulum* (Daud.).—One specimen, ♀ ad., January.

252. *Syrnium perspicillatum* (Lath.).—Two specimens, ♂ ad., Nov. 6; ♂ juv., Nov. 7.

The young specimen is still in the fluffy dress of the nestling bird, with the quills about two-thirds grown. The remiges and rectrices are nearly as in the adult, except that the latter are much more broadly tipped with white. The clothing plumage, both above and below, is everywhere loose and downy, and nearly uniform creamy white (rather lighter on the throat), excepting on the chin, lores, and sides of the face (including the auriculars and a narrow ring around the eyes), where it is intense black, giving the bird a very odd expression. The primary coverts are dark brown, like the quills, but the secondary coverts and tertials are buff, the latter more or less barred and mottled with brown, and interspersed with a few brown feathers of the new plumage.

253. *Asturina nitida* (Lath.).—Two specimens—♀ ad., July 21; ♀ juv., Jan. 24.

254. *Rupornis magnirostris nattereri* (Scl. & Salv.).—This is apparently a common species at Chapada throughout the year. It is represented by 26 specimens, collected as follows: January, 1; February, 4; March, 1; April, 2; May, 0; June, 4; July, 1; August, 5; September, 1; October, 2; November, 1; December, 4. About 14 are fully adult, 5 are young, and the others in various stages of immaturity. They are all distinctly referable to *nattereri* as distinguished from true *magnirostris*.

255. *Buteo brachyurus* Vieill.—One specimen, Nov. 2.

256. *Buteo albicaudatus* Vieill.—Of the series of 18 specimens 13 were taken in August, 4 in September, and a single specimen Nov. 3.

Judging by descriptions, none of the birds in this series can be fully adult. According to Mr. Sharpe (Cat. Bds. Brit. Mus., I, 1874, p. 102), the upper parts in the adult should be "slaty gray, darker on the head," etc., and "the sides of face and throat deep slaty gray, rest of under surface white," etc. Mr. Ridgway says: "Above dark plumbeous; rump and lower parts pure white; throat plumbeous-black or bluish-plumbeous" (Proc. U. S. Nat. Mus., I, 1878, p. 155). To all appearances 11 of the 18 specimens of the present series are adult, and vary in general coloration within rather narrow limits. An average specimen may be described as follows:

Entire throat, whole head, neck and interscapulars blackish with a faint tinge of ashy—in other words, plumbeous black—with more or less concealed white on the crown; scapulars dull blackish brown, more or less edged and tinged with rufous, passing into clear deep rufous on the shoulder coverts; back brown strongly mixed and varied with rufous; rump barred about equally with rufous, plumbeous and white; upper tail-coverts white, the upper central ones narrowly and irregularly barred with plumbeous; basal two-thirds or three-fourths of the tail white or grayish white, narrowly barred with plumbeous or rusty plumbeous, particularly on the central feathers, much less so on the outer feathers, and with a very broad subterminal band of black, tipped with gray, passing into white at the extreme tip. Below, from the throat posteriorly, white or ashy white, crossed by numerous fine wavy bars of pale grayish brown, finest posteriorly and broadest across the chest, where they are more strongly tinged with rufous, with sometimes considerable rufous on the sides of the lower pectoral region. Axillars white, with heavy double bars of pale rufous and plumbeous.

The variation from this, in what seem to be practically adult birds, consists in the absence of the ashy tinge above, a slight and more or less irregular edging and spotting of rufous on the interscapulars, and heavier bars on the chest, which may vary from pale rusty plumbeous to nearly clear rufous. Or there may be less rufous over the dorsal region generally, and the lower parts, below the throat, especially centrally, may be nearly pure white without trace of cross-bars. There is little variation in the markings of the rump, upper tail-coverts and tail.

