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## STUDIES OF PERUVIAN BIRDS. NO. 53 THE FAMILY TROGONIDAE

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Names of colors are capitalized when direct comparison has been made with Ridgway's "Color standards and color nomenclature."

### ***Trogon collaris collaris* Vieillot**

*Trogon collaris* VIEILLOT, 1817, Nouveau dictionnaire d'histoire naturelle, nouv. éd., vol. 8, p. 320—Cayenne.

*Trogon elegans* CABANIS AND HEINE (ex Lichtenstein MS), Museum Heineanum, vol. 4 (pt. 1), p. 178—in synonymy of *T. "curucui"* [= *collaris*].

*Trogon erythrinus* CABANIS AND HEINE (ex Lichtenstein MS), loc. cit.—in synonymy of *T. "curucui"* [= *collaris*].

The typical subspecies reaches a limited area in northwestern Perú, as is discussed under the following form.

### ***Trogon collaris castaneus* Spix**

*Trogon castaneus* SPIX, 1824, Avium species novae, . . . Brasiliam, vol. 1, p. 48, pl. 37—"in sylvis Tabatingae" [Brazil]; ♀; Munich Mus.

*Trogon auratus* SWAINSON, 1835, Ornithological drawings, . . . Birds of Brazil, pt. 5, pls. 61, 62.

*Trogon auratus* SWAINSON, "1838" (= Dec., 1837), Animals in menageries, p. 329—Brazil.

*Trogon Eytoni* FRASER, 1856, Proc. Zool. Soc. London, p. 368—Rio de Janeiro.

This form has not been recognized since its original description, but birds from south of the Amazon are separable from true *collaris* and several specimens from the mouth of the Napo, on the

north bank of the upper Amazon, belong to the same form, to which the name *castaneus* would appear to be applicable.

The markings on the tail of the males are not pronouncedly different from those of *collaris*, although the white bars are a little clearer white in *castaneus*. The upper wing-coverts, tertials, and outer margins of the secondaries are, however, noticeably distinct, with the white vermiculations and speckling relatively broader, making the entire shoulder region appear more whitish, often more coarsely patterned.

The females of *castaneus* have the brown portions of the plumage rather paler and less richly colored than those of *collaris*, sometimes markedly but sometimes not so clearly. Usually the shoulder has a lighter, less dusky tone.

I have no material from the lower Amazon, but a few examples from the State of Bahia agree well with the upper-Amazonian series. It is probable, therefore, that *eytoni* is a synonym of *castaneus* as, indeed, its description of coarser barring on the wing-coverts than in *collaris* would indicate. There is no exact locality for Swainson's *auratus*, but it may easily have been Bahia or Rio de Janeiro, from both of which areas material was available in Swainson's time. Swainson in some measure proposed *auratus* as a substitute name for part of *collaris* which he believed to be of composite origin, but the citation of the single locality, Brazil, with figure and description, gives the name an individual standing as a possible synonym of *castaneus* instead of *collaris*.

As noted above, the birds from the mouth of the Napo agree with those from south of the Amazon—a not unusual correlation. Farther up the Napo, at the mouth of the Curaray, the same association exists, judging by a single adult male from that locality, although a female from the same place is closer to *collaris*. Still farther up the Napo Valley, on the Río Suno and its environs, agreement is more definitely with *collaris*.

I have no fully adult males from Zamora, but a Macas male is *collaris* and a female from Zamora has the richer brown color of the same form. Two young males from Zamora (one nearly adult) suggest the same assignment. Still farther to the southward, on the Río Chinchipe, Perú, north of the bend of the Marañón, there is also a better match with *collaris* than with *castaneus*, although a long series may some day alter this opinion. In the vicinity of Moyobamba, however, south of the Marañón, the situation changes and *castaneus* finds its western limit of range.

Two birds from "Guayabamba" [=Huayabamba Valley] present a curious problem. Both are adult males, judging by the full pattern of coloration, but they differ greatly in length of tail. One bird from 4500 feet elevation agrees well enough with the rest of the series of *collaris*, having the wing measuring 119 mm. and the tail 140, although the tail is 4 mm. longer than that of the next largest male, a bird from Teffé, Brazil. The other "Guayabamba" specimen, from 3800 feet, has the wing 123 mm. and the tail 157. Whether or not this unusual length of tail has any significance other than as abnormality is uncertain. The tail in this specimen is peculiar in other ways than in its length. The right and left sides are not evenly developed, although there is no molt in evidence. The rectrices have more rounded tips than usual, without the spatulate and truncate appearance that is found in normal examples, but there is no obvious abrasion to account for it. Furthermore, the white tips of the three outer feathers are unusually long, and the distance from the base of the feathers in question to the base of the white tips is, on some of the feathers, quite normal. I conclude, therefore, that this particular specimen is too unsatisfactory to serve as a criterion of measurement. The explanation of the abnormality may lie in a retardation of development, although the bird appears to be adult in other respects. Young males have the tail somewhat longer than the adults, with the rectrices rounded terminally, instead of spatulate, and the white tips of the three outer feathers also are longer than in the adults, although the whole pattern of these feathers is different, being without the strong barring shown by the old males. (The immature plumage will be discussed below.) Possibly, therefore, this long-tailed bird is in its first "winter" plumage while still retaining the immature character of long tail and long white tips on the outer rectrices.

In this connection it may be interesting to discuss the immature plumages of males and females of *collaris*. The description of the young male given in the "Catalogue of the birds in the British Museum" (vol. 17, pp. 448-449) is somewhat misleading, owing to incompleteness and to comparison with an immature male *T. personatus* that was somewhat too far advanced in the post-juvenal molt to show all of the juvenal characteristics. Young females of *collaris* are not described, but the description of the young female *personatus* does not agree with the plumage shown by young birds of that species and sex in the collection before me.

In any case, the juvenal head and body plumage of male *collaris* is largely brown, although there may be numerous green-tipped feathers on the upper surface or on the breast, variously strong or weak. There is a small white spot in the center of the breast. All the upper wing-coverts (except the primary-coverts) and the tertials are brown, finely vermiculated with blackish and with a broad, triangular ochraceous buff spot near the tip, bordered, at least "fore and aft," by a blackish edge. The secondaries have the outer margins brown with dark vermiculations. The median rectrices are green or greenish, at least basally, and rufous at the tip or just before it, in which latter case there may be a trace of a dusky terminal border. In exceptional cases the brown of the tip may spread basad, mixing with the green of the base in gradually decreasing amount. The next two pairs of rectrices have their outer webs like the median pair while the inner webs are brownish black. The three outer pairs in general resemble the adult female feathers, although there is sometimes almost as complete black and white barring as in the tail of the adult males but with the white tips longer and the contour of the tips more slender and more evenly rounded, not spatulate.

The young female has no trace of green anywhere in the plumage; the upper wing-coverts and tertials have very small, if any, pale spots at or near the tips, being like the adult female feathers; and the tail has the median three pairs of rectrices as clear chestnut as in the adults but without the black terminal bar that is so prominent in the adults of the same sex. The outer three pairs are somewhat like those of the adult females but with the subterminal bar less pronounced or sharply drawn, and the dark speckling more diffuse or reduced. Occasionally bars are developed as in some young males (and very rarely in adult females). The length of the tail is sometimes greatly in excess of that of adult females. One young female of *collaris* from the foot of Mt. Duida, for example, has the tail 157 mm., whereas the tail of adult females from the same region is 132 mm. or less.

I cannot find that typical *collaris* reaches Colombia, although it may possibly do so in the southeastern part of the country, at La Morelia or Florencia. I have no specimens from the eastern side of the Andes in this area. Across the Eastern Andes, in the upper Magdalena Valley, a different form occurs at relatively high elevations, and its distribution extends north in this drainage and across to the Cauca Valley, also remaining almost exclusively in the

Subtropical Zone. This form has not been recognized and is, therefore, described below. On the eastern side of the Eastern Andes in the Bogotá region, the north-Venezuelan *exoptatus* occurs, although I have no data to show any continuity of range between this region and the portion of Venezuela occupied by *exoptatus*. As far as I can learn, the species is absent from the Mérida region and even from most of western Venezuela. The birds of Mt. Duida are *collaris collaris*, as might be expected from the Ecuadorian extension of range of that form.

There is a variable amount of whitish or other pale feathering on the anterior lores, immediately behind the nares, in the females. Several specimens of this sex from the Duida region show it rather strongly developed, but it appears irregularly to a lesser degree in other regions. A longer series than I have before me will be necessary to determine any taxonomic significance it may have. The extent, or even presence or absence, of the white post-ocular lunule is quite variable.

Since the central-Colombian population cannot be referred to any of the other known forms of *collaris*, it may be characterized and named as follows.

#### ***Trogon collaris subtropicalis*, new subspecies**

TYPE: From Andalucia, west side of Eastern Andes, Colombia; altitude 5000 feet. No. 115995 in the American Museum of Natural History. Adult male collected June 6, 1912, by Leo E. Miller; original no. 3115.

DIAGNOSIS: Similar to other South American members of the species in general coloration but males differing as follows: Wing and tail longer than in *collaris virginalis* and *castaneus*; markings on outer rectrices less coarse than in *exoptatus*, with narrower black bars than in *virginalis*, and with the pale bars narrower and less purely white than in *castaneus*; vermiculations of the upper wing-coverts, tertials, and outer margins of the secondaries averaging finer than in *castaneus*, and with the black lines in particular narrower than in *collaris* and *virginalis*; green of head, back, and breast less bluish than in *virginalis*.

Females with wing and tail longer than in *collaris*, *virginalis*, and *castaneus*; head, back, and breast a little brighter brown than in *castaneus* and lighter than in *virginalis*; shoulder and inner remigial areas somewhat more finely vermiculated than in *exoptatus*, lighter brown than in *collaris* and *virginalis*, and brighter

brown than in *castaneus* and *exoptatus*; rufous color of median rectrices often lighter than in *collaris* and *virginalis*.

· RANGE: Subtropical Zone of Magdalena and Cauca valleys in central Colombia, rarely descending to the Tropical Zone.

DESCRIPTION OF TYPE: Upper parts metallic green; forehead, sides of head, and throat black; breast a little darker than the back, crossed on the lower portion by a broad white band; lower under parts light Spectrum Red; thighs black. Remiges black with outer margins of second to sixth primaries (from outside) prominently white; secondaries and tertials with exposed outer surfaces finely vermiculated with white, continued more coarsely on the upper wing-coverts except the primary-coverts, with the white nearly but not quite equal in width to the blackish inter-spaces; under wing-coverts largely dull whitish. Tail with median feathers metallic green, darker than the back and with a broad black terminal bar; second and third pairs with outer webs similar but with the whole inner web blackish; outer three pairs crossed by alternating black and white bars of which the white ones are narrower, from one-half to somewhat less than full width of the black, but with the subterminal black bar somewhat wider and the tips broadly white; the basal part of each feather is black, extending distad medially along both webs, progressively more on the subexternal and antesubexternal feathers, thus restricting the barring to the more exposed parts of these quills.

REMARKS: This subspecies appears to live regularly at a greater elevation in the mountains than any of the others, although this is a virtual necessity in the geographical area it occupies in which the forests are predominantly above the Tropical Zone. The other forms may extend their range from the Tropical to the Subtropical Zone, but the greater extent of the former and the apparent partiality of the species for the lower elevations make it a more common inhabitant of the Tropical Zone forest although not entirely restricted to it.

A young female from Puerto Valdivia, lower Cauca Valley, at only 600 feet elevation, has a tail of 141 mm. length, but this measurement is not definitive since young females, as noted on an earlier page, may have greatly elongated tails. The wing length (123 mm.) is the minimum for *subtropicalis* and below the maximum of *virginalis*, while the brown color of the breast and back and the rufous of the median rectrices are closer to the hues of *subtropicalis*. Consequently, although the locality is well below

the Subtropical Zone, I must refer the specimen tentatively to *subtropicalis*, pending specimens of the male sex for certain identification.

There is in any case a certain amount of intergradation shown by examples from the Western Andes. An adult female from "Coast Range west of Popayán," on the eastern side of the range at 9000 feet elevation, has the wing 123 mm. and the tail but 136.5, to which the nearest approach is shown by a female from Miraflores, in the Central Andes, with the tail 140.

On the other hand, the male from Primavera, presumably in the Subtropical Zone of the western side of the Western Andes, has the tail 139 mm. in length, but the tail markings are those of *virginalis* and not of *subtropicalis*. Two males, as well as two females, from Cocal, 4000 feet, agree with *virginalis* both in dimensions and pattern. The exact delimitation of the ranges of these two forms must await more extensive material from the Western Andes, although the division appears to occur along the crest of this range, in spite of the continuity of the Subtropical Zone across the divide.

The situation west of Bogotá also needs some clarification. Of four "Bogotá" males, three are *exoptatus*, as is a male from Buena Vista, on the eastern side of the Eastern Andes. Another "Bogotá" male is *subtropicalis*, but I have no males from the western side of the Eastern Andes, at that latitude, with which to compare it. At the head of the Magdalena Valley, the birds are *subtropicalis*. A single female from El Roble (7200 feet) is, therefore, referred to *subtropicalis*, subject to reëxamination when adult males from the same region are available for study.

There are records of the species from numerous localities in Perú other than those from which I have seen material, but most of these may be assigned to *castaneus* without much question. Such records are from La Merced, La Gloria, Amable Maria, Soriano, Río Cadena, Río Cosireni, Monterico, Huambo, upper Ucayali, lower Ucayali, and Iquitos.

There is a record of *collaris* from Cutervo, but it is open to considerable question. In a report on Stolzmann's collection from that locality, Taczanowski (1880, Proc. Zool. Soc. London, p. 211) recorded only one trogon, a male collected at 9900 feet which he identified as *collaris*. In the "Ornithologie du Pérou" (1886, vol. 3, pp. 163-164) he cited this reference and the locality (*ex* Stolzmann), without giving the elevation. On page 167 of the same

work, he gives the locality with elevation (also *ex* Stolzmann) under "*Trogon personatus propinquus*" but without the 1880 reference.

It thus appears probable that Taczanowski first identified Stolzmann's specimen as *collaris* but later as "*propinquus*" and that in writing his book he neglected to transfer the 1880 reference and its given locality. Judging by the elevation given both in the 1880 account and under "*propinquus*" in the "Ornithologie du Pérou," the proper allocation is in the species *personatus* and the form *heliothrix* (*q. v.*).

I am unable to assign any Peruvian records safely to *virginalis*. The record of "northwestern Perú" given by Peters (1945, "Check-list of birds of the world," vol. 5, p. 155) was based on the specimens recorded as *collaris* by Bangs and Noble (1918, Auk, vol. 35, p. 451). A careful comparative study of a pair of the Perico birds, kindly lent by Mr. Peters, shows better agreement with *collaris* than with *virginalis*. If *virginalis* actually occurs in Perú it must be restricted to the western side of the Western Andes as it is in Ecuador, although no Peruvian specimens have yet been taken.

#### SPECIMENS EXAMINED

##### *T. c. collaris*.—

###### FRENCH GUIANA:

Tamanoir, 1 ♂;  
Ipousin, 1 ♂, 1 ♀.

###### VENEZUELA:

Mt. Duida (Caño Seco, Cumbre de Cabeceras, El Puente), 2 ♂, 2 ♀;  
Esmeralda, 1 ♀;  
mouth of Río Ocamo, 1 ♀.