In what seems to be the next stage to this, the rufous shoulder-patch is much more restricted, the lower back is more rufous, and the rump and upper tail-coverts are heavily barred with blackish, more or less varied with rufous; the middle of the

breast is mainly white, with the whole pectoral region and flanks heavily barred with mixed rufous and blackish, and the thighs conspicuously so. The basal portion of the tail, which in the adults is white, is dull gray, crossed by numerous bars of dusky.

In a still earlier stage there is no rufous on the wing-coverts, the whole dorsal surface being nearly uniform blackish brown, with in some specimens touches of pale rufous on the scapulars ; and there is generally a large amount of partly concealed white on the crown, hind head and nape. The back, rump and upper tail-coverts are spotted black and white. Below the plumage is mixed black and white, sometimes the black prevailing and sometimes the white, with no tendency to transverse markings, even on the thighs. Tail almost wholly grayish brown, crossed by a great number of indistinct lighter bars.

One specimen is brownish black throughout, both above and below, except for patches of concealed white on the head, neck and breast, and for rufous tipping and barring to the feathers of the belly, thighs and lower tail-coverts, and concealed bars of rufous on the scapulars and some of the wing-coverts.

Another specimen is entirely deep black throughout, with the rump and upper tail-coverts spotted black and white, and with much concealed white at the base of the scapulars and nape feathers. The tail is that of a normal adult except that it is much more heavily barred, and there is more or less ashy tinging the plumage of the head and back. It is hence apparently a melanistic adult, although there is no rufous on the shoulders, nor in fact anywhere in the plumage.

This is doubtless the true *Buteo albicaudatus* Vieill., in which case the Rio Grande bird, so called, is quite different, as shown by Mr. Sennett's admirable series of nearly thirty specimens from the Lower Rio Grande Valley in Texas, representing the species from the downy nestling to the fully adult birds. This northern form I propose to call

***Buteo albicaudatus sennetti*, subsp. nov.**

In the adults of the Rio Grande form the whole lower surface is pure intense white, from the bill to the tail, excepting for a few

wavy very narrow bars of grayish brown over the middle region of the body, but confined mainly to the flanks, sometimes, however, extending as faint bars to the thighs. The whole upper surface, including the outer surface of the folded wings, is ashy gray, except of course the rufous shoulder patch, and a rufous tinge on the outer scapulars. Only in more or less immature birds is the throat plumbeous. Although young birds of the Rio Grande form are brownish black spotted more or less on the rump, breast and thighs with white, at no stage is there a close agreement with corresponding phases of the Chapada series. There seems to be no great variation in size or structural features between the two forms, which doubtless completely intergrade in coloration over the area separating these two extreme borders of the habitat of the species. Yet the color variations clearly entitle the two forms to subspecific separation.

I have named this subspecies in honor of Mr. George B. Sennett, in recognition of his important contributions to our knowledge of Texan ornithology.

257. *Heterospizias meridionalis* (Lath.).—Represented by a series of 22 specimens, taken as follows: June, 1; July, 7; August, 9; September, 2; October, November and December, 1 each. About 12 may be considered as fully adult, but only two or three have the dorsal plumage to any great extent ashy. The rest are in various stages of immaturity, from very young birds (though all are full grown) to those nearly adult. Temminck's description (Pl. Col., text to pl. xxv) gives a very good description of the plumage of both the adult and young birds—much better than some later accounts.

Birds of the first and second years are dull brown above with more or less partly concealed yellowish white on the head and hind neck, sometimes more or less strongly tinged with ferruginous; the lesser upper wing-coverts are irregularly barred and freckled with deep rufous, as are also the greater primary and secondary coverts and the basal portion of the secondaries. The tail feathers are dull brown like the back, the basal two-thirds irregularly barred with ashy white and more or less varied with rufous. The throat is whitish or buffy white, with shaft-lines of

dusky ; the lower throat and breast are soiled white, varying in different specimens to rusty white, heavily blotched with dusky ; the thighs are blackish, tinged and variegated with irregular very narrow bars of dusky ferruginous, varying in some specimens to dark ferruginous barred narrowly with black.

In what appears to be the next stage the whole upper parts, including the head, are dusky brown, the feathers of the whole head, but particularly of the nape and sides of the neck, strongly ferruginous, barred finely and centrally streaked with blackish ; the scapulars are also marginally barred with rufous, and the lesser wing-coverts are rufous barred with blackish. The chin and throat have become more or less dusky brown, the feathers narrowly barred with pale dull rufous ; some of the breast feathers are almost wholly brown, those of the middle of the breast centred with broad spots and blotches of yellowish or buffy white ; from the breast posteriorly the plumage is barred about equally with blackish brown and dull ferruginous.

In the fully adult stage—perhaps only in high plumage—the feathers of the head, back of the neck, and the scapulars are centred more or less broadly with ashy slate, and the scapulars have a strong ashy tinge in favorable lights. The lower surface generally is barred with blackish brown and dull rufous, the rufous bars the broader ; the thighs are much deeper, brighter rufous, with very narrow bars of blackish, in some specimens wholly obsolete. The white tail-bars have become reduced to one broad bar placed about midway the tail, and a narrow tipping of white.

Apparently several years are required in attaining adult plumage, resulting in a great variety of intermediate stages. There is also apparently considerable variation in the intensity of the rufous in birds of nearly the same age.

258. *Parabuteo unicinctus* (Temm.).—One specimen, ♂ ad., June 26.

259. *Leucopternus albicollis* (Lath.).—Two specimens, ♂ ad. and ♀ ad., Oct. 7.

260. *Harpyhaliaëtus coronatus* (Vieill.).—One specimen, ♂ ad., Oct. 20.

261. *Spizaetus mauduyi* (Daud.).—One specimen, ♀ ad., Oct. 11.

262. *Spiziastur melanoleucus* (Vieill.).—One specimen, ♀ ad., Oct. 1.

263. *Accipiter pileatus* (Temm.).—Three specimens, ♂ ad., June 30; ♂ juv. and ♀ juv., May 15.

264. *Accipiter* (sp. incog.).—One specimen, ♂ juv., Jan. 19. Probably referable to *A. guttatus* (Vieill.).

265. *Micrastur ruficollis* (Vieill.).—Three specimens, ♂ ad., May 3; ♂ juv., May 16; ♀ ad., Aug. 17.

266. *Geranospiza cærulescens* (Vieill.).—One specimen, ♀ ad., Jan. 24.

267. *Falco fusco-cærulescens* Vieill.—The 5 specimens representing this species were taken: 2 in July, 3 in August, and 1 in December.

268. *Falco rufigularis* (Daud.).—Two specimens—Chapada, ♂ ad., Nov. 12; ♀? ad., Piedra Blanca, Bolivia, April 20.

The November specimen is in worn condition, and the dorsal plumage is nearly black, with a narrow edging of slaty gray. The April specimen is in fresh, unworn plumage, and is almost wholly deep slaty-gray above, with shaft-streaks and subapical blotches of black.

269. *Falco sparverius australis* Ridgw.—Represented by 40 specimens, 15 males and 25 females, taken as follows: January, 2; March, 2; April, 9; June, 3; July, 4; August, 7; September, 1; October, 8; November, 2; December, 2.

Of the 15 males, 6 show no rufous on the crown, and very few of the others show more than the slightest trace of rufous on a few feathers; in none does the rufous form a decided spot. Of the 25 females all but three have more or less rufous on the crown, it sometimes forming a large well-defined spot, but generally is restricted to very narrow streaks on a few feathers only.

Some of the March and April specimens, both males and females, show a strong wash of rusty buff over much of the ventral surface, varying in amount in different specimens, and wholly fading

out later in the season. The width of the black bars on the back, and the amount of the black spotting and streaking below is subject to a wide range of individual variation. The intensity of the rufous above also varies greatly in individuals of the same sex taken at the same season; it also becomes much paler through fading towards the close of the breeding season.

270. *Elanoides forficatus* (Linn.).—Four specimens—October, 1; November, 3.