###### ECUADOR:

Río Suno, above Avila, 1 ♂;  
below San José, 2 ♂, 1 ♀;  
Zamora, 2 ♂, 1 ♀;  
Macas region, 1 ♂.

###### PERÚ:

Huarandosa, 2 ♂, 2 ♀;  
Perico, 1 ♂<sup>1</sup>, 1 ♀<sup>1</sup>.

##### *T. c. castaneus*.—

###### BRAZIL:

Borba, 1 ♂, 1 ♀;  
Igarapé Auará, 1 ♂, 1 ♀;  
Rosarinho, 1 ♂, 3 ♀;  
Teffé, 2 ♂;

<sup>1</sup> Specimens in the Museum of Comparative Zoölogy, Cambridge, Massachusetts.



Bahia, Cajazeiras, 2 ♂, 4 ♀.

BOLIVIA:

Lower Beni, 1 ♂, 1 ♀.

PERÚ:

Huachipa, 2 ♂<sup>1</sup>, 2 ♀<sup>1</sup>;

Lagarto, 4 ♂, 2 ♀;

Sarayacu, 5 ♂, 2 ♀;

Orosa, 1 ♂;

Samiria, 1 "♂" [= ♀];

Apayacu, 1 ♂;

Puerto Indiana, 1 ♂, 1 ♀;

Río Seco, 1 ♂;

Río Negro, 1 ♂;

Huayabamba [Valley], 2 ♂;

mouth of Río Curaray, 1 ♂, 1 ♀.

*T. c. virginalis*.—

ECUADOR:

(Nanegal, Chimbo, Paramba, Zaruma, La Chonta, Las Piñas, Río de Oro, "Quito," "lower west side of Pichincha"), 14 ♂, 4 ♀.

COLOMBIA:

Primavera, 1 ♂;

Cocal, 2 ♂, 2 ♀;

Las Lomitas, 2 ♀.

*T. c. subtropicalis*.—

COLOMBIA:

Andalucía, 1 ♂ (type);

Miraflores, 1 ♂, 1 ♀;

El Eden, 1 ♂, 1 ♀;

near Honda, 2 ♂;

Cauca Valley, 1 ♂;

La Candela, 2 ♂, 1 ♀;

Salento, 1 ♀;

La Frijolera, 1 ♀;

Coast Range west of Popayán, 1 ♀;

El Roble, 1 ♀;

San Antonio, 5 ♂, 5 ♀;

Castilla (near Cali), 3 ♂;

Puerto Valdivia, 1 ♀;

Antioquia, 1 ♂;

"Bogotá," 1 ♂.

*T. c. exoptatus*.—

COLOMBIA:

Buenavista, 1 ♂;

"Bogotá," 3 ♂, 1 ♀.

VENEZUELA:

(San Estéban, Cristóbal Colón, Carapas, San Carlos, El Limón, Quebrada Seca, Colonia Tovar, Río Neveri, Cumbre de Valencia, Montaña de

<sup>1</sup> Specimens in Chicago Natural History Museum.

Guácharo, Campos Alegre Valley, La Latal, La Trinidad, Rincón San Antonio), 18 ♂, 10 ♀.

TRINIDAD:

(Caparo, Princetown, "Trinidad"), 3 ♂, 1 ♀.

TOBAGO:

(Castare, "Tobago"), 3 ♂, 1 ♀.

**Trogon personatus personatus** Gould

*Trogon personata* GOULD, 1842, Ann. Mag. Nat. Hist., vol. 9, p. 237—"The Cordillerian Andes"; Bogotá, Colombia, suggested by Chapman, 1926.

Although Gould did not specify the exact locality for his *personata*, the plate in his "A monograph of the Trogonidae" leaves no doubt of the application of the name for which Chapman suggested the type locality, Bogotá. Since the allied form, *temperatus*, also occurs in "Bogotá" collections, it may be well to restrict the type locality of *personatus* still further, and I suggest Choachi, Colombia, altitude of 1966 meters, where this form definitely occurs.

In describing *temperatus* (1923, Amer. Mus. Novitates, no. 96, p. 2), Chapman chose to consider it specifically distinct from *personatus*, and it must be admitted that there is little sign of intergradation between the two forms in central Colombia where both occur, albeit at different elevations on the mountains. Nevertheless, the separation is not so sharply maintained in other parts of the specific range of *personatus* where *temperatus* does not occur but where the population is definitely intermediate in one character or another. Even in northern Ecuador and southwestern Colombia, the weakly barred outer rectrices of the males of *assimilis* present a strong approach toward the condition in *temperatus*, although the median rectrices are less bluish and more bronzy (in *assimilis*); the white tips of these outer feathers are relatively short as in true *personatus*, and the relatively light brown breast, narrowly barred outer rectrices, and brown (rather than gray) upper wing-coverts of the females also agree better with the characters of *personatus* than with those of *temperatus*. Furthermore, the bill of *assimilis* is as large as it is in *personatus*, leaving only the weakly barred outer rectrices of the males as a character suggesting affinity to *temperatus*.

In the highlands of Perú, a different combination of characters is shown. The males have the central rectrices more bluish, on average, than in *assimilis*, agreeing thereby with *temperatus*, and have the white tips of the outer three pairs of rectrices relatively

long as in that form, but the white barring of these outer feathers averages stronger than in *assimilis*, though rarely as pronounced as in *personatus*. The females have the barring of the outer rectrices relatively coarse as in *temperatus*, but the upper wing-coverts are browner, occasionally showing a grayish trend that is in marked contrast to the stronger brown of *personatus* but still not so gray as in *temperatus*. The bill in this form, *heliotherix*, is smaller than in *personatus* and *assimilis* and occasionally about as small as in some *temperatus*.

In southeastern Perú and Bolivia, the males of *submontanus* have the tail very like that of *temperatus* or sometimes even less noticeably barred on the outer feathers, while the bill ranges in size from that of *heliotherix* to that of *personatus*, being thus larger than that of *temperatus*. The females have the coarsely barred outer rectrices of *temperatus* and *heliotherix* and have the dark or even grayish brown upper wing-coverts of *heliotherix*, from which they are not positively distinguishable.

Thus we are presented with an interesting and unusual combination of geographical and altitudinal separation of ranges for the different subspecies in the Andean region. True *personatus* occurs in the Magdalena Valley and on the eastern side of the Eastern Andes in Colombia, and ranges thence down the eastern side of the Andes across Ecuador and Perú to the Chanchamayo Valley, not ascending above the Subtropical Zone but slightly invading the Tropical Zone in the more southern part of its range. On the Pacific side of the Andes in southwestern Colombia, western Ecuador, and northwestern Perú, *assimilis* occupies likewise the Subtropical Zone. In the Temperate Zone of at least the Central Andes of Colombia (there are no certain records of the other two cordilleras) and on both sides of the Andes in northern Ecuador, *temperatus* is a zonal representative of these two forms, if not also a geographical one.

No counterpart of *temperatus* has been found in southern Ecuador, but in Perú, *heliotherix* occupies that position as far south as the Junín region, but it appears to cross the zonal line to the upper portion of the Subtropical Zone. In southeastern Perú and Bolivia, *submontanus* occupies the Subtropical Zone and extends noticeably into the Tropical Zone and doubtfully upward into the Temperate Zone.

To recapitulate the picture in terms of elevations, *personatus* has been found from 5000 to 9000 feet in Colombia, from 4000 to

6100 in northern Perú, and not above 4000 in central Perú (although it may possibly exist at higher levels). In Colombia and Ecuador, *temperatus* has been taken from 10,000 to 12,700 feet. In Perú, *heliothrix* is found from 6000 to 10,000 feet. In south-eastern Perú and Bolivia, *submontanus* occurs from 2200 to 8900 feet. The upper limit of distribution of the species thus drops from 12,700 to 8900 feet, and the lower limit from 5000 to 2200, while the line of demarcation between the superior and inferior forms (where they are segregated) is lowered from about 10,000 to 5000 from north to south. Since the entire range is in the geographical Torrid Zone, this lowering of distributional limits is unexpected and is not reflected in a comparable lowering of the limits of the altitudinal zones of distribution that are effective for the great majority of Neotropical birds. This trogon appears to have accepted boundary lines based on some restrictive factors yet to be determined which operate across the zonal lines that mark the ranges of most of the Andean birds.

There has developed a certain amount of confusion respecting the application of the names of *assimilis* and *heliothrix*, but these will be discussed under their respective headings.

To return to the matter of *p. personatus*, itself, it may be said in recapitulation that it may be recognized by its large bill, strong and clear barring on the outer three rectrices of the males, with the white tips of these feathers relatively short (9–13 mm. along the shaft on the outermost rectrices), and the median rectrices relatively coppery. Females with the brown of the breast moderately light and dull; barring on outer rectrices relatively fine.

Young males show a certain amount of bronzy tone on the basal half of the median rectrices. The distal portion of these feathers is rufescent, sometimes tipped with a blackish bar. The barring on the outer three rectrices is sometimes coarse and sometimes very irregular. Young females have somewhat similar outer rectrices, but the median ones are entirely rufous without any black tip, which, however, appears in the adult plumage.

No Peruvian records of the species are assignable with certainty to *p. personatus* except those from Chaupe and Tulumayo (part; male) of which the specimens in question have been examined in the present study. A young female from Chaupe has the throat suffused with brown, giving a certain resemblance to the female of *Trogon collaris* in that respect.

The population of the Mérida region of Venezuela is indis-

tinguishable from east-Colombian birds, but a series of males from Santa Marta, Colombia, shows recognizable distinction. Six males from that area I am unable to match with any of 29 males from different parts of the range of *p. personatus*. Only a single character appears to be constant, although another minor one occurs in most of the series of both sexes and has some accessory value. The Santa Marta birds may be known as follows.

**Trogon personatus sanctaemartae**, new subspecies

TYPE: From Valparaiso, Santa Marta, Colombia. No. 73140, the American Museum of Natural History. Adult male collected May 25, 1899, by Grace H. Hull.

DIAGNOSIS: Similar to *T. p. personatus* of the Subtropical Zone of the Mérida region of Venezuela, eastern Colombia, eastern Ecuador, and eastern Perú, from which it differs by the stronger pale markings on the upper wing-coverts and inner remiges which give this region a noticeably lighter tone.

RANGE: Confined to the Subtropical Zone of the Santa Marta Mountains of northern Colombia.

DESCRIPTION OF TYPE: Upper surface mostly changeable metallic green, bluer on the head and uropygium (near Viridian Green away from the light; Peacock Blue toward the light); forehead, sides of head, chin, and throat black; breast like the top of the head, posteriorly bordered by a white band; rest of under parts between Scarlet-Red and Rose Doree, becoming lighter posteriorly; thighs black. Remiges blackish; outer margins of second to sixth primaries (from outside) narrowly and sharply white toward the base but more freckled distally and not reaching quite so far as the tips of the primary-coverts on the sixth plume nor the tips of any of the primaries themselves; fifth primary to inner secondaries with a white patch across both webs at the extreme base; secondaries (most or all of outer web) and tertials (both webs) relatively broadly vermiculated with white; alula and primary-coverts uniform blackish, but except for a green area on the smaller lesser wing-coverts, the upper wing-coverts are marked like the inner remiges. Under wing-coverts blackish with indistinct pale tips; axillars whitish. Median rectrices, most of outer webs of next pair, and outer margins of the next pair varying from Calla Green to bronzy Citrine in different lights, but with a broad black tip; inner webs of second and third pairs also blackish; remaining three pairs graduated, with white tips (10 mm. along shaft

on outermost, 15 mm. on third pair); remainder of these feathers blackish crossed by narrow, semi-vermiculated whitish bars except on a large unbarred basal area mesially situated on the inner webs and present to a much more limited extent on the outer webs, progressively more extensive from the outermost to the third pair of feathers; the dark space just anterior of the white tip broader than the other interspaces, forming a noticeable subterminal dark bar. Bill (in dried skin) dull yellowish, tinged with reddish on the mandible; feet brownish yellow. Wing, 121 mm.; tail, 142; exposed culmen, 16; culmen from base, 20; tarsus, 14.

REMARKS: Females apparently indistinguishable from those of *personatus*.

It will be seen in the following pages that one of the characters separating the males of *heliothrix* from those of *assimilis* is the relative prominence of the pale vermiculations or speckling on the upper wing-coverts and inner remiges, although these forms are at the opposite end of the scale from *sanctaemartae* in respect to the actual pallor of the shoulder. In this factor, *sanctaemartae* is more nearly matched by *roraimae* which, however, is easily distinguished by the much more reddish gold of the median rectrices.

In nearly all of the forms of *personatus* in both sexes there is a buffy or even whitish patch at the base of the outermost primary on the outer web. It is nearly obsolete in *temperatus* but usually well developed in the other forms except *sanctaemartae* where again it is very weak. The character is not perfectly constant and hence is of uncertain value in the discrimination of the subspecies, but it is useful as contributory evidence.

### **Trogon personatus assimilis Gould**

*Trogon assimilis* GOULD, 1846 (Oct.), Proc. Zool. Soc. London, p. 67—Perú; ♂; British Mus.

*T[rogon] propinquus* CABANIS AND HEINE, 1863, Museum Heineanum, vol. 4, no. 1, p. 175—Puellaró, Ecuador; ♂ imm.; Halberstadt Mus.

The use of the name *assimilis* for this form is open to some question, but without the type for careful comparative study it is impossible to substantiate any claims to the contrary. Chapman (1926, Bull. Amer. Mus. Nat. Hist., vol. 55, p. 330) reported that Gould's only specimen of this species from "Perú" in the British Museum—doubtless the type of *assimilis*—is exactly like west-Ecuadorian birds to which, therefore, he applied Gould's name, believing "Perú" to be in error. He did not realize that the same

form occurs in extreme northwestern Perú nor that the Peruvian highland form, *heliiothrix*, is extremely like it. Captain Jean Delacour has recently examined Gould's bird for me and also reports that its characters are in close agreement with those of the west-Ecuadorian specimens in the British Museum, although the lengths of the white tips of the three outer tail feathers are not conclusive, since the tip of the outermost feather is longer than in males at hand from western Ecuador and that of the third feather is shorter than in any male of *heliiothrix*.

In any case, without proof to the contrary, I accept the name *assimilis* for the west-Ecuadorian population but retain the type locality as Perú, presumably in the neighborhood of Palambra where this form occurs.

The characters of this form are as follows. Bill large as in *p. personatus* but larger than in *temperatus*. Males with median rectrices inclined to golden green, but not so pronouncedly as in average *personatus*, though more than in *temperatus*. Upper wing-coverts and margins of inner secondaries and tertials darker, with less distinct pale freckling or vermiculation, especially noticeable on the secondaries and tertials, in comparison with both *personatus* and *temperatus*. Outer three rectrices with decidedly less pronounced pale cross-lines than in *personatus*, although these markings are stronger than in *temperatus*, and white tips of these feathers about as in *personatus*, being 9 to 13 mm. along the shaft on the outermost rectrices, and 16 to 18.5 on the third pair. Females are not always clearly distinguishable from those of *personatus*, although the upper wing-coverts and outer margins of the secondaries and tertials average darker and more finely freckled (not so clearly grayish as in *temperatus*) and the barring on the outer three rectrices is a little coarser on average, occasionally matching some females of *temperatus*.