271. *Ictinia plumbea* (Gm.).—Represented by a series of 20 specimens, taken as follows: January, 1; August, 1; September, 7; October, 6; November, 3; December, 2.

272. *Gampsonyx swainsoni* Vigors.—Four specimens, taken one each in April, May, August and September.

273. *Leptodon cayennensis* (Gm.).—Two specimens—♂ ad., Sept. 4; ♀ juv., Nov. 20.

274. *Leptodon unicinctus* (Temm.).—One specimen, ♂ in transition plumage, Sept. 23.

275. *Ibycter americanus* (Bodd.).—One specimen, ♂ ad., Oct. 19.

276. *Milvago chimachima* (Vieill.).—Three specimens—♀ ad., Sept. 9; ♂ ad., Oct. 20; ♀ juv., Aug. 10.

277. *Polyborus tharus* (Mol.).—Three specimens—♀ ad., Feb. 21; ♀ juv., Aug. 15; ♂ juv., July 31.

278. *Gypaguspapa* (Linn.).—One specimen, ♂ ad., May, 1883.

279. *Cathartes aura* (Linn.).—One specimen, “♀?”, July 25.

280. *Ceriana cristata* (Linn.).—One specimen, ♂ ad., October.

281. *Columba speciosa* Gm.—Six specimens—four males, one female and one unfledged young, taken as follows: January, 1; September, 2; October, 1; November, 2.

282. *Columba rufina* (Temm.).—Five specimens, taken as follows: April, 1; September, 3; October, 1.

283. *Zenaida maculata* (Vieill.).—Two specimens—♂ ad., August; ♀ ad., July 15.

284. *Columbula picui* (Temm.).—The series of 12 specimens was taken as follows: May, 2; August, 5; September, 1; October, 1; November, 1.

285. *Columbula campestris* (Spix).—One specimen, ♀ ad., Cachoeira.

286. *Columbigallina griseola* (Spix).—One specimen, ♂ ad., July 22.

287. *Columbigallina talpacoti* (Temm.).—The 9 specimens—7 males and 2 females—were taken in January, 1; April, 3; June, 2; July, 1; September, 2.

288. *Peristera cinerea* (Temm.).—Four specimens—♂ ad., April, 7; 2 ♂ ad. and 1 ♀ ad., July 21-24.

289. *Engyptila erythrothorax* (Temm.).—Three specimens—♂ ad., March, 7; ♀ ad., September; ♀ ad., Oct. 30.

290. *Engyptila rufaxilla* (Rich. & Bern.).—Five specimens, of which 1 was taken in August, 2 in October, and 2 in November.

291. *Geotrygon montana* (Linn.).—Two specimens—♂ ad., Sept. 4; ♂ juv., Nov. 21.

292. *Penelope superciliaris* Temm.—Represented by 9 specimens, taken in August, September, October and November.

293. *Jacana jacana* (Linn.).—Three specimens—♂ ad., Oct. 2; ♀ ad., Feb. 15; ♀ juv., March 2.

294. *Vanellus cayennensis* (Gm.).—One specimen—♀ ad., Cuyaba, Dec. 5.

295. *Hoplopterus cayanus* (Lath.).—Two specimens, Cachoeira, Jan. 28, and Corumba, March 11.

296. *Charadrius dominicus* Müll.—Eleven specimens, taken Oct. 5 to Nov. 14, 1882.

297. *Ægialitis collaris* (Vieill.).—Corumba, Feb. 28 to April 1—7 specimens.

298. *Gallinago gigantea* (Temm.).—One specimen, ♀ ad., June.

299. *Gallinago frenata* (Licht.).—One specimen, ♂ ad., Nov. 1.

300. *Tringa fuscicollis* Vieill.—Three specimens, Oct. 6 and 21, 1882.

301. *Totanus solitarius* (Wils.).—This species seems to be almost a summer resident, the 11 specimens having been taken as follows: September, 3; October, 2; December, 1; February, 2; March, 2; April (April 10), 1.

302. *Bartramia longicauda* (Bechst.).—Chapada, 4 specimens, Sept. 26 to Oct. 27; Piedra Blanca, Bolivia, 1 specimen, April 23.

303. *Actitis macularia* (Linn.).—One specimen, Corumba, April 1.

304. *Aramides cayennensis* (Gm.).—Four specimens—May, September, and October.

305. *Rufirallus cayanensis* (Gm.).—Two specimens—♂ ad., May, 10; ♀ ad., Oct. 17.

306. *Ionornis martinica* (Linn.).—One specimen, ♂ ad., Cachoeira, June 30.

307. *Glaucestes parvus* (Bodd.).—One specimen, ♀ ad., Corumba, March 26.

308. *Theristicus caudatus* (Bodd.).—One specimen, ♂ ad., May 31.

309. *Tantalus loculator* Linn.—One specimen, ♀ ad., June 30.

310. *Ardea egretta* Gmel.—Two specimens, ♂ ad., Jan. 7; ♀ ad., Oct. 2.

311. *Ardea candidissima* Gmel.—One specimen, May 12.

312. *Butorides cyanurus* (Vieill.).—Three specimens—♀ ad., Cachoeira, Feb. 3; ♂ ad., Dec. 2; juv., Dec.

313. *Pilherodius pileatus* (Bodd.).—One specimen, ♂, December.

314. *Tigrisoma fasciatum* (Such).—One specimen, ♀ ad., Sept. 11.

315. *Cancroma cochlearia* Linn.—Two specimens, ♂ ad., June 18; ♀ ad., Oct. 10.

316. *Cairina moschata* (Linn.).—One specimen, ♂ ad., July 31.

317. *Anhinga anhinga* (Linn.).—One specimen, ♀ ad., Nov. 6.

318. *Colymbus dominicus* Linn.—Two specimens, ♂ and ♀, Sept. 19.

319. *Crypturus tataupa* (Temm.).¹—Seven specimens, taken as follows: May, 1; August, 1; September, 3; November, 1; December, 1.

The November specimen is a downy chick; only a few days old. In coloration it has little resemblance to the adults. It may be described as follows:

Whole front of head, including lores and sides of the face in front of the eyes, brownish buff, the extreme tips of the downy fibres blackish, a narrow superciliary stripe, widening into a broad band behind the eyes, and a narrow stripe dividing the crown, and extending down the back of the neck, yellowish brown, like the forehead; sides of the crown and nape varied dark rusty brown and blackish; ear-coverts and a narrow maxillary stripe blackish; general color above rufescent dusky, the fibres of the downy feathers subapically ringed with pale buff; below, chin and throat grayish white, passing on the lower throat into a pale buffy tint; rest of the lower surface mixed buff and dusky, the downy feathers dusky and tipped with yellowish, passing into a rufescent buff posteriorly.

320. *Crypturus parvirostris* Wagler.—Four specimens—April, May, July and October.

321. *Crypturus undulatus* (Temm.).—Seven specimens, taken in February, May, October and November.

322. *Rhynchotus rufescens* (Temm.).—Seven specimens—♂ ad. and ♀ ad., Aug. 14; ♂ ad. and ♀ ad., Nov. 7; three young chicks, Nov. 9. The latter may be thus described:

¹ The specimens of *Tinamidæ* have been kindly identified by Mr. P. L. Sclater, whose determinations are here adopted.

The head is striped rusty yellow and black, as follows : a broad black central crown stripe, separated from a much narrower lateral black stripe on each side by a narrow rusty yellow stripe ; this outer black stripe is succeeded laterally by a broad rusty yellow superciliary stripe, which is divided posteriorly by a narrow black stripe on the side of the head behind the eye ; a narrow black line above and below the auriculars, and a black maxillary stripe, extending on to the sides of the neck, all of the intervening space rusty yellow. General color above mottled yellowish white, rufous and black, the coarser bristly feathers being blackish subapically and each terminating in a pair of long rusty bristles ; between the bristly feathers are softer more downy yellowish white feathers. Below, chin and whole throat white, passing into ochraceous over the breast and under surface generally, but paler behind the gular region.