The single male specimen at hand from Palambra, Perú, is troublesome but I believe is correctly referred here and not to *heliiothrix*. In the first place the locality is relatively low, at 4000 feet, which is in agreement with data available for *assimilis* but not for *heliiothrix*. The bill is somewhat larger than that of the series of *heliiothrix* but is matched in the series of *assimilis*. The white tip of the outer rectrices is near the maximum for *assimilis*, though just below the minimum for *heliiothrix*. The markings on the shoulder and outer rectrices are not perfectly definitive, nor is the color of the middle pair; one broken plume is rather bluish and a

new one just appearing is more bronzy. The sum of the characters favors assignment to *assimilis*.

This form ranges northward to southwestern Colombia, but there are no other indications of Peruvian occurrence than this Palambla bird and probably the type of *assimilis*.

In the material at hand there is further evidence of the unreliability of the north-Ecuadorian localities given by Goodfellow and Hamilton. Specimens of undoubted identity as *personatus*, *assimilis*, and *temperatus*, respectively, are labeled "Papallacta," and two others are labeled "Papallacta, 11,500 ft.," although one is definitely *temperatus* and the other *assimilis*. Still another specimen, a young male, is marked as from "above Mindo," but it is almost certainly *personatus* from the eastern side of the Andes, although, owing to the variability of immature individuals, it is impossible to be sure. Possibly it is an unusual specimen of *assimilis*.

### **Trogon personatus heliothrix** Tschudi

*Tr[ogon] heliothrix* TSCHUDI, 1844 (May), Arch. Naturgesch., vol. 10, pt. 1, p. 300—Perú = Temperate Zone above the Chanchamayo Valley; I suggest Maraynioc; Neuchâtel Mus. or Berlin Mus.

Although *p. personatus* also occurs in the Chanchamayo Valley, in the Subtropical Zone, and possibly in the uppermost levels of the Tropical Zone, I believe the name *heliothrix* is applicable to the Temperate Zone form and not to the other, although the case is far from clear. Tschudi's descriptions (in the original account and in the "Fauna Peruana, Aves," p. 257) note the middle rectrices as darker than the back (they are lighter and more golden in *p. personatus*) and the outer [three] black with fine whitish bars, much clearer on the outer web. (The bars are not so fine in *personatus* and are about the same on both webs.)

Cabanis and Heine (1863, "Museum Heineanum," vol. 4, no. 1, pp. 176–177, footnote) described what they claim to be the [co]types of Tschudi's *heliothrix* in the Berlin Museum, but as far as I can learn there are likely to be other cotypes still in the Neuchâtel Museum. Cabanis and Heine's remarks, therefore, are not necessarily conclusive as regards differences between their description and Tschudi's. Tschudi earlier (1843, Arch. Naturgesch., vol. 9, pt. 1, pp. 385–390) described various new birds collected by Bernard Philippi in central Perú, and the types or cotypes of these remained in Berlin. It is possible that the



cotypes of *Trogon heliothrix* were from the Philippi collection, as claimed by Cabanis and Heine, but this is doubtful since Tschudi (1846, *Reiseskizzen*, vol. 2, p. 256), mentions *heliothrix* in a manner suggesting his personal acquaintance with it in the field.

Be that as it may, Cabanis and Heine call the median rectrices shining golden green (which suggests *p. personatus*) and the outer ones barred more broadly exteriorly than interiorly (which agrees better with the Temperate Zone form than with *personatus*). Their description of the vermiculations on the wing is not specific enough to be of much help. Tschudi says that the upper wing-coverts are black with very fine, inconspicuous white points ("Fauna Peruana") or varied with innumerable black and white lineations (original description). The account in the "Fauna Peruana" is more applicable to the Temperate Zone bird than to *personatus*, although not entirely inapplicable to the latter.

All this points to the name *heliothrix* as probably belonging to the population of the Temperate Zone of Perú from the Junín region northward, with a slight infringement of the Subtropical Zone. Compared with the other northern forms of the Andes, the characters are as follows. Bill relatively small, agreeing with the larger extreme of *temperatus* but smaller than the bills of *personatus* or *assimilis*. Males with central tail-feathers averaging less golden and more bluish green than in *personatus* or *assimilis* and more as in *temperatus*. Outer three rectrices more strongly barred than in *assimilis* or *temperatus* but less than in *personatus*; tips of these feathers averaging longer than in any of the other three subspecies (14–18 mm. on outermost and 19–24 on the third pair). Freckling on the upper wing-coverts and outer margins of secondaries and tertiaries a little stronger than in *assimilis* but less pronounced than in *personatus* and *temperatus*. Females much like those of *assimilis*, with shoulder markings dark, sometimes tinged with grayish and sometimes very nearly as gray as in *temperatus*; outer tail-feathers relatively coarsely barred as in *temperatus*. Breast averaging less deeply hued than in *temperatus*, about as in the other two forms.

Young males are somewhat as described for those of *personatus*, but the median rectrices are darker, less bronzy green, and the rufous distal portion is much more restricted to an area near the tip. Young females are not clearly separable from those of *personatus* and *assimilis*.

A nearly adult male from Utcubamba (6000 feet) has the markings on the outer tail-feathers about as prominent as in adult males of *personatus*, but the obvious immaturity of the rest of the tail suggests that this is no more than an extreme degree of variability in that particular. Other features agree with *heliothrix* and not with *personatus*, which the elevation of the locality serves to confirm.

The series from Leimebamba shows much variation. One of the males, indeed, has the barring on the outer rectrices about as clear as in some examples of *personatus*, and the vermiculations on the shoulder and inner remiges likewise sharper and clearer than usual, but the bill remains small, the white tips of the outer rectrices are long, and the median rectrices are only slightly golden tinged. Another male has the median rectrices more noticeably golden and the shoulder markings only a little narrower and duller than the last-mentioned example, while the bill is as large as in some specimens of *personatus*, but the barring of the outer three tail feathers is the weakest of any of the series of *heliothrix*, being nearest to that shown by *temperatus*. It is here, apparently, that the intergradation between *heliothrix* and *personatus* takes place. A short distance east of Leimebamba, across the Andes to the eastern side, at Pucatambo ("Poco Tambo"), true *personatus* occurs.

Judging by the elevations of the respective localities, the records from Cutervo, Tamiapampa, Compan ("Cumpang"), and Garita del Sol all belong to *heliothrix*. Taczanowski (1886, "Ornithologie du Pérou," vol. 3, pp. 166-168) referred the Cutervo and Tamiapampa birds (or records) to "*propinquus*" (= *assimilis*) and recognized *heliothrix* (from Maraynioc) as distinct by reason of a smaller bill and a bluer tone of the head, body, and median rectrices, but these supposed distinctions do not hold good in material at hand from the two regions. There is still a possibility that the more northern part of the population may prove to be separable from the centrally placed *heliothrix*, but I can find no characters to support such distinction in the specimens before me.

A specimen of *heliothrix* is at hand labeled as from Tulumayo, Junín (4000 feet), from which there is also a specimen of *personatus*. It was taken on the day that the collector moved his station from Chilpes (where *heliothrix* occurs) to the lower collecting ground, and it is probable that the bird in question was

taken on the journey between the two places. The boundary between the ranges of the two forms lies in the intermediate area. I have accordingly listed this specimen with the suggested itinerary locality.

### **Trogon personatus submontanus Todd**

*Trogon temperatus submontanus* TODD, 1943 (Febr. 25), Proc. Biol. Soc. Washington, vol. 56, p. 8—Samaipata, Bolivia; ♂; Carnegie Mus.

This form combines some of the characters of *personatus* with some of *temperatus* and, as do *temperatus* and *heliothrix*, inhabits the Temperate Zone. The bill is large as in *personatus*, and the females have the shoulders and outer margins of the inner remiges vermiculated with brown, rather than with gray, again as in *personatus*; the outer remiges of the females, however, are coarsely barred as in *temperatus* and *heliothrix*. The males have the shoulder and inner remiges marked as in *temperatus* (more sharply than in *assimilis* and less so than in *heliothrix* and *personatus*), the median rectrices are relatively bluish, and the outer three are even less noticeably barred than in *temperatus*, while the tips are long.

This form reaches the southeastern portion of Perú, and a record from Huaisampillo (10,000 feet) should belong here. Two males recorded by Berlepsch and Stolzmann (1906, Ornith., vol. 13, p. 97) from Idma, Urubamba Valley, 4600 feet, under the name "*personatus*," are problematical, as is the record from Cosñipata (2300 feet), mentioned earlier under *p. personatus*. Both localities are below the elevations at which *heliothrix* and some *submontanus* live, and if *p. personatus* reaches this far to the southward it would be expected to occur at these lower elevations. It appears, however, that *submontanus* is not zonally restricted, as are the other forms of the species. Bond and de Schauensee (1943, Proc. Acad. Nat. Sci. Philadelphia, vol. 95, p. 211) assign all their Bolivian specimens to *submontanus*, including examples from as low as 2200 feet. Through the kindness of Mr. Bond and Mr. de Schauensee I have been enabled to examine these critical examples. Unfortunately, none of the specimens from 2200 and 2600 feet is adult, but they show closer approximation to comparable specimens of undoubted *submontanus* from higher elevations than to examples of *personatus*, and in the absence of fully adult examples from the same elevations, must be referred to *submontanus*.

Thus a young male from Palmar (2600 feet) has the median

rectrices dark and without the bronzy hue of *personatus*. Two young females from Santa Ana, Río Coroico (2200 feet), are less certain, but the barring on the outer three pairs of rectrices is relatively coarse and the general hue of the upper wing-coverts and inner remiges is relatively dark, with more suggestion of a grayish tinge than is common in females of *personatus*, agreeing with the adult females of *submontanus*. An adult female from La Oroya, Perú (3300 feet), agrees best with females of *submontanus*, and a number of adults of both sexes from Samaipata, Bolivia (5500 feet), also agree with specimens from still higher elevations.

The highest locality of record is San Cristóbal, Cochabamba (8900 feet), which is within the altitudinal range of *personatus* in Colombia, but not in Perú, and within that of *heliothrix* in Perú. The lowest limit of *submontanus* is below that of any other form. It may be concluded, therefore, that *submontanus* is principally Subtropical in zonal distribution but that it invades the Tropical Zone to a noticeable extent. It is not certain that it actually enters the Temperate Zone.

#### SPECIMENS EXAMINED

##### *T. p. roraimae*.—

###### BRITISH GUIANA:

Mt. Tweek-quay, 1 ♂;  
"British Guiana," 1 ♂.

###### VENEZUELA:

Roraima, 2 ♂, 1 ♀;  
above Paulo, 1 ♂;  
Philipp Camp, 1 ♂;  
Rondon Camp, 1 ♂ (type);  
Mt. Auyan-tepui, 1 ♂, 1 ♀.

##### *T. p. duidae*.—

###### VENEZUELA:

Mt. Duida (Caño Seco, Cumbre No. 2, Laterite Valley), 5 ♂ (including type), 1 ♀.

##### *T. p. sanctaemartae*.—

###### COLOMBIA:

Santa Marta, Valparaiso, 3 ♂ (including type), 4 ♀;  
Las Nubes, 2 ♂;  
El Líbano, 1 ♂, 3 ♀.

##### *T. p. personatus*.—

###### VENEZUELA:

Mérida region (La Culata, El Valle, Escorial, Pedregosa, Capáz, "Mérida"),  
17 ♂, 12 ♀, 1 (?);  
San Carlos, 1 ♂, 1 ♀.

## COLOMBIA:

La Frijolera, 1 ♂;  
 El Eden, 1 ♂, 1 ♀;  
 Choachi, 1 ♀;  
 Santa Elena, 1 ♀;  
 "Bogotá," 6 ♂, 2 ♀.

## ECUADOR:

Papallacta, 1 ♂;  
 "Ambato" [= east of Ambato], 1 ♂, 1 ♀;  
 Baeza, 2 ♂, 1 ♀;  
 Puyo, 1 ♀.

## PERÚ:

Andoas, 1 ♂;  
 Chaupe, 2 ♂, 1 ♀;  
 Pucatambo, 1 ♂<sup>1</sup>;  
 Tulumayo, 1 ♂;  
 Eneñas, 1 ♂<sup>2</sup>.

*T. p. temperatus*.—

## COLOMBIA:

Laguneta, 2 ♂ (including type), 2 ♀;  
 Santa Isabel, 1 ♂, 1 ♀;  
 Almaguer 1 ♂, 2 ♀;  
 Torné, 1 ♂;  
 Valle de las Papas, 1 ♂;  
 "Bogotá," 3 ♂, 2 ♀.

## ECUADOR:

Oyacachi, 1 ♂, 1 ♀;  
 above Baeza, 2 ♂, 3 ♀, 1 ♀<sup>2</sup>;  
 upper Sumaco, 1 ♀;  
 "Papallacta," 2 ♂, 1 ♀;  
 above Milligalli, 1 ♀;  
 Ambato, 1 ♂;  
 Province of Pichincha, 1 ♀;  
 "Ecuador," 1 ♂.

*T. p. assimilis*.—

## COLOMBIA:

Gallera, 1 ♀;  
 Cocal, 1 ♂.

## ECUADOR:

Gualea, 1 ♂, 1 ♀;  
 west side of Pichincha, 2 ♂;  
 "Papallacta," 2 ♂;  
 Zaruma, 1 ♀;  
 El Chiral, 1 ♂, 2 ♀.

## PERÚ:

Palambra, 1 ♂<sup>2</sup>.

<sup>1</sup> Specimen in Chicago Museum of Natural History.

<sup>2</sup> Specimens in Academy of Natural Sciences of Philadelphia.

*T. p. heliothrix*.—

## PERÚ:

- La Lejia, 2 ♂, 2 ♀;  
 San Pedro, 1 ♂, 1 ♀;  
 Leimebamba, 1 ♂, 4 ♂<sup>1</sup>, 3 ♀<sup>1</sup>;  
 Chira, 1 ♂<sup>1</sup>;  
 Utcubamba, 1 ♂<sup>1</sup>;  
 Molinopampa, 2 ♂<sup>2</sup>, 1 ♀<sup>2</sup>;  
 Rumicruz, 2 ♀;  
 Chilpes, 2 ♀;  
 [between Chilpes and] Tulumayo, 1 ♀;  
 Maraynioc, 1 ♂, 1 ♀;  
 Auquimarca, 1 ♀<sup>1</sup>.

*T. p. subsp.*?—

## ECUADOR:

- "above Mindo," 1 ♂.

*T. p. submontanus*.—

## PERÚ:

- Santo Domingo, 1 ♂;  
 Inca Mine, 1 ♀;  
 La Oroya, 1 ♂<sup>1</sup>;  
 Oconeque, 1 ♀<sup>1</sup>.

## BOLIVIA:

- Pitiguaya, 1 ♂;  
 Roquefalta, 1 ♂;  
 Incachaca, 1 ♂, 1 ♀;  
 Samaipata, 6 ♂<sup>1</sup>, 3 ♀<sup>1</sup>;  
 San Jacinto, 1 ♂<sup>1</sup>;  
 Palmar, 1 ♂<sup>1</sup>;  
 Santa Ana, 2 ♀<sup>1</sup>.

***Trogon curucui peruvianus* Swainson**

*Trogon Peruvianus* SWAINSON, "1838" (= Dec., 1837), *Animals in menageries*, p. 350—Perú (I suggest Moyobamba); ♀; W. Hooker's collection, (?) Liverpool Mus.

*Trogon bolivianus* OGILVIE-GRANT, 1890, *Catalogue of birds in the British Museum*, vol. 17, pp. 443, 470, pl. 15—Cosñipata, Perú; ♂; cotypes in British Mus.

It is most surprising to be unable to find any references (except in Sherborn's "Index animalium") to Swainson's description which long antedates Gould's use of the same name for a different bird (1858). The description is quite adequate, but the record seems to have been completely overlooked. The name *bolivianus*, singularly based on a Peruvian specimen, must be submerged as a

<sup>1</sup> Specimens in the Academy of Natural Sciences of Philadelphia.

<sup>2</sup> Specimens in the Chicago Natural History Museum.

synonym of *peruvianus*. Since other of Hooker's birds are fairly obviously from the Moyobamba region, I suggest that place as type locality of this form.

The species is not common in Perú but is widely distributed over the humid Tropical Zone. I can find no distinctions in birds from the various parts of the country. Records (under the names *bolivianus* and *variegatus*) are from Cosñipata, Marcapata, Pizana, Shapaja, Moyobamba, Huacamayo, and "Upper Ucayali."

Beyond the Peruvian border there are records from the Cochabamba region of Bolivia, but material at hand from that region appears to be assignable to typical *curucui* and not to *peruvianus*. Further study is needed of Bolivian birds. A male and a female from the lower Río Beni (if correctly labeled) agree with the Peruvian form which ranges also up the Eastern Andes to south-eastern Colombia and down the Amazon to the Rio Negro near its mouth and to the Rio Tapajoz.

Authorities differ decidedly as to the characters separating *T. c. behni* from *T. c. curucui*, but in the absence of any specimens clearly assignable to *behni* I am unable to form a clear opinion. It appears that *behni* is larger than either *curucui* or *peruvianus*, having the wing of the males 131 to 138 mm. in length, which is larger than anything I have in the series at hand, including 10 Paraguayan birds, 15 from Matto Grosso, and 16 from eastern and northern Bolivia. Possibly in Bolivia *behni* is restricted to the regions of Tarija and southern Santa Cruz; my birds from the Province of Sara have a maximum wing length of 128 mm. The supposedly greener, less purplish, blue crown and throat sometimes ascribed to *behni* need confirmation in view of the variable nature of such coloration in many of the trogons.

#### SPECIMENS EXAMINED

##### *T. c. curucui*.—

###### BRAZIL:

Rio de Janeiro, 1 ♂;  
Goyaz, 1 ♂, 1 ♀;  
Piauhy, 6 ♂, 1 ♀;  
Ceará, 2 ♂, 1 ♀;  
Bahia, 2 ♂, 1 ♀;  
Maranhão, 4 ♂;  
Matto Grosso, 13 ♂, 2 ♀;  
"S. Brazil," 1 ♂.

PARAGUAY: 9 ♂, 1 ♀.

## BOLIVIA:

(Vermejo, Roquefalda, Mission San Antonio, Todos Santos, Province of Sara), 10 ♂, 4 ♀ ;

Todos Santos, 1 ♂<sup>1</sup>, 1 ♀<sup>1</sup>.

*T. c. peruvianus*.—

## BOLIVIA:

Lower Beni, 1 ♂, 1 ♀.

## PERÚ:

Río Cosireni, 1 ♂;

Río Tavera, 1 ♀ ;

mouth of Río Urubamba, 1 ♂, 1 ♀ ;

Chanchamayo, 1 ♂;

Sarayacu, 1 ♀ ;

Río Marañón, 1 ♂;

Río Seco, 2 ♂.

## ECUADOR:

"Ecuador," 1 ♂.

## COLOMBIA:

La Morelia, 1 ♂, 1 ♀ ;

east slope of Eastern Andes, 1 ♂.

## BRAZIL:

Teffé, 2 ♀ ;

Rio Madeira (Rosarinho, Santo Antonio de Guajará, Borba), 6 ♂, 1 ♀ ;

Villa Bella Imperatriz, 4 ♂, 4 ♀ ;

Rio Tapajóz (Igarapé Brabo, Igarapé Amorín, Piquiatuba), 2 ♂, 3 ♀ ;

Rio Negro, Igarapé Cacao Pereira, 1 ♂, 3 ♀.

***Trogon viridis viridis* Linnaeus**

[*Trogon*] *viridis* LINNAEUS, 1766, *Systema naturae*, ed. 12, vol. 1, p. 167, no. 3—Cayenne; ♂.

[*Trogon*] *strigilatus* LINNAEUS, 1766, *op. cit.*, ed. 12, vol. 1, p. 167, no. 1—Cayenne; ♀.

*Trogon melanopterus* SWAINSON, "1838" (= Dec., 1837), *Animals in menageries*, p. 332—Brazil; restricted to Bahia by Griscom and Greenway, 1941.

? *Tr[ogon] albiventer* CUVIER, 1829, *La règne animal*, ed. 2, p. 459, note—based on Levaillant, 1807, *Hist. Nat. Courouc. et Tourac*, pt. 3, p. 10, pl. 5.

*A[ganus] venustus* CABANIS AND HEINE, 1863, *Museum Heineanum*, vol. 4, pt. 1, p. 194—New Granada.

? *Trogon Leverianus* SHAW, 1792, *Museum Leverianum*, p. 175—South America, Cayenne.

*T[rogon] cyanurus* FINSCH, 1870, *Proc. Zool. Soc. London*, p. 559—Cayenne.

Pebas, 1 ♂; mouth of Río Curaray, 1 ♂, 3 ♀ ; Apayacu, 1 ♀ ; Puerto Indiana, 3 ♂, 1 ♀ ; mouth of Río Santiago, 2 ♀ ; mouth of Río Cinipá, 1 ♂; lower Río Cinipá, 1 ♂; Pomará, 2 ♂, 4 ♀ ; Río Seco, 1 ♂, 1 ♀ ; Río Negro, 3 ♂; 1 ♀ ; Orosa, 1 ♂, 1 ♀ ;

<sup>1</sup> Specimens in Academy of Natural Sciences of Philadelphia.



Sarayacu, 4 ♂, 4 ♀; Río Pisqui, 1 ♂; Lagarto, 5 ♂, 1 ♀; Santa Rosa (Ucayali), 3 ♂.

A total of some 370 specimens from various parts of South America east of the range of *T. s. chionurus* are not readily segregated into recognizable forms. All distinctions of color or pattern are completely overcome by the individual variations shown by examples from the same limited areas, and those of size, although they show certain trends in various regions, are accompanied by so much overlap that identification of a large part of the series on that basis is impossible.

	WING	TAIL
15 males, the Guianas	134-149 mm.	137-155 mm.
13 males, Venezuela and northern Brazil	134-155	142-166
14 males, Amazon	136-147	127-155
16 males, Perú	143-157	145-166
9 males, southeastern		
Brazil	146-157	145-162

Of the 15 Guianan examples, four have the wing as long as some of the southeast-Brazilian series and nine agree in tail measurement. In the reverse direction, three of nine southeast-Brazilian birds are as short winged as the Guianan and six as short tailed. The overlap is thus greater than is indicated by the range of measurements. If the Venezuelan and Amazonian populations are included with the Guianan birds, the separation of a southeast-Brazilian form is even more difficult, while on the basis of size the Peruvian series would have to be included in the southeast-Brazilian form with a wide hiatus in range, occupied in part by the smaller Amazonian population.

I have no material from Caviana Island from which locality Brodtkorb (1937, Occas. Papers Mus. Zool., Univ. Michigan, no. 349, p. 2) has proposed to recognize "*albiventer*" on the basis of five birds with pale bellies. Aside from the fact that there is little possibility that Levaillant could have had examples from Caviana Island, the character is of doubtful value since it occurs in individuals from various parts of South America, including the type locality of *strigilatus*. Pelzeln (1871, "Zur Ornithologie Brasiliens," p. 20) dismisses Levaillant's bird as a male bleached by fire or sun, which seems a reasonable conclusion.

I can find no valid reason to supplant the specific name *viridis* with the name *strigilatus*. It was recognized long ago that these names applied to the two sexes of the same species, and authors

adopted *viridis* as the preferred name. Lesson (1831, "Traité d'ornithologie," p. 119) accepted *viridis* and placed *strigilatus* as a synonym, but he cited both names from Gmelin and not from the earlier Linnaeus. Gray (1845, "The genera of birds," vol. 1, p. 69) followed a somewhat similar procedure but quoted *viridis* from Linnaeus and *strigilatus* from Gmelin. Burmeister (1856, "Systematische Uebersicht der Thiere Brasiliens," vol. 2, p. 277) also accepted *viridis* and cited both names from Linnaeus, thereby qualifying as first reviser and fixing the synonym as cited. As well as I can determine, Ridgway (1911, Bull. U. S. Natl. Mus., vol. 50, pt. 5, p. 751) reversed the arrangement and accepted *strigilatus*, presumably (although not so stated) because of line priority in the original reference, a procedure not authorized by the International Rules of Zoological Nomenclature. On the basis of the evidence here presented, it is necessary to revert to *viridis* as the specific term.

I am greatly puzzled by the original account of *Trogon Leverianus* Shaw, which is customarily placed in the synonymy of *viridis*. Pelzeln (1871, "Zur Ornithologie Brasiliens," p. 20) said that the specimen originally in the Leverian Museum was then in the Royal Museum [Vienna] and was a faded example of *viridis*, and subsequent authors appear to have accepted this assignment of the name. Shaw's original plate, however, shows a male bird with vermiculated wing-coverts, which are at total variance with the condition in *viridis*, though in agreement with the characters of *Trogon surrucura*. If the locality Cayenne as given by Shaw is correct, the bird could not have been *aurantius*, but since it probably was a trade-skin, it may have been from southeastern Brazil and not from Cayenne. The under parts were described as white, but whether this had resulted from faded yellow (*viridis*) or red (*surrucura*) was not indicated. The problem should be investigated by someone with access to the original specimen if it still exists. The matter is of some importance since *leverianus* antedates both *surrucura* and *aurantius* and may have to replace one or the other.

Additional Peruvian records of *viridis* are from Iquitos, Chayavitas, Chamicuros, Rioja, Huambo, Santa Cruz, Tocache, Tingo Maria, and "Upper Ucayali."

### ***Trogon rufus sulphureus* Spix**

*Trogon sulphureus* SPIX, 1824, Avium species novae, . . . Brasiliam, vol. 1, p. 48, pl. 38, part, fig. 1—Tabatinga, Brazil; ♂; Munich Mus.

*A[ganus] Devillei* CABANIS AND HEINE, 1863, Museum Heineanum, vol. 4, no. 1, p. 191, footnote 6—based on *Trogon meridionalis* Deville and DesMurs (*nec* Swainson), 1849, Rev. Mag. Zool., ser. 2, vol. 1, pp. 331, 333—Santa Maria, Perú.

The males of this upper Amazonian form have the most strongly coppery tails of any of the subspecies of *rufus* and, although some of the others show an occasionally noticeable amount of this reddish tinge, they do not reach even the average depth of color exhibited by *sulphureus*. The most poorly marked *sulphureus* may be matched in both the other forms mentioned, but separation is shown by other characters. Most of the series of males of *cupreicauda* have little or no coppery tinge in the tail, and in addition the tail appears to be shorter than in all the other forms, although this feature may need confirmation. Six males have the tail 114 to 128 mm. in length; seven males of *sulphureus* show 128 to 145 mm. Additionally, the upper wing-coverts, tertials, and outer margins of the secondaries are more coarsely vermiculated, on average, with the blackish lines predominant, making the general color darker than in *sulphureus*. In *amazonicus*, on the other hand, the markings are again coarse, but the whitish lines are the broader, giving the area a distinctly more whitish tone than in *sulphureus* or *cupreicauda*.

While females of *amazonicus* and *sulphureus* are very much alike, the shoulder markings in the lower Amazonian form tend to be coarser and lighter in general effect than those of the upper Amazonian birds, following the same trend of difference shown by the males. The females of *cupreicauda* have this shoulder area a little more coarsely barred, on average, than females of *sulphureus* and darker in general appearance than in either *sulphureus* or *amazonicus*. An additional character, other than a shorter tail, serves to separate them from the females of all the other forms. This is a strong, warm brown coloration of portions of the outer three rectrices, distributed as follows. On the third rectrix (from outside) the basal two-thirds of the outer web is bright brown, with the color crossing the shaft diagonally to the inner web where it forms a subterminal lunate border to the white tip, returning broadly basad along the inner margin. On the subexternal feather, the pattern is the same but is withdrawn somewhat basad. Outermost feather similarly patterned, but the brown color barely crosses the shaft to the outer web at the extreme base. The brown margins of the inner webs of the next two rectrices are

broadier than in the other forms in which there is little trace of the pattern of the outer three feathers as described. It is shown by all eight females of *cupreicauda* examined.

The typical form, *rufus*, appears to have no trace of the coppery tinge in the tails of the males shown by *cupreicauda*, *sulphureus*, and *amazonicus*, but the color is greener and less bluish than that present in the Central American *tenellus*. In *chrysochlorus*, the tail is very like that of *rufus*, but the vermiculations on the wing-coverts, tertials, and margins of the secondaries are finer than in the average of any of the other forms and the size is greater (eight males have the tail, 144–157 mm.). The distribution of *rufus* involves the north bank of the lower Amazon at Faro and Manaos, Brazil, but the distribution elsewhere in Brazil is problematical. Without positive characters for the separation of females, I am unable to place with certainty a female from the mouth of the Río Ocamo, Venezuela, but a male from the opposite side of the Orinoco agrees with *amazonicus* as do males from the upper Río Negro (Camanaos, Tatú, and Santa Maria), and the same assignment is indicated in a male from Igarapé Cacao Pereira, on the lower Negro, opposite Manaos.

On the other hand, two males from west of the Cassiquiare, opposite El Merey, are as coppery tailed as Peruvian birds and must be assigned to *sulphureus*. Since the Cassiquiare thus appears to form a barrier between the ranges of *sulphureus* and *amazonicus* in that part of the country, it is not impossible that the upper Orinoco does so also in the case of *amazonicus* and *rufus*, and since *rufus* inhabits part of Venezuela, as at Mt. Auyan-tepui, the "mouth of the Ocamo" female may be referred tentatively to the typical form, subject to revision when males become available from the same side of the upper Orinoco.

The separation of ranges between *sulphureus* and *amazonicus* south of the Amazon is not clearly marked but may be tentatively placed at the Rio Madeira. Of two males from Teffé, one is as coppery tailed as average *sulphureus*, while the other is matched by overlapping examples from Perú and the Rio Tapajóz. One male from Rosarinho is intermediate between the two Teffé birds, while one from Humaythá, Rio Madeira, is like the most coppery-tailed Tapajóz bird, a little more coppery than the weakest extreme from Perú. Of two males from Villa Bella Imperatriz, east of the Madeira, one has very little coppery tinge on the tail, but the other is like the Humaythá bird. Of seven males from the

Tapajóz, three from the left bank (the type region of *amazonicus*) are as strongly coppery as extremes of *sulphureus*; one from the right bank is a little greener, and two from the left bank and one from the right, together with one from the Rio Xingú, are rather definitely greener than Peruvian specimens. The region between the Peruvian border and the Xingú thus presents a lack of uniformity in the population that is confusing, but since one bird from Villa Bella Imperatriz is greener tailed than any Peruvian specimen, it seems advisable to consider *amazonicus* as first appearing east of the Madeira. This gives it a somewhat interrupted range across the Amazon to the west bank of the Negro, but additional material will be needed to clarify the situation.