323. *Nothura media* (Spix).—Two specimens — ♂ ad., Sept. ; ♀ juv., June 21.

324. *Rhea americana* Lath.—This species is represented by a single specimen, without data.

PART IV.—OÖLOGICAL NOTES.

A small collection of eggs, with a few nests, form part of the Chapada collection. The identity of the eggs was determined by the collector's number of the skin of the parent bird being marked on the label accompanying the eggs, and the accuracy of the determination of the eggs is thus assured with at least reasonable certainty. In a few cases the eggs were catalogued separately by the collector, and labeled merely with the vernacular names of the species. In all such instances, however, the eggs have been discarded as unidentifiable and worthless.

In the first part of this report the eggs were described in connection with the general remarks on the species. Later, however, it was thought better to bring the oölogical references together under a special subheading at the close of the more general part of the paper. In the following pages will be found descriptions of the eggs of the Chapada collection, with such notes as the collector chanced to record on the labels, except those of the Oscines, described in Part I of the present paper. For convenience a list of the species of which descriptions of eggs have been

already given is here appended, with a reference to the page in Volume III, of this Bulletin where they are described :

<i>Turdus albicollis</i> , p. 341.	<i>Arremon polionotus</i> , p. 363.
<i>Turdus albiventer</i> , p. 341.	<i>Saltator similis</i> , p. 365.
<i>Mimus modulator</i> , p. 342.	<i>Schistochlamys atra</i> , p. 368.
<i>Basileuterus flaveolus</i> , p. 345.	<i>Coryphospingus cucullatus</i> , p. 371.
<i>Arbelorhina cyanea</i> , p. 348.	<i>Zonotrichia capensis</i> , p. 372.
<i>Calliste margaritæ</i> , p. 353.	<i>Ammodramus manimbe</i> , p. 374.
<i>Tanagra sayaca</i> , p. 355.	<i>Ostinops decumanus</i> , p. 376.
<i>Ramphocelus atrisericeus</i> , p. 357.	<i>Cassicus persicus</i> , p. 377.
<i>Tachyphonus rufus</i> , p. 360.	<i>Uroleuca cyanoleuca</i> , p. 380.

***Leptopogon amaurocephalus* Cab.**

The eggs of this species are pure white, and measure about .55 x .77 in. The collection contains three sets, taken Dec. 2 and 3, 1882. The seven eggs, marked as belonging to three sets, are unaccompanied by notes as to the character or situation of the nests.

***Elænea pagana albiceps* (d'Orb. & Lafr.).**

Two eggs marked as belonging to No. 58,446, ♀, taken Oct. 21, 1882, are white with a slight creamy tinge, with a broad circle of very fine dark reddish brown and lavender dots about the larger end. The average measurements are .52 x .72 in.

***Rhynchocyclus sulphureus* (Spix).**

Two eggs of this species, belonging to different sets, are greatly elongated, measuring .67 x 1.00 in. ; the ground color is dull reddish white, faintly blotched with brown, only a little darker than the ground color. The eggs were taken Nov. 1, 1883.

***Myiobius nævus* (Bodd.).**

Two eggs labeled as belonging to this species, taken late in October, 1882, are deep creamy white, with a circle of pale reddish brown dots and blotches about the larger end. They measure .52 x .72 in.

***Empidonax bimaculatus* (d'Orb. & Lafr.).**

This species is represented by a set of three eggs, taken Oct. 31, 1882. The ground color is rather strong buff, with heavy rusty brown blotches forming a broad ring around the larger end, mixed with a few smaller spots of lilac. Measurements, .55 x .74 in.

Metopia galeata (*Licht.*).

Two eggs of this species, taken Oct. 13, 1882, have a buffy white ground color, and are thickly covered by fine streaks and blotches of pale umber, which become massed in a broad zone around the larger end, nearly concealing the ground color. They measure .65 x .95 in.