In a former discussion of this form under the name *devillei* (1930, Field Mus. Nat. Hist., zool. ser., vol. 17, no. 7, pp. 294–296), I mistakenly placed Santa Maria on the right bank of the Amazon south of Pebas whereas it is on the left bank, northeast of Pebas. In the case of the present species, the matter is of academic interest but does not affect the application of the name *devillei* (in any case a synonym of *sulphureus*) since the subspecies is found on both sides of the Amazon hereabouts.

There are rather few records of this trogon from Perú. The localities from which I have not seen material are only Chamicuros, Nuevo Loreto, and Santa Maria.

#### SPECIMENS EXAMINED

##### *T. r. tenellus*.—

###### COSTA RICA:

(Atirro, Guacimo, Tuis, Miravalles, Bebedero, Orotina, El Pozo, Boruca, Limón, Atalanta), 11 ♂, 7 ♀.

###### NICARAGUA:

(Chontales, Río Grande, Los Sabalos, Savala, Tuma), 6 ♂, 5 ♀.

###### PANAMÁ:

(Chiriquí, Bogava, Cascajal Coclé, Chitrá, Santa Fé, [Lion Hill], Tacarcuna, Tapalisa, Cituro, Río Calovévora, Insolita Is., Cebaco Is.), 19 ♂, 10 ♀.

##### *T. r. cupreicauda*.—

###### COLOMBIA:

Baudó, 2 ♂ (including type), 1 ♀;

Alto Bonito, 2 ♂, 1 ♀;

Barbacoas, 3 ♂, 2 ♀;

Juntas de Tamaná, 1 ♀;

San José, Cauca, 1 ♀;

within 20 miles of Honda, 1 ♀.

## ECUADOR:

- Bulún, 2 ♂, 1 ♀;  
 Río Cayapas, 1 ♂;  
 Gualea, 1 ♀.

*T. r. sulphureus*.—

## ECUADOR:

- Coca, Río Napo, 1 ♂;  
 "Equateur," 1 ♂.

## PERÚ:

- Apayacu, 1 ♂, 1 ♀;  
 mouth of Río Santiago, 1 ♂;  
 Orosa, 3 ♂, 1 ♀;  
 Santa Rosa, Ucayali, 1 ♀;  
 Puerto Bermúdez, 2 ♂<sup>1</sup>.

## BRAZIL:

- Teffé, 2 ♂, 2 ♀;  
 Humaythá, 1 ♂;  
 Rosarinho, 1 ♂.

## VENEZUELA:

- Río Cassiquiare, opposite El Merey, 2 ♂.

*T. r. amazonicus*.—

## BRAZIL:

- Villa Bella Imperatriz, 2 ♂, 1 ♀;  
 Rio Tapajóz, Igarapé Brabo, 3 ♂, 1 ♀;  
 Limoál, 3 ♂, 2 ♀;  
 Piquiatuba, 1 ♂, 1 ♀;  
 Caxiricatuba, 1 ♂, 1 ♀;  
 Tauarý, 1 ♀;  
 Rio Xingú, Villarinho do Monte, 1 ♂;  
 Rio Tocantins, Baião, 2 ♀;  
 Bemfica, Pará, 1 ♀;  
 Prata, 1 ♀;  
 Rio Negro, Igarapé Cacao Pereira, 1 ♂;  
 Camanaos, 1 ♂;  
 Santa Maria, 1 ♂, 1 ♀;  
 Tabocal, 1 ♀;  
 Tatú, 1 ♂, 1 ♀.

## VENEZUELA:

- Río Cassiquiare, El Merey, 1 ♀;  
 Río Orinoco, opposite mouth of Ocamo, 1 ♂.

*T. r. rufus*.—

## VENEZUELA:

- Mouth of Río Ocamo, 1 ♀;  
 Mt. Auyan-tepui, 1 ♂.

## BRITISH GUIANA:

- Tumatumari, 1 ♂;  
 Camarang River, 2 ♂;

<sup>1</sup> Specimens in Chicago Natural History Museum.

"Demerera," 9 ♂, 2 ♀.

FRENCH GUIANA:

Ipousin, 3 ♂, 2 ♀.

SURINAM:

Lelydorp, 1 ♂, 1 ♀;

"interior," 2 ♀.

BRAZIL:

Manaos, 1 ♂;

Faro, 1 ♂, 1 ♀.

*T. r. chrysochlorus*.—

BRAZIL:

Espirito Santo, Sagrado do Veado, 1 ♂;

São Paulo, São Sebastião, 1 ♂;

Paraná, Roça Nova, 1 ♂, 1 ♀;

Foz de Iguassú, 1 ♂;

Guayra, 1 ♀;

Santa Catharina, Hansa, 1 ♂;

Salto Pirahy, 2 ♂, 1 ♀;

"Brazil," 1 [♂].

PARAGUAY:

Colonia Independencia, 2 ♂.

### ***Trogon violaceus ramonianus* Deville and DesMurs**

*Trogon ramoniana* DEVILLE AND DESMURS, 1849, Rev. Mag. Zool., ser. 2, vol. 1, p. 331—Sarayacu, Pampa del Sacramento [Perú]; ♂; Paris Mus.

The distinction of *ramonianus* from *violaceus* and *concinus* is fairly consistent, although an occasional variant in the range of *violaceus* resembles *ramonianus* in its lack of clear vermiculations on the upper wing-coverts and tertials. Similarly, some specimens of the population found on the south bank of the Amazon show a perceptible amount of this vermiculation. Such, presumably, was the male recorded by Hellmayr as *v. violaceus* from Maruins, Rio Madeira (1910, Novitates Zool., vol. 17, p. 387), a specimen which unfortunately is not now in the Rothschild Collection.

There is no regularity about the appearance of this marking in Amazonian birds except that a male from Faro (north of the Amazon) is sufficiently strongly marked to justify assignment of the example to *violaceus*—an assignment which accords well with the relationships to Guianan birds exhibited by many Faro specimens. South of the Amazon, the character has no apparent taxonomic value.

Ridgway (1911, Bull. U. S. Natl. Mus., vol. 50, pt. 1, p. 786) postulated as one of the characters of his tentative "*goeldii*" a more sharply ridged culmen than that possessed by Ecuadorian

examples of "*ramonianus*," but Deville and DesMurs use the same character for *ramonianus*. Nevertheless, some of my birds from the lower Amazon show a pronounced knife-like ridge on the culmen that is conspicuously thinner and sharper than I have seen in upper Amazonian specimens, though it is not constant and therefore not certainly of diagnostic value.

The true distinction of upper and lower Amazonian (south bank) birds appears to lie rather in the coloration of the crown, breast, and tail of the males, and to a lesser degree the tone of the back, and in these respects segregation appears to be demonstrated, at least in the series now before me. Males from south of the Amazon in Perú are definitely darker than those from the Tapajóz and Tocantins. The crown, nape, and breast are darker and more violaceous blue, the back has a more distinct bluish tone, rather intense on the upper tail-coverts, and the upper surface of the tail is more blue than green in all lights. In positions between the eye and the source of light in which the lower Amazonian birds may appear more bluish on the tail and upper coverts, the Peruvian specimens are strongly violaceous.

In these respects, a single male from the left bank of the Madeira (Rosarinho) agrees better with the Peruvian birds than with those from farther downstream. Association with the Peruvian series is thus indicated, although a series from Rosarinho might show a greater tendency in the other direction.

It seems possible, therefore, to recognize the subspecies *crissalis* (for reference see the next entry) as distinct from *ramonianus*. I can find no character that serves to distinguish the females of the two forms.

North of the Amazon in Brazil, Perú, Ecuador, southwestern Venezuela, and presumably southeastern Colombia, there is, in general, excellent agreement with *crissalis*. A single specimen obtained by Ludovico Söderstrom's collectors, presumably in Ecuador, and labeled simply "Napo," is the only disturbing example. It is not fully adult and still retains some of the juvenal feathering, but the portions of the plumage that are apparently adult resemble the corresponding areas in *ramonianus*. An even younger male of *ramonianus* from Orosa, Perú, reverses this condition and tends to resemble *crissalis*, but all the fully adult birds divide well into two series.

I have no material from the lower Rio Negro, Brazil, but find the birds from the upper Negro referable to *crissalis* as are speci-



mens from the region of Mt. Duida, Venezuela. A single example from southeastern Colombia is a female and indeterminate as to subspecies, but it presumably is to be associated with east-Ecuadorian examples which, with the possible exception of the Söderstrom bird of uncertain locality, appear to belong to *crissalis*.

Peruvian records that may be assigned to *ramonianus* are from Sarayacu, upper and lower Ucayali, La Merced, Chamicuro, and Moyobamba.

### **Trogon violaceus crissalis** (Cabanis and Heine)

[*Aganus*] *crissalis* CABANIS AND HEINE, 1863, Museum Heineanum, vol. 4, pt. 1, p. 190—"Bahia" [error; lower Amazon suggested by Peters, 1945]; ♂; Halberstadt Mus.

*Chrysotrogon ramonianus goeldii* RIDGWAY, 1911, Bull. U. S. Natl. Mus., vol. 50, pt. 5, p. 786, footnote—Pará, Brazil; ♂; U. S. Natl. Mus.

The discussion of the relationship of this form to *ramonianus* is discussed under that form. A single male from Perú north of the Amazon is available, being kindly lent by the Academy of Natural Sciences of Philadelphia, and this is referable to *crissalis*, not to *ramonianus*. Two females in the American Museum collection from the same locality (mouth of the Río Curaray) belong with it. On this basis, an early record from Iquitos presumably also must be referred to the present form.

### **Trogon violaceus concinnus** Lawrence

*Trogon concinnus* LAWRENCE, 1862, Ann. Lyc. Nat. Hist., New York, vol. 7, p. 463—New Grenada = Lion Hill, Panamá; ♂ imm.; Amer. Mus. Nat. Hist.

[*ganus*] *lepidus* CABANIS AND HEINE, 1863, Museum Heineanum, vol. 4, pt. 1, p. 187—Babahoyo, Ecuador; ♂; cotypes in Halberstadt Mus.

I have no Peruvian specimens of this subspecies, but a male from Portovelo, Ecuador, was secured not far from the Peruvian boundary and suggests the assignment to *concinnus* of Taczanowski's record of "*caligatus*" from Lechugal (a single female collected by Stolzmann). In the "Ornithologie du Pérou" (1886, vol. 3, p. 174), the locality "Tumbez" appears to be an error for "Lechugal," since Stolzmann is credited with the collection of the specimen, while on the next page a statement by Stolzmann says that he found the bird only at Lechugal. In any case, Tumbes is not a likely locality for this trogon.

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The northern forms of this species have had a checkered nomenclatural career. Gould ("A monograph of the Trogonidae," pl. 7

and text) described and figured *Trogon caligatus*. Subsequently, Bonaparte (1856, Compt. Rendus Acad. Nat. Sci. Paris, vol. 42, p. 955) described *Trogon sallaei* from Córdoba, Vera Cruz, México, from birds collected by Auguste Sallé. The same year, Sclater (1856, Proc. Zool. Soc. London, p. 286) reported on the Sallé collection which he had examined in company with Bonaparte, and placed *Trogon sallaei* in synonymy under "*T. aurantiiventris*" (which does not occur anywhere in México!), recording at the same time a male and female of *caligatus* and both sexes of *puella*, all from Córdoba. No sex is given for the specimen or specimens of "*aurantiiventris*" although Bonaparte had described both plumages.

Bonaparte had mentioned that Sallé found "*Trogon xalapensis*" at Córdoba, and since this appears to be a synonym (by a slight margin of time) of *puella*, Sclater's identification of *puella* in the Sallé collection was to be expected. The question of *caligatus* and *sallaei* is not so easy to answer. If Sclater examined the Sallé collection in company with Bonaparte, it seems hardly likely that he would have associated Bonaparte's name *sallaei* with the wrong specimens. On the other hand, since *puella* appears to have been represented in the collection by other specimens, it is difficult to see how Sclater could have confused an "*aurantiiventris*" or "*sallaei*" with it, but it is even more difficult to discover what he might have had that was different from both *puella* and "*caligatus*." Bonaparte's description of *sallaei* defines a bird with a yellow belly and a black forehead (as well as black cheeks and throat), but presumably with the top of the head and the breast as green as the back. This is not the case in any of the forms of the *violaceus* group, all of which have the head and breast bluer than the back or, as in the Mexican subspecies and *concinus*, with the whole top of the head black—at least not green. In *puella* and *aurantiiventris*, the crown is as green as the back and the forehead is black, but the belly is not yellow, although a very light example of *aurantiiventris* might conceivably reach a pale orange tint that would suggest yellow in comparison with the deeper red of *puella*. No definite record of the *aurantiiventris* group exists from México, however, and no one has attempted to claim such occurrence on the basis of Sallé's bird which probably did not belong to this species.

Van Rossem (1934, Bull. Mus. Comp. Zoöl., vol. 77, no. 7, p. 392) reports his inability to find the male cotype of *sallaei* in the

Paris Museum, but he found the female cotype which he identified as belonging to the Mexican form of *violaceus*. In view of this assignment, he adopted the name *sallaei* for that subspecies, regardless of the fact that the male was not certainly of the same form. With Sclater's synonymy (1856) after his presumed examination of the type, I do not believe we are justified in attempting any assignment of the name until Mexican specimens come to light that agree with Bonaparte's description of the male and furthermore show enough similarity to *aurantiventris* to explain Sclater's assignment of the name *sallaei* to synonymy under that form.

This brings us back to consideration of the name *caligatus*, which antedates *sallaei*. After Gould's original description and plate, Pelzeln (1856, Sitzber. K. Akad. Wiss. Wien, vol. 20, p. 494) found Mexican birds in the Berlin Museum to differ from Gould's account by reason of their black caps, whereas Gould had shown and stated that the top of the head was blue except for the black forehead. Cabanis and Heine (1863, Museum Heineanum, vol. 4, pt. 1, p. 187) confirmed Pelzeln's findings with additional material, and disclosed the fact that a male from Cartagena, Colombia, agreed well with Gould's account, thereby establishing a definite locality for *caligatus* as described. The existence of a blue-capped bird in northern Colombia seems to have been overlooked or ignored thereafter until Chapman (1914, Bull. Amer. Mus. Nat. Hist., vol. 33, p. 607) rediscovered it and named the form which he called *columbianus* from Opon, Magdalena Valley.

In the meantime, however, Gould produced his second, rewritten edition of his monograph of the Trogonidae in which, in the text to plate 16 (dated 1875), he made the incredible statement that his first account and figure of *caligatus* were incorrect and that the type, which he still had, was black capped and not blue capped. He thereupon redescribed *caligatus* with the emended character and provided a new plate of it. This amendment was accepted by subsequent authors without discussion, as far as I can learn, until Peters (1929, Bull. Mus. Comp. Zoöl., vol. 69, no. 12, pp. 432-434) discussed the case and refused to believe that Gould could have so aptly described a bird he did not have in his possession in 1838. Peters considered it much more likely that Gould had had ample time in the years between the two editions of his work to become somewhat confused as to the specimen he had originally described and pictured. In any case,

while Gould's type was without locality, there is no specimen of "*caligatus*" (the name adopted by Ogilvie-Grant for the Mexican bird) listed in the "Catalogue of birds in the British Museum" for the Gould Collection, either as from an unknown locality or as the type of the "species." There is a male from México listed, and it is probable that this is the bird figured and described in the second edition of the monograph but not in the first. There are two males without locality from the Gould Collection listed under "*meridionalis*," and three skins from Remedios, Antioquia [Colombia], including both sexes, though not from the Gould series. These Colombian birds should not be "*meridionalis*" (= *v. violaceus*) but presumably belong to the north-Colombian form that was not then generally recognized, and one of the Bogotá skins may easily have been the original specimen of *caligatus*, which was without locality as are these trade-skins. In any case, I believe with Peters that we must accept Gould's original description and plate as the foundation of the name *caligatus*, regardless of Gould's subsequent attempt to revise the account.

Recent authors have assigned Costa Rican birds to *concinus*, but the series at hand shows measurements more in accord with those of *braccatus*, as do examples from Nicaragua. Ten males from Costa Rica have the wing, 120–128 mm. (average, 123.7); seven males from Nicaragua: wing, 119–127 (average 123.1); 11 males from Guatemala and México: wing, 123–130 (average, 125.9); nine males from Panamá: wing, 111–120 (average, 117.1). In addition, the Costa Rican birds show little tendency towards the coarser vermiculation of the upper wing-coverts as shown by *concinna*, although this is not constant in the more southern form. I can detect no constant difference in the depth of yellow on the belly of the males of the two forms, although the hue varies in both, possibly owing to differences in freshness of plumage or age of the specimen.

#### SPECIMENS EXAMINED

*T. v. braccatus*.—

MÉXICO:

(Tehuantepec, Yucatán, Vera Cruz, "México"), 7 ♂, 1 ♀.

GUATEMALA:

(El Cipres, Finca Carolina, Cobán, Alta Vera Paz, Finca Chamá, Finca Sepur, San Lucas, Secanquim, Hacienda California, "Guatemala"), 9 ♂, 6 ♀.

## HONDURAS:

(Cofradia, Catacombas, Peñitas, Caliche), 9 ♂, 5 ♀.

## NICARAGUA:

(Chontales, Volcán Viejo, Volcán Chinandega, Tuma, Matagalpa, Muy Muy, San Juan Talpaneca, Río Coco), 9 ♂, 6 ♀.

## COSTA RICA:

(Carrillo, El Zapotal, Guayabo, Bonilla, Boruca, Bebedero, Monte Redondo, Punta Arenas, Aquinares, Bagaces, Miravalles, Atirro), 13 ♂, 5 ♀.

*T. v. concinnus*.—

## PANAMÁ:

(El Real, Tapalisa, Almirante, El Villano, La Marea, Santa Fé, Wilcox Camp, [Lion Hill], Bogava, Capira, Almijas Is., Brava Is., Sevilla Is., Cebaco Is., Insolita Is., Gobernador Is., Espartal Is., Chiriquí, La Chorrera), 30 ♂ (including cotype), 16 ♀ (including cotype).

## ECUADOR:

(Chongon Hills, Hacienda Ana Maria, Esmeraldas, Pambilar, Portovelo, Chimbo, coast of Manaví), 10 ♂, 3 ♀.

*T. v. caligatus*.—

## COLOMBIA:

(Opon, Puerto Valdivia, within 20 miles of Honda, Minca, Cacagualito), 5 ♂ (including type of *columbianus*), 1 ♀.

*T. v. violaceus*.—

## VENEZUELA:

(Munduapo, La Prisión, Mt. Auyan-tepui), 7 ♂, 6 ♀.

## BRITISH GUIANA:

(Tumatumari, Rockstone, Essequibo River, Wismar, "Demerara"), 3 ♂, 4 ♀.

## SURINAM:

"Interior," 1 ♂, 1 ♀.

## TRINIDAD:

(Caparo, Princetown, Savannah Grande, Carenage), 12 ♂, 6 ♀.

## BRAZIL:

Faro, 1 ♂, 2 ♀.

*T. v. ramonianus*.—

## PERÚ:

Río Negro, 2 ♀;

Orosa, 2 ♂, 1 ♀;

Lagarto, 1 ♂;

Santa Rosa (Ucayali), 2 ♂.

## BRAZIL:

Rio Madeira, Rosarinho, 1 ♂.

*T. v. crissalis*.—

## PERÚ:

Mouth of Río Curaray, 1 ♂<sup>1</sup>.

## ECUADOR:

Coca, Río Napo, 2 ♂, 1 ♀;

"Napo," 1 ♂;

"Equateur," 1 ♀.

<sup>1</sup> Specimen in Academy of Natural Sciences of Philadelphia.

## COLOMBIA:

Flores, 1 ♀.

## VENEZUELA:

Esmeralda, Duida, 1 ♂, 1 ♀;

Lalaja, 1 ♂;

Campamento del Medio, 1 ♀;

Río Pescada, 1 ♂;

Playa del Río Base, 1 ♀;

mouth of Río Ocamo, 1 ♀.

## BRAZIL:

Rio Negro (Tatú, San Gabriel, Yucabí), 2 ♂, 1 ♀;

Rio Tocantins (Baião, Mocajuba), 2 ♂, 2 ♀;

Rio Tapajoz (Igarapé Brabo, Igarapé Amorin, Caxiricatuba, Limoã), 5 ♂, 5 ♀.

***Trogon melanurus melanurus* Swainson**

*Trogon melanurus* SWAINSON, "1838" (= Dec., 1837), Animals in menageries, p. 329—Demerara [? ex Schomburgk MS].

*Trogon nigricaudata* GOULD, 1838, A monograph of the Trogonidae, ed. 1, pl. 18 [*Trogon melanurus* in text].

Study of an extensive series of birds from the broad range heretofore assigned to *melanurus melanurus* reveals a recognizable distinction of an upper Amazonian subspecies which may be known as follows.

***Trogon melanurus eumorphus*, new subspecies**

TYPE: From Sarayacu, Río Ucayali, Perú. No. 237883, the American Museum of Natural History. Adult male collected August 12, 1927, by Carlos Olalla and sons.

DIAGNOSIS: Nearest to *T. m. melanurus* of the Guianas and the lower Amazon (west to the Rio Tapajóz and Faro), but males with upper wing-coverts, tertials, and outer margins of secondaries darker, with the blackish vermiculations equal to, or slightly broader than, the light ones, and the latter not so clearly white as in *melanurus*; white pectoral band usually noticeably narrower; tail averaging bluer.

RANGE: Upper Amazon Valley, from southeastern Colombia to northern Bolivia and eastward to the right bank of the Rio Negro at its mouth (not on the upper reaches) and on the south bank of the Amazon to Villa Bella Imperatriz.

DESCRIPTION OF TYPE: Top of head, back, and breast shining Meadow Green (much bluer when held toward the light), with black or blackish subterminal bands; uropygium bluer (violaceous toward the light); chin, throat, and sides of the head black;

a relatively thin white pectoral band, with subterminal black areas on the feathers; thighs grayish black; rest of under parts Rose Doree  $\times$  Scarlet Red. Remiges black with a marginal white line toward the base of the second to fifth primaries (from outside), with the white continued more distad as whitish freckling; outer margins of secondaries, most of exposed portions of the tertials and of the greater, median, and lesser upper wing-coverts (except the smallest) freckled or finely vermiculated with black and grayish white, giving a grayish rather than whitish aspect to the area; inner webs of the smaller tertials with extensive blackish marginal stripes; primary-coverts and alula black. Tail with median rectrices above Alizarin Blue held away from the light, and Dusky Violet-Blue (1) held toward the light, with a well-defined terminal band of black; next pair with most of outer webs similarly colored; third pair with outer margins duller and somewhat greener blue; outermost pair with dull whitish freckling on the outer margins toward the base; rest of tail deep black in dorsal aspect; ventral aspect of entire tail uniformly blackish. Bill (in dried skin) Warm Buff; feet dull light brownish. Wing, 160 mm.; tail, 158; exposed culmen, 18; culmen from base, 24; tarsus, 14.5.

REMARKS: Females indistinguishable from those of *T. m. melanurus*.

Where the ranges of *melanurus* and *eumorphus* approach each other there is some intermediacy apparent, and possibly some doubt as to the exact line of separation. One of five males from Borba could be referred to *melanurus* without difficulty; two show a trend in that direction by their whiter wing-coverts and tertials; the other two are good *eumorphus* as are the two adult males from Villa Bella Imperatriz and the male from Igarapé Auará. The birds from both banks of the Tapajóz are assignable to *melanurus*.

North of the Amazon, the examples from the right bank of the Rio Negro near its mouth are well-marked *eumorphus*. I have no skins from the median portions of the river or from the left bank near the mouth, but specimens from the upper Negro and the Uaupés and from the Cassiquiare and Duida regions of Venezuela are *melanurus*. A male from Tatú is unusual in that the upper wing-coverts, tertials, and margins of the secondaries are exceptionally broadly patterned (with the usual whitish effect), and the white breast band is rather weak. The variations do not clearly indicate any trend toward another form.

Specimens from Faro are as variable as the Borba birds. One male is like the greener examples of *eumorphus*, but three other males may be assigned to *melanurus* without difficulty, although they have the tail somewhat tinged with blue as in some other examples of *melanurus*—far removed from the average or extreme condition of *eumorphus*. The bluer-tailed specimens of *melanurus* and the greener-tailed individuals of *eumorphus* are somewhat similar in respect to the color of the tail, although the extremes are noticeably distinct. The character of the grayness or whiteness of the “shoulder” and the inner remiges is even more constant.

In the Peruvian series, one male from the mouth of the Río Curaray deserves comment. It appears to be not fully adult since the outer rectrices are freckled with whitish on both webs, and the adjacent two pairs are similarly marked on their outer margins, while the rectrices themselves are somewhat narrowed toward their tips and are dull and brownish instead of black as in adults. The vermiculation of the upper wing-coverts, tertials, and secondaries is coarser even than in the Tatú specimen mentioned above, and the inner margins of the smaller tertials have none of the blackish marking that is usually so prominent in *eumorphus*, though less developed in *melanurus* and sometimes lacking in that form. This character will be discussed in another connection a little later.

All Peruvian records from east of the Andes belong to *eumorphus* and embrace the following localities not represented in the material examined: Iquitos, Yurimaguas, Santa Cruz, Jeberos, Pebas, Nauta, and “Upper Ucayali.”

### ***Trogon melanurus mesurus* (Cabanis and Heine)**

*T[roctes] mesurus* CABANIS AND HEINE, 1863, Museum Heineanum, vol. 4, no. 1, p. 202—Babahoyo, Ecuador; ♂, ♀ cotypes in Halberstadt Mus.

*Curucujus melanurus pacificus* CHAPMAN, 1923 (Nov. 19), Amer. Mus. Novitates, no. 96, p. 4—Alamor, Ecuador; ♂; Amer. Mus. Nat. Hist.

Males of this western form are quite readily separable from *eumorphus* and *melanurus* by the much finer vermiculation of the upper wing-coverts, tertials, and outer margins of the secondaries and the lighter, less blackish under surface of the tail, faintly tipped with a darker shade; from *eumorphus*, further, by the greener median rectrices, and from *melanurus* by slightly less well-developed white pectoral band.



The record of "*melanurus*" from Lechugal presumably belongs to *mesurus*.

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The study of *melanurus*, *eumorphus*, and *mesurus* presented no unusual problems, possibly because of the excellent series of each of the forms available for examination and the geographical coverage obtained. A very different situation was encountered in the Central and Western Andes of Colombia, involving two and possibly three species.

The long-tailed, white-breasted bird known as *macroura* is usually considered as a conspecies of *melanurus*. It differs from *melanurus* and *mesurus* by its larger bill, (usually) longer wing and tail, with the tail usually longer than the wing instead of the reverse; vermiculations of the shoulder area rather coarse and whitish in effect; under side of the tail somewhat brownish with darker tips as in *mesurus*; and median rectrices inclined to bluish though not so blue as in *eumorphus*. This bird ranges from the Canal Zone southward through eastern Panamá and along the western side of the Western Andes in the Atrato Valley. There are records from Remedios and Neche, in the Antioquia region of the Central Andes which present a certain problem, as will appear from the following discussion.

In southwestern Colombia and extreme northwestern Ecuador, north of Esmeraldas, occurs the form known as *australis*, considered as a conspecies of *massena*. This is a long-tailed bird with the under surface of the tail somewhat brownish rather than blackish in the males, the upper surface of the tail rather bluish with the terminal blackish band relatively narrow and sharply defined, with no white pectoral band, and with the freckling on the upper wing-coverts, tertials, and outer margins of the secondaries rather fine. In addition, every male of this form that I have examined (only three) has the whole side of the head metallic green like the breast, and the throat nearly equally so, a character I have not seen mentioned in accounts of this form but one which appears to be quite significant.

These characters are difficult to evaluate. The long tail suggests either *massena* or *macroura*. The brownish under surface of the tail (with dull dusky tips) suggests *massena*, *macroura*, and *mesurus*. The bluish upper surface of the tail agrees best with *macroura* and *melanurus*. (It is not so blue as in *eumorphus*.) The well-defined, narrow terminal band on the tail is shared by

all but *massena* and its conspecies *hoffmanni*. The absence of a white pectoral band is a feature of *massena* and *hoffmanni*, although there may be a suggestion of white in that part of the plumage in some examples, while some specimens of *eumorphus* and at least one of *macroura* show a weak bar in place of the usual prominent one. The freckling on the shoulder area shows agreement with *massena*, *hoffmanni*, and *mesurus*. The green facial area is not matched by any of the other forms, although a slight suggestion is sometimes apparent in all of the forms. The nearest approach I have found is in a male of *hoffmanni* from Tocumé, Panamá. It is not a character of immaturity, since obviously immature birds have no trace of it.

It is difficult to say, therefore, whether *australis* is conspecific with *macroura* or with *massena*. It is likewise difficult to say with assurance that *macroura* is conspecific with *melanurus* and *eumorphus*. The matter is further complicated by the presence of a still undescribed form in central and western Colombia that shows considerable affinity to the *melanurus* group but which can hardly be assigned to that group if *macroura* is retained in it, provided that certain early accounts are reliable.

While I think there is a possibility that *australis* is a conspecies of *macroura* and not of *massena*, the evidence is not yet sufficient to justify the transfer of the name from one group to the other and I retain the accepted arrangement. Similarly I retain *macroura* as a conspecies of *melanurus*, although in doing so I retain some doubts as to the correctness of this assignment. The new form, described below, may possibly conflict with *macroura* in the Antioquia region and, although it has many characters in common with the *melanurus* group, I cannot clearly assign it to that group until the uncertainty in the Antioquia region is resolved. The details are given in the discussion of the new form which may be known as follows.

### **Trogon comptus, new species**

TYPE: From Bahía de Málaga, Colombia. No. 407962, the American Museum of Natural History. Adult male collected March 16, 1941, by R. C. Murphy and J. G. Correia; original no. 191.