Pipra fasciata *d'Orb. & Lafr.*

Two eggs of this species, marked as belonging to No. 58,513, ♀, taken Oct. 21, 1882, have a grayish white ground color concealed for the most part with longitudinal streaks and elongated narrow blotches of very dark purplish brown. Size, .62 x .83 in.

Furnarius albogularis (*Spix*).

There are 17 eggs of this species in the collection, belonging apparently to six sets, five of which have three eggs each and one has only two. They are unmarked, clear dull white, and vary considerably in size and shape. Extreme eggs measure .80 x 1.20 and .78 x 1.00, averaging about .80 x 1.05 in. They were collected Oct. 4-6, 1882.

Lochmias nematura (*Licht.*).

Two eggs of this species are plain soiled white, and measure .75 x 1.00. On the label is the following note by the collector: "Nest made in a hole in a small bank above a spring. Depth of hole, one foot. Nest composed of leaves of water plants. Oct. 28, 1882."

Another set of two similar eggs, badly incubated, belong apparently to the same species, the label of which bears the legend, "Nest composed of leaves of water plants in a hole 1½ feet deep, in a bank over a stream in forest."

Synallaxis azaræ *d'Orb.*

There are 8 eggs, in four sets of two each, marked as belonging to this species, taken in October, November and December, 1882. They are white, with a faint greenish creamy tinge, and average about .65 x .80 in.

One of the nests is described by the collector on the label as "composed of short, small dry sticks, 12 inches high, 8 inches wide, with a round entrance also of sticks, 9 inches in length."

***Thamnophilus ambiguus* Swain.**

Two eggs of this species, taken Nov. 6, 1882, are dull white, rather profusely marked with streaks and blotches of purplish and lavender, except about the smaller end, where they are more sparsely distributed. Size, .63 x .84 in.

***Thamnophilus radiatus* (Vieill.).**

Two eggs of this species, taken Nov. 6, 1882, have a general resemblance in style and markings to those of *T. ambiguus*; they are, however, much larger, and the ground color is more fully and evenly covered with rather finer markings. The grayish ground color is nearly concealed over the whole egg by fine stippings and streaks of lilac and dots and scratches of blackish 'heliotrope purple.' Size, .67 x .93 in.

***Phaethornis pretrii* (L. & D.).**

A single nest of this species bears the following label: "Nest hanging by roots from roof of a small cave over a stream in a forest. Oct. 21, 1882." The nest is cornucopia-shaped, with the nest-cavity at the top. It has a vertical length on its convex side of 5½ inches, and of 4 inches on the shorter side. The depth of the cavity is 1½ in., and its diameter at top is about 1¼ in. It is a bulky, compactly felted structure, composed of fine vegetable material of a brownish color, and consists of what looks like fronds of a very delicate fern, mixed with silky fibers resembling spiders' silk. The pure white eggs measure .35 x .60 in. The collection also contains several clutches of eggs without nests.

***Hemiprocne zonaris* (Shaw).**

Three eggs of this species average .96 x 1.45 in., and are soiled white. They were collected Oct. 25, 1882.

Cypseloides senex (*Temm.*).

An egg of this species, marked as belonging to skin No. 34,042, ♀, was collected Nov. 4, 1882. The collector has noted on the label: "Nest built of loose material, on a small rocky ledge, over which the water of a large stream fell. In the nest was one young bird and an egg." The egg measures .70 x 1.10 in., and is chocolate colored, doubtless from soiling.

Caprimulgus parvulus *Gould.*

The collection contains 10 eggs of this species, belonging apparently to five sets, taken in October and November, 1882. They are buffy white, sparingly but rather uniformly covered with small streaks and blotches of light and dark drab brown, and average about .80 x 1.05 in. The labels state that the eggs were placed on the bare ground in open clearings or at the edge of forests.

Nyctidromus albicollis derbyanus (*Gould.*).