DIAGNOSIS: Similar to *T. melanurus eumorphus* of the upper Amazonian region from southeastern Colombia to Bolivia, but

white breast band lacking; red of lower under parts deeper, less pinkish. Differs from *T. massena australis* of southwestern Colombia and extreme northwestern Ecuador by shorter tail with bluer upper surface and blacker ventral surface; usually slightly coarser or darker freckling on the shoulder area; black instead of green facial area; more prominently black subterminal portions of the breast feathers; and noticeably darker and bluer head, breast, and back. The belly is perhaps deeper red and the feathering of the thighs blacker, less grayish than in *australis*. From *macroura*, this new form differs by bluer anterior and dorsal coloration; finer freckling on the shoulder area; absence of white breast band; shorter tail with bluer upper surface and blacker under side.

RANGE: Pacific slope of the Western Andes of Colombia, extending at least to La Frijolera at the northern end of the Central Andes.

DESCRIPTION OF TYPE: Upper parts shining blue-green, with a little admixture of bronzy green. Chin, throat, lores, and sides of face deep black; breast like the back, with the subterminal portion of the feathers black; thighs black; rest of under parts of body Scarlet Red  $\times$  Spectrum Red. Remiges largely black with a white or whitish outer margin toward the base of all but the outermost and several inner feathers; a white area at the base of the inner webs of the secondaries; outer margins of secondaries and exposed portion of tertials and most of the upper wing-coverts moderately finely freckled or vermiculated with grayish white and blackish; alula and primary-coverts black; innermost lesser coverts like the back; under primary-coverts blackish; rest of under wing-coverts freckled like the upper series. Median rectrices dark purplish blue with a broad black tip rather sharply defined; next two pairs black with broad outer margins dark blue; remaining quills black with subdued light freckling on the outer margin of the outermost plumes towards their bases; under side of the tail uniform black. Bill (in dried skin) yellow; feet blackish. Wing, 153 mm.; tail, 135; exposed culmen, 23; culmen from base, 26; tarsus, 13.

REMARKS: The females are the darkest of all the forms considered in this discussion. The top and sides of the head and the chin, throat, and chest are quite clouded with sooty or sooty brown; the upper wing-coverts, tertials, and outer margins of the secondaries are blackish, without the freckling that occurs on most of the other forms, least on *massena* and *hoffmanni* where it

is usually weak or absent; tail with the under surface uniformly blackish as in *eumorphus* and many *melanurus*.

The females, as do the males, present characters that fail to indicate clear relationship to any single one of the other allied forms. The dark chest and unmarked shoulder area suggest *massena* and *hoffmanni*, but the tail suggests *eumorphus* and *melanurus*.

It is to be noted that the description of the female of *australis* given in the original account and based on two females from Barbacoas and Bagado, respectively (Chapman, 1915, Bull. Amer. Mus. Nat. Hist., vol. 34, pp. 384–385), pertains to the female of *comptus*, since both these females belong to the present new form. A female of true *australis* from Carondelet, Ecuador, is inseparable from the light-breasted extreme of female *massena* (with weak freckling on the upper wing-coverts and tertials) or from the more finely freckled examples of *macroura*. It has the under surface of the tail brownish gray with dark tips as in these other forms and as in the males of *australis*—not the uniform blackish shade possessed by *comptus*. A young female of *australis* from Pambilar, Ecuador, has the freckling on the wings somewhat more prominent than in the adult female, at least on the new feathering; the specimen still retains the immature buff-barred secondaries, tertials, and greater upper wing-coverts and the marginally white-barred and white-tipped outer rectrices, as well as a few scattered brown body feathers. Both these females are as clearly distinguishable from the females of *comptus* as are the males of *australis*, but do not point exclusively to *massena* nor to *macroura* as the closest affine.

The possible overlap of range by *comptus* and *macroura* is postulated on the basis of a record of *macroura* by Sclater (1879, Proc. Zool. Soc. London, p. 535) from Remedios and [Río] Neche, Antioquia (the latter locality a few miles above Dos Bocas). These localities are a little east of La Frijolera whence came one of the paratypes of *comptus*. (Incidentally, this example is also one of the paratypes of *australis*.) It is not impossible that there is an actual separation of ranges of the two forms, but the localities are fairly close and, until more is known of the local distribution of both in the Antioquia region, it is best not to make them conspecific, especially since *comptus* is even less like *macroura* than is *eumorphus*, the east-Colombian representative of *melanurus* with which *macroura* is supposed to be conspecific.

Another record about which there is some doubt is one from Noanamá, western Colombia, published by Hellmayr (1911, Proc. Zool. Soc. London, p. 1193) who referred it to *massena* with the comment that it was smaller and had the middle rectrices washed with bluish instead of clear bronzy green. Chapman, in the original discussion of *australis*, refers this record tentatively to his *australis* which is probably correct, since Hellmayr doubtless would have marked the decided blue (rather than the bluish wash) of the tail if he had had a specimen of *comptus*. Furthermore, he gives the length of the tail of the Noanamá specimen, a male, as 168 mm. which is somewhat in excess of the maximum exhibited by the series of *comptus* at hand (162 mm.). I see no reason, therefore, not to accept the Noanamá record as pertaining to *australis*.

The range of wing and tail measurements of *comptus* are as follows: male, wing, 152.5, 153, 156.5, 171 mm.; tail, 135, 141, 142, 161 (average, 149.9); female, wing, 150, 154, 158, 163, 165; tail, 132, 136, 150, 151, 161. In *macroura*, the males have the wing 160–172; the tail, 168–183 (average, 182.8). In *australis* (including Hellmayr's Noanamá figures), the male has the wing 166–171; tail, 162–172 (average, 166.2).

There is a character found in this assemblage of forms that may possibly be of some taxonomic value, but it is not constant in any form and I have been unable to use it to advantage. This is a blackish area on the inner webs of the smaller tertials. In its most pronounced development, it is very marked and occupies most of the inner web of the feather to the shaft. In its weakest form it is a mere dusky shading along the inner margin, and often it is quite absent. It is poorly developed in *massena*, *hoffmanni*, *australis*, *mesurus*, and *comptus*, is most strongly apparent in *macroura*, and is usually evident in *melanurus* and *eumorphus*, but there are exceptions throughout. As an indicator of specific affinities, it leaves much to be desired.

I find myself unable to distinguish *hoffmanni* with any certainty, but since my material from Guatemala northward is very meager, I hesitate to deny its validity. The series at hand from the different countries involved shows the males to measure as follows:

	WING	TAIL
México	181–186 mm.	167–176 mm.
Guatemala	182	178

Nicaragua	168-182	162-171
Costa Rica	171-176	161-165
Panamá	163-180	159-173
Colombia	181	177

There is a somewhat greater size apparent in the more northern examples, but it is not sharply marked.

I am puzzled by six females from Panamá and Costa Rica which have both maxilla and mandible black or brownish with but slight trace of the yellowish coloration shown by the adults. Judging by the males from the various areas in question and by the heaviness of the bill, all these females belong to *massena hoffmanni*, the adult females of which, like those of all the forms treated in the present discussion, have the maxilla black, except for a yellowish patch at the base of the commissure, and the mandible completely yellow. Two examples (one from Panamá and one from Costa Rica) have the tail and the wings with definite indications of immaturity, but also show more traces of yellow on the bill than the other four which appear to be fully adult. On the other hand, three other Panamá females and two females of *m. massena* from México and Guatemala, respectively, also have the markings of immaturity on wings and tail but have the mandible without any black. Six adult females from Panamá and one of *m. massena* from Guatemala have the normal adult female bill with blackish maxilla and yellow mandible. Young males at hand, without exception, have the maxilla at least partially blackish or brownish and the mandible mostly yellow, with or without some traces of black. Adult males have both maxilla and mandible yellow or orange.

It is difficult to interpret this evidence.<sup>1</sup> If the bill of the young birds (at least in *hoffmanni*) is at first uniformly blackish and that of the adult females has the mandible yellowish, the transition must take place variously before the molt of wings and tail to adult condition or after that change. I may add that 11 young females of *melanurus*, *eumorphus*, and *mesurus* agree in having no trace of black on the mandible.

The situation in Panamá with reference to *hoffmanni* and *macroura* deserves a brief mention. Long ago, Ogilvie-Grant (1892, "Catalogue of birds in the British Museum," vol. 17, p. 475, footnote) remarked that in the neighborhood of the Panamá Railroad, there was intergradation in size between "*massena*" and *macroura* and that the females could not be distinguished with certainty in

that region. The character of size is explainable by the separation of *hoffmanni* from *massena*, but the similarity of the females is a cause of confusion. Normally, females of *massena* and *hoffmanni* are without any pronounced freckling on the upper wing-coverts, while those of *macroura* are definitely marked with fine, though somewhat dull, light freckles. The distinction does not hold throughout either series, and, especially in eastern Panamá, some examples of *hoffmanni* are as strongly freckled as the less well-marked examples of *macroura*. In addition, females of *massena* usually show a definitely darker (often brownish) breast, while those of *macroura* have that area lighter gray. Here again, the birds from eastern Panamá and Costa Rica (in other words, *hoffmanni*) are sometimes as light breasted as *macroura* in its darkest extreme. The males show definite distinction by the characters detailed in an earlier paragraph, and identification sometimes must depend on examples of that sex, but the occurrence of both *hoffmanni* and *macroura* supposedly from the same localities in certain instances may complicate the determinations. In the material at hand, there are examples of both from Tocumé and the Canal Zone in Panamá and from the Río Jurado in north-western Colombia. Perhaps there is some local segregation by which the two are not perfectly coincident. This is a problem that must be determined by some future field investigator.

#### SPECIMENS EXAMINED

##### *T. massena massena*.—

###### MÉXICO:

(Río Givicia and Tolosa), 4 ♂, 2 ♀.

###### GUATEMALA:

(Coban, Alto Vera Paz, and "Guatemala"), 3 ♂, 3 ♀.

###### HONDURAS:

Mouth of Roman River, 1 [♂].

###### BRITISH HONDURAS:

(No locality), 1 ♂.

###### NICARAGUA:

(Río Coco, Vizagua, San Rafael del Norte, Savala, Tuma, Los Sabalos, San Juan Talpaneca, and San Francisco), 7 ♂, 4 ♀.

##### *T. m. hoffmanni*.—

###### COSTA RICA:

(Limón, Bonilla, Bebedero, Boruca, Pozo Azul, Parismina, Volcán de Oso, El Pozo, Carrillo, Miravalles, Atalanta, and Lagarto), 14 ♂, 2 ♀.

###### PANAMÁ:

(El Villano, Bogava, Chiriquí, Almirante, Tocumé, La Chorrera, Wilcox Camp, Río Calovévora, La Marea, Santa Fé, [Lion Hill], Barro Colorado

Island, Tacarcuna, east slope of Tacarcuna, Gatún, Sevilla Is., Espartal Is., and "Panamá"), 18 ♂, 16 ♀.

COLOMBIA:

Río Jurado, Chocó, 1 ♂<sup>1</sup>.

*T. m. australis*.—

COLOMBIA:

Barbacoas, 1 ♂ (type);

Bahia de Málaga, 1 ♂.

ECUADOR:

Pambilar, 1 ♂, 1 ♀;

Carondelet, 1 ♀.

*T. melanurus macroura*.—

PANAMÁ:

(Tocumé, [Lion Hill], Chepigana, Cape Garachiné, El Real), 8 ♂, 7 ♀.

COLOMBIA:

Río Salaqui, Chocó, 1 ♂, 1 ♀;

Atrato River, 1 ♂, 1 ♀;

Río Jurado, 4 ♂<sup>1</sup>, 2 ♀<sup>1</sup>;

Río Jurubidá, 1 ♂<sup>1</sup>, 1 ♀<sup>1</sup>;

Río Jalami, 1 ♂<sup>1</sup>.

*T. m. eumorphus*.—

COLOMBIA:

Florencia, 2 ♂.

ECUADOR:

(Río Suno, San José, Coca), 3 ♂, 1 ♀.

PERÚ:

Mouth of Río Curaray, 2 ♂, 1 ♀;

Puerto Indiana, 1 ♂;

Apayacu, 1 ♂;

Orosa, 2 ♀;

Sarayacu, 9 ♂ (including type), 6 ♀;

Santa Rosa (Ucayali), 1 ♂, 2 ♀;

Lagarto, 1 ♀;

mouth of Río Urubamba, 3 ♂;

Chuchurrás, 1 ♂;

Astillero, 2 ♂, 1 ♀.

BOLIVIA:

Mission San Antonio, 2 ♂;

Todos Santos, 1 ♂;

lower Beni, 1 ♂, 1 ♀;

Province of Sara, 1 ♀.

BRAZIL:

Monte Cristo, 1 [♀];

Rio Teodoro, 1 ♂;

Teffé, 1 ♂, 1 ♀;

Rio Madeira, Rosarinho, 4 ♂, 4 ♀;

Lago Sampaio, 5 ♂, 7 ♀;

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<sup>1</sup> Specimens in Academy of Natural Sciences of Philadelphia.



Santo Antonio de Guajar , 1 ♂, 1 ♀;  
Borba, 5 ♂, 1 ♀;  
Igarap  Auar , 1 ♂, 4 ♀;  
Villa Bella Imperatr , 3 ♂, 2 ♀;  
Rio Negro, Igarap  Cacao Pereira, 5 ♂, 4 ♀.

*T. m. melanurus*.—

BRAZIL:

Rio Tapaj , Caxiricatuba, 2 ♂;  
Tauary, 2 ♂, 1 ♀;  
Limo , 1 ♂;  
Igarap  Brabo, 2 ♂;  
Piquiatuba, 1 ♂, 1 ♀;  
Rio Majary, Recreio, 1 ♂;  
Rio Xing , Porto de Moz, 1 ♂;  
Rio Tocantins, Mocajuba, 1 ♀;  
Par , Prata, 1 ♂;  
Maguary, 1 ♀;  
Faro, 4 ♂, 1 ♀;  
Rio Negro, Tat , 1 ♂, 1 ♀;  
San Gabriel, 2 ♀;  
Mt. Curycuryari, 1 ♂;  
Rio Uaup s, Tahuapunto, 1 ♂;  
Iauarete, 1 ♀.

COLOMBIA:

Opposite Tahuapunto, 1 ♀.

VENEZUELA:

R o Huaynia, junction of the Cassiquiare, 2 ♀;  
mouth of the Ocamo, 1 ♂;  
Mt. Duida, Esmeralda, 1 ♂;  
R o Pescada, 1 ♂;  
Valle de los Monos, 1 ♀;  
Playa del R o Base, 1 ♀;  
Campamento del Medio, 2 ♀;  
Savana Grande, 1 ♂, 2 ♀.

BRITISH GUIANA:

(Tumatumari, Kamakusa, Demerara River, and Potaro Landing), 9 ♂, 6 ♀.

SURINAM:

Paramaribo, 1 ♂.

*T. m. mesurus*.—

PER :

Palambla, 2 ♂;  
Paletillas, 3 ♂, 1 ♀.

ECUADOR:

(Alamor, Esmeraldas, Chone, Chongocito, Chongon Hills, Celica, Santa Rosa, Pullango, Cebollal, Daule, Las Pi as, Vinces, and "Ecuador"), 16 ♂ (including type of "*pacificus*"), 7 ♀.

*T. comptus*.—

COLOMBIA:

Bah a de M laga, 1 ♂ (type), 1 ♀;

La Frijolera, 1 ♂, 1 ♀;  
 Barbacoas, 1 ♀;  
 Bagado, Chocó, 1 "♂" [= ♀];  
 La Selva, 1 ♂<sup>1</sup>;  
 Guayacana, 2 ♂<sup>1</sup>;  
 [Western Andes], Río Baudó side, 1 ♀<sup>1</sup>.

**Pharomachrus mocinno antisianus** (D'Orbigny)

*Trogon antisianus* D'ORBIGNY, 1837, Mag. Zool., vol. 7, cl. 2, pl. 85 and text—Yungas, Bolivia.

*Trogon antisienis* D'ORBIGNY, 1847, Voyage dans l'Amérique Méridionale, Oiseaux, vol. 4, p. 381—Yungas, Bolivia. (*Trogon antisianus* on pl. 66, fig. 1, 1840.)

*Trogon pulchellus* GOULD, 1838, A monograph of the Trogonidae, ed. 1, text to pl. 22.

*Trogon Peruvianus* GOULD, 1838, *loc. cit.*, in synonymy of *T. pulchellus*.

Chaupe, 1 ♂.

I have no adult Bolivian males for comparison but follow recent authors in referring Peruvian birds to this form. I can find no distinctions in a long series from Ecuador, Colombia, and western Venezuela.

Peters (1945, "Check-list of birds of the world," vol. 5, p. 148) has emended the specific name to "*mocino*" without comment but presumably because De la Llave, the original author of the species, stated that he was naming the bird for Señor Mocino who had given him considerable information concerning it. It is questionable, however, whether the Spanish letter "ñ" is any more correctly transliterated to "n" than to "nn" since it actually is neither. I prefer to revert to De la Llave's original spelling.

I consider *antisianus* as only a well-marked geographical form of the Central American *mocinno*. Peruvian records are from Balsapuerto, Nuevo Loreto, Piquitambo, Garita del Sol, Chanchamayo [region], Idma, and Huaynapata.

**Pharomachrus pavoninus pavoninus** (Spix)

*Trogon pavoninus* SPIX, 1824, Avium species novae, . . . Brasiliam, vol. 1, p. 47 [bis], pl. 35—Tabatinga and Marabitanas, Brazil; ♂♂; Munich Mus.

The typical form ranges in Perú from the region of the upper Ucayali to the mouth of the Curaray and westward to the Amazonian lowlands west of the Huallaga. Presumably it occurs in some places in the Tropical Zone of eastern Ecuador since I have

<sup>1</sup> Specimens in Academy of Natural Sciences of Philadelphia.

a single example from southeastern Colombia (Florencia), and it ranges eastward to the region of Mt. Duida, Venezuela, the Rio Negro and the Rio Branco, in Brazil north of the Amazon, and at least to Teffé south of it.

I have serious doubts about the validity of *P. p. viridiceps* (Griscom and Greenway, 1937, Bull. Mus. Comp. Zoöl., vol. 81, p. 426—lower Amazon, Brazil). The characters of green instead of golden or bronzy golden cap and somewhat shorter upper tail-coverts (not surpassing the tail) are shown by several of the Peruvian and north-Brazilian and Venezuelan birds, being no more than individual variations. The reputed darker green hue of the females and their browner ventral coloration are also suggested in the individual differences of the females of *pavoninus* at hand. The authors had only two males and three females of their *viridiceps*. A larger series will be necessary to determine the status of this form.

A discussion of the characteristics of the other forms of the species is given below in the account of *auriceps*.

Records of *pavoninus* in Perú are from Santa Cruz, "Upper Ucayali," and Chanchamayo.

### **Pharomachrus pavoninus auriceps (Gould)**

*Trogon (Calurus) auriceps* GOULD, 1842, Ann. Mag. Nat. Hist., vol. 9, p. 238—the Cordillerian Andes [= "Quito," Ecuador]; ♂♂, ♀♀, imm.; British Mus.

*Pharomachrus xanthogaster* TURATI AND SALVADORI, 1875, Proc. Zool. Soc. London, "1874," p. 652—Colombia, "Bogotá."

*P. [= Tanypeplus] heliactin* CABANIS AND HEINE, 1863, Museum Heineanum, vol. 4, no. 1, p. 207—Nanegal and Pallatanga, Ecuador; ♂, ♀; Halberstadt Mus.

In the Subtropical Zone of the Andes, from Colombia to Bolivia, the trogons of this group are recognizably distinct from the Tropical Zone *pavoninus*. I have seen no evidence of intergradation, but sufficient material is not available from the juncture of the ranges to demonstrate the presence or lack of such transition, and the general similarity of *auriceps* and *pavoninus* indicates a close relationship. Consequently I am inclined for the present to treat these two forms as zonal conspecies.

The differences have been pointed out in varying degree by earlier authors, but may be noted here. Adult males of *auriceps* are larger than those of *pavoninus* (see fig. 1), the feathers of the whole head and throat are noticeably longer, the gular area is extended farther posteriad, and the bill is yellow but

never red. In the males of *pavoninus* there is usually a pronounced red area on the bill, varying in extent, sometimes occupying all but the tip of the bill, sometimes restricted to the basal portion of the maxilla and mandible or the maxilla alone, and sometimes lacking. When there is no obvious red, the yellow color of the bill is duller than that of *auriceps*. The longest upper tail-coverts more frequently exceed the tail than in *pavoninus*.

Adult females of *auriceps* share the larger comparative dimensions of the males and their longer head feathering and more extensive gular area. The green area of the breast in *auriceps* is projected farther posteriad than in most *pavoninus* and often meets the red of the belly without the interposition of any decidedly brown intermediate patch, usually very evident in *pavoninus* (as it is in *P. mocinno antisianus* although there it is a grayer tone of brown than in *pavoninus*). The tail is markedly different. In *auriceps*, the outer rectrices are usually as uniform blackish as in the males of that form, although there may be a pale patch at the tips of one or more outer pairs. In *pavoninus* females, however, there is a broad white or whitish tip on the three outer pairs, sometimes a second pale spot a little basad on the inner web, and a series of pale quadrate spots along the outer web for some distance basad, sometimes continued still farther as a marginal line. The bill in both forms is brown and not certainly distinctive, but it averages a little lighter in *auriceps* and sometimes has a suggestion of reddish tone in *pavoninus*.

Young birds of both sexes of the two forms are best distinguished by the extent of the pale markings on the tips of the outer rectrices which, for the most part, differ as in the adult females. Young males of *auriceps* may have a more sharply defined touch of whitish in this region than the adult females, but it is much less developed than in *pavoninus*.

I find myself quite unable to differentiate "*heliactin*" from western Ecuador. Chapman (1926, Bull. Amer. Mus. Nat. Hist., vol. 55, p. 328) has recounted the confusion exhibited by the measurements of the specimens he examined from various parts of the range. Additional material now before me does not accord in every particular with his findings, but it does not resolve the difficulty in recognizing "*heliactin*." Only three west-Ecuadorian males have the wing shorter than central Peruvian birds and only four of 10 examples are shorter winged than east-Ecuadorian or any Colombian skins. The tail agrees in length with that of east-

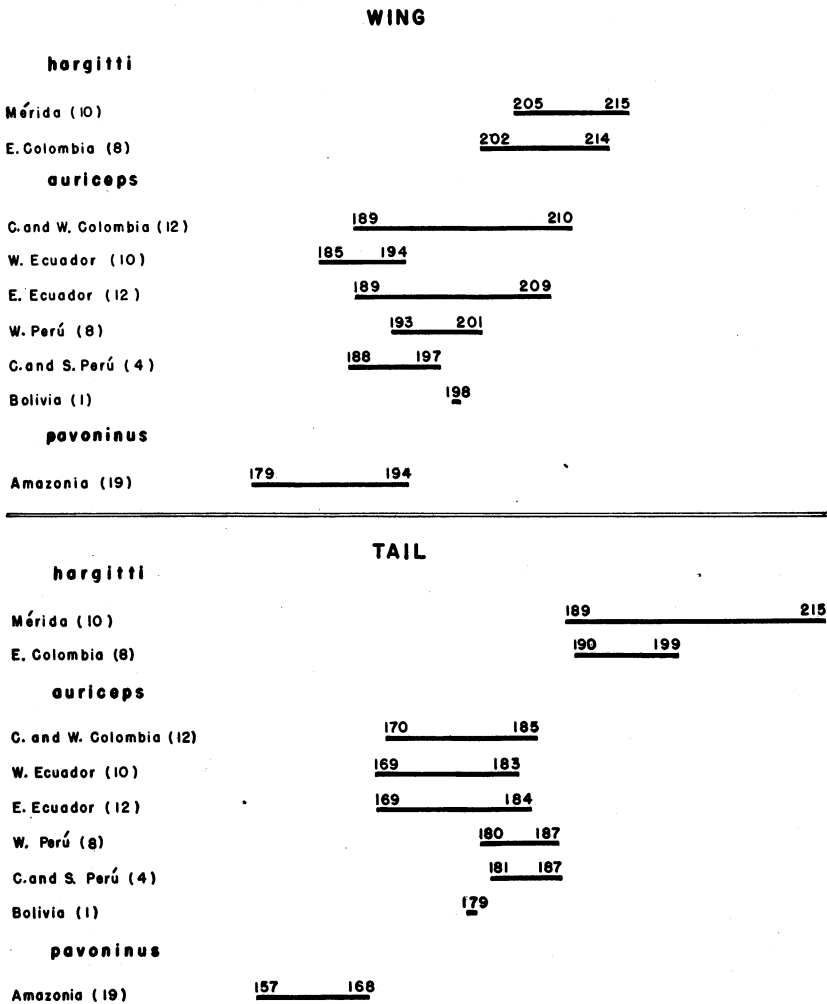


FIG. 1. Measurements of the wing and tail in males of *Pharomachrus pavoninus*.

Ecuadorian and west-Colombian examples, and, although the Peruvian birds have longer tails on the average, 19 of 47 males from central and western Colombia to Bolivia come within the zone of overlap.

On the other hand, the birds from the Mérida region of Venezuela are distinctly longer tailed than the remainder of the series, excluding "Bogotá skins" of which more will be said below. The wing averages longer, also, but there is some overlap, which is not the case with the tail. Thirteen Mérida males have the tail 189 to 211 mm. in length; the remainder (except for Bogotá), 169 to 187 mm. The type of *hargitti* [*Trogon (Calurus) Hargitti* Oustalet, 1891, *Le Naturaliste*, vol. 13, p. 261—interior of Venezuela ("sans doute"); I suggest Mérida as restricted type locality; (♂), Paris Mus.] is said to have the tail 215 mm., and was presumed to have come from the interior of Venezuela, both of which factors point to the availability of the name for the Mérida population.

A small series of males from "Bogotá," Colombia, indicates the probable assignment of east-Colombian birds to *hargitti*. One of them has the tail only 178 mm. in length, and there is no reason to doubt that this particular specimen came from west of the Eastern Andes. The other six specimens have the tail 192 to 198, in agreement with the Venezuelan specimens. A single male from El Roble, definitely East-Andean, has the tail 190 mm., which is outside the limits of Central and West-Andean examples but within those of the Mérida males. The evidence seems adequate to include the Eastern Andes of Colombia in the range of *hargitti*.

It is doubtful that the name *xanthogaster*, though earlier than *hargitti*, is available for this long-tailed form. The type (obviously a male) is said to have the tail only 185 mm. Both *hargitti* and *xanthogaster* were described from yellow-bellied examples that were rather certainly no more than mutants of the normal local birds. Two females at hand from "Bogotá," both in the "*xanthogaster*" plumage, are decisive as to subspecies. Both are shorter tailed than any Mérida female. One has the tail but 187 mm. long, although the outer feathers of this appendage are in molt. The other has the tail 190 mm. in length which is matched or exceeded by Central and West-Andean birds, while adult Mérida females at hand have the tail 193 to 208. These two females, therefore, appear to be best referable to *auriceps*. Two other "Bogotá" females at hand agree with the Mérida birds, having tails of 201 and 202, respectively, and are assignable to *hargitti*.

Peruvian records of *auriceps* are from Tambillo, Cutervo, Paucal, Tabaconas, Nuevo Loreto, Cumpang, Tamiapampa, Garita del Sol, and Idma.

## SPECIMENS EXAMINED

*P. p. pavoninus*.—

## PERÚ:

Chuchurrás, 1 ♂;  
 Chamicuros, 1 "♀" [= ♂ imm.];  
 mouth of Urubamba, 1 ♂;  
 Santa Rosa, 1 ♂;  
 Lagarto, 3 ♂;  
 Sarayacu, 2 ♂;  
 Orosa, 3 ♂;  
 mouth of Río Curaray, 3 ♂, 1 ♀.

## BRAZIL:

Teffé, 1 ♂;  
 Rosarinho, 1 ♂;  
 Rio Negro, Tatú, 1 ♂, 1 ♀;  
 Rio Uaupés, Tahuapunto, 1 ♂.

## VENEZUELA:

Mt. Duida, Pie del Cerro, 1 ♂;  
 Caño Seco, 1 ♀;  
 Agüita, 1 ♂.

## COLOMBIA:

Florencia, 1 ♂.

*P. p. auriceps*.—

## BOLIVIA:

Incachaca, 1 ♂.

## PERÚ:

San Miguel, Urubamba, 1 ♂;  
 Chilpes, 1 ♀;  
 Utcuyacu, 1 ♂;  
 Junín, 1 [♂];  
 Chaupe, 2 ♂, 1 ♀;  
 Palambla, 4 ♂;  
 Taulis, 1 ♂, 2 ♀;  
 Seques, 1 ♂;  
 Chachapoyas, 1 ♂;  
 "Perú," 1 ♂.

## ECUADOR:

"Río Tigre" [= Quito skin], 2 ♂;  
 Ambato, 3 ♂, 2 ♀;  
 San José de Sumaco, 1 ♂;  
 Baeza, 2 ♂, 2 ♀;  
 below Baeza, 3 ♂, 3 ♀;  
 above Baeza, 2 ♂;  
 El Chiral, 2 ♂;  
 Punta Santa Ana, 1 ♂, 1 ♀;  
 Guallea, 1 ♂;  
 Zaruma, 4 ♂;  
 San Nicolás, 1 ♂;  
 Intag, 1 ♂, 1 ♀;

Milligalli, 2 ♂;  
"Ecuador," 1 ♀.

COLOMBIA:

Cerro Munchique, 1 ♀;  
Miraflores, 2 ♂, 2 ♀;  
La Florida, 3 ♂, 1 ♀;  
San Antonio, 5 ♂, 1 ♀;  
Almaguer, 1 ♂;  
Salento, 1 ♂;  
Subia, 1 ♀;  
"Bogotá," 1 ♂, 2 ♀.

*P. p. hargitti*.—

COLOMBIA:

El Roble, 1 ♂;  
"Bogotá," 5 ♂, 2 ♀;  
"Colombia," 1 ♂, 1 ♀.

VENEZUELA:

Mérida, 5 ♂, 3 ♀;  
El Valle, 4 ♂, 4 ♀;  
Culata, 3 ♂, 6 ♀;  
Capas, 1 ♂;  
Escorial, 1 ♂, 2 ♀;  
Montañas Sierra, 1 ♀;  
Montanas Conejos, 1 ♂.