Nine eggs of this species, belonging to five sets, taken in September, October and November, vary in ground color from pinkish white to pinkish buff, well covered with small blotches of pale brown, varying from drab to pale reddish brown. They vary somewhat in size and shape, averaging about .87 x 1.24 in. "The eggs are laid on a few leaves or on the bare ground at the edge of a forest or by an open clearing." (Collector's notes on labels.)

Colaptes campestris (*Vieill.*).

The collection contains three sets of the eggs of this species, two of four each and one of six, taken in September and October. The labels read: "Eggs of Picapao do Campo. Found in cupim or white ants' nest. Nest in a large hole." One label states: "Male on nest, and caught by hand."

The eggs are of course glossy white; they average about .94 x 1.12 in.

***Guira guira* (Gm.).**

One egg, "found in a nest built of sticks in campo. Height from ground, 2 metres. Several females are said to lay in the same nest until it is so full that the eggs roll off." (Collector's note on label.)

The egg is deep bluish green, overlaid by a network of whitish chalky streaks and blotches. Size, 1.18 x 1.63 in.

***Ictinia plumbea* (Gm.).**

A single egg of this species was taken Oct. 6, 1882. The label reads: "On high tree, second branch; height from ground, 60 feet. Mother shot on the 6th, and on the 8th the male was found on the nest." The egg is soiled white, and measures 1.37 x 1.76 in.

***Cariama cristata* (Linn.).**

There are two sets of the eggs of this species, one of two eggs taken Sept. 29, 1882, and one of three eggs taken Oct. 6, 1883. The eggs are dingy grayish creamy white, with a few small blotches and specks of russet brown. They average about 2.00 x 2.40 in. In size, shape and markings they much resemble the eggs of some of the species of *Buteo*.

The following is a transcript of one of the labels: "Seriema. On open campo in small valley. Nest situated on a tree some thirty feet high. The nest was about ten feet from the ground, built on three branches, and was two feet in thickness and two and a half in circumference, made of dry sticks, dirt, bark and weeds. Found male on nest."

***Engyptila rufaxilla* (R. & B.).**

Two eggs of this species measure .85 x 1.15 in. "Called Turily." Collected Nov. 22, 1882.

***Engyptila erythrothorax* (Temm.).**

Similar to the eggs of the preceding species, except perhaps slightly larger and more elongated. Size, .82 x 1.20.

***Crypturus parvirostris* Wagl.**

Four eggs, labeled "Inambu—(No. of mother 2602" = Am. Mus. No. 34,888), average 1.15×1.50 in. The color is drab-gray, and while the surface is smooth it is much less highly polished than in the eggs of *Rhynchotus rufescens*. Collected Oct. 7, 1882.

***Crypturus tataupa* (Temm.).**

Three eggs, labeled 'Inambu,' are doubtless referable to this species. They are a little larger and darker in color than those of *C. parvirostris*, but do not differ from them more than eggs of the same species often do. Size, 1.25×1.65 in.

***Crypturus undulatus* (Temm.).**

Four eggs of this species average 1.60×2.00 . The color is ecrú drab; the shell is smooth and polished but not as lustrous as in some other species of the family. The label reads: "Taca. Eggs on the ground in forest. No nest whatever. Nov. 2, 1882."

***Rhynchotus rufescens* (Temm.).**

The collection contains four clutches of the eggs of this species, three of six eggs each and one of five. The eggs vary considerably in size, shape and color, the extremes in size measuring as follows: 1.60×1.95 and 1.85×2.25 in. An average egg measures 1.70×2.10 in. The color varies from reddish drab to dark slaty drab, and the surface of the shell is very highly polished. The following is a transcript from one of the labels: "Perdiz-grande. Found in cluster of grass behind a white ants' nest. No signs of nest, only a few feathers underneath eggs. Clutch, 5 eggs. Campo. Sept. 28, 1882." Another label has: "Eggs on bare ground in open campo. Clutch, 6 eggs. Nov. 29, 1882."