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## Systematic Notes on the Bird Family Cracidae. No. 10<sup>1</sup> The Genera *Mitu* and *Pauxi* and the Generic Relationships of the Cracini

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### GENERIC RELATIONSHIPS OF THE CRACINI

The Cracidae were divided by Huxley (1868) in two subfamilies, the Penelopinae and the Cracinae, based on a very clear-cut difference in the proportions of the pelvis. This division was adopted by Sclater and Salvin (1870) who modified it, however, by recognizing an additional subfamily, the Oreophasinae, for *Oreophasis* which Huxley had included in the Penelopinae. This arrangement was not adopted by some of the authors who followed, but it has been revived by some present-day authors. I believe that it certainly represents a natural division of the family, but, because subfamily rank may be too important to accord to the three groups, I recognize three tribes: the Penelopini, the Cracini, and the Oreophasini. These correspond to the subfamilies of Sclater and

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<sup>1</sup> The present paper completes this subseries of systematic notes on the Cracidae. The genus *Oreophasis* was not discussed, but the specimens of *Oreophasis* that I have examined are included here in the list of specimens, to give a complete list of all the material that I have studied. A monographic study of the family is in preparation and is based in part on these systematic notes.

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Salvin, but I have reversed their order by placing the Penelopini ahead of the Cracini because the former is less specialized.

Verheyen (1956) apparently was the first author to divide the family into tribes rather than subfamilies, but he recognized an additional tribe, the Pipilini, which is a subdivision of the Penelopinae of Sclater and Salvin. This subdivision seems unnecessary, and I do not adopt it, but do not deny the fact that the genera that I include in the Penelopini (the same that were included by Sclater and Salvin) can be divided into three groups: one consisting of *Ortalis* and *Penelope*, another of *Pipile*, *Aburria*, and *Chamaepetes* (the Pipilini of Verheyen), and the third of *Penelopina*, which I think is quite distinct, not at all intermediate between *Ortalis* and *Penelope* as Vuilleumier (1965) stressed.

The following discussion is concerned only with the Cracini which consist of four genera: *Nothocrax* Burmeister, 1856, which is aberrant; and *Mitu* Lesson, 1831, *Pauxi* Temminck, 1813, and *Crax* Linnaeus, 1758, which are more closely related. All these genera were merged with *Crax* by Vuilleumier (*loc. cit.*) who stated in his summary: ". . . it is evident that characters such as the casque, relied upon heavily in the past to establish genera, are only of specific value; there is thus no reason to keep *Nothocrax*, *Pauxi*, and *Mitu* separate from *Crax*, where they undoubtedly belong. In *Crax*, color pattern, voice, and tracheal structure are much better clues to the relationships than wattles and/or casque."

Color pattern seems to be a conservative character, but the color pattern of *Nothocrax urumutum* is so different from that of *Mitu*, *Pauxi*, and *Crax* that it needs no elaboration. *Nothocrax urumutum* is chestnut and rufous, mottled above, has no true black in its plumage, and is not glossy anywhere, whereas the plumage is black and white and glossy, generally speaking, in the other three genera. One of the two color phases of female *P. pauxi* is brown and barred, and some females of *C. rubra* have some brown in the plumage, but the pattern is not at all similar to that of *N. urumutum*.

*Nothocrax* is also very much smaller,<sup>1</sup> has a completely different crest, and is nocturnal rather than diurnal. I do not at all agree, therefore, that *Nothocrax* must be merged with *Crax*, and I believe also that Taibel (1965) was certainly incorrect when he stated that *Nothocrax* is intermediate between *Mitu* and *Crax*.

Vuilleumier accorded great generic importance to the similarities in vocalizations which consist of a buzzy or booming note in the male

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<sup>1</sup>The mean wing length of the males measures, in round numbers, 294 mm. in *N. urumutum*, as against 379 in *Mitu*, 395 in *Pauxi*, and 385 in *Crax*.

which is apparently correlated with a convolution in the trachea where this sound is amplified. But the vocalizations and tracheal structure vary in *Crax*. Yarrell (1830) has shown that the trachea is not convoluted in *C. globulosa* (which he called *C. yarrellii*),<sup>1</sup> and the vocalizations of *C. daubentoni* consist of a long-drawn-out whistle, not of a booming call. It is probable that the trachea of *C. daubentoni* is not convoluted, although the information is not clear. It is known, moreover, that the vocalizations and tracheal structure vary in *Penelope* from species to species, the trachea being convoluted in some species, but not in others. I believe, therefore, that the vocalizations (associated with tracheal structure) are primarily important for species recognition, a species character, but not one of significance at the generic level.

*Mitu*, *Pauxi*, and *Crax* are related and are similar in size. All the males, and some females, share also the same color pattern. The pattern is, however, different in other females, especially in *Crax*, and the three genera have constant, well-marked differences in the structure of the bill and crest. The degree of sexual dimorphism varies. *Mitu* is not sexually dimorphic, other than slightly so in size, but *Pauxi* is partly dimorphic, and *Crax* is completely so, although the degree of dimorphism varies greatly in this genus.

The base of the upper bill is flattened and depressed, not arched, and is strongly compressed laterally in *Crax* (fig. 1), and, together with the base of the mandible, is covered by fleshy membranes which form a knob on the culmen, or on the wattles on the mandible, or on both, in six of its seven species. These membranes and fleshy appendages are not found in *Mitu* and *Pauxi*, as the rhamphotheca covers the whole bill, but the rhamphotheca ends at the base of the helmet in *Pauxi* which is covered by skin which shrinks after death, not by a layer of horn. The helmet of *Pauxi*, and the swelling at the base of the premaxillary bone in *M. mitu*, are certainly analogous, but this character and its integument have been modified to a conspicuous degree in *Pauxi*. Figure 2 shows also some modifications in the palate, which have not been investigated and the significance of which is unknown to me. The base of the premaxillary bone is not swollen in *M. tomentosa*, and is only very slightly so in *M. salvini*.

The crest is completely different in all the four genera. It is composed of long feathers in *Crax*, which grow in rows and are strongly stiffened, except at the tip which is very gracefully curled, the crest remaining

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<sup>1</sup> In an adult male of *C. globulosa*, dissected by Amadon during the course of this study, the trachea was perfectly straight, not convoluted.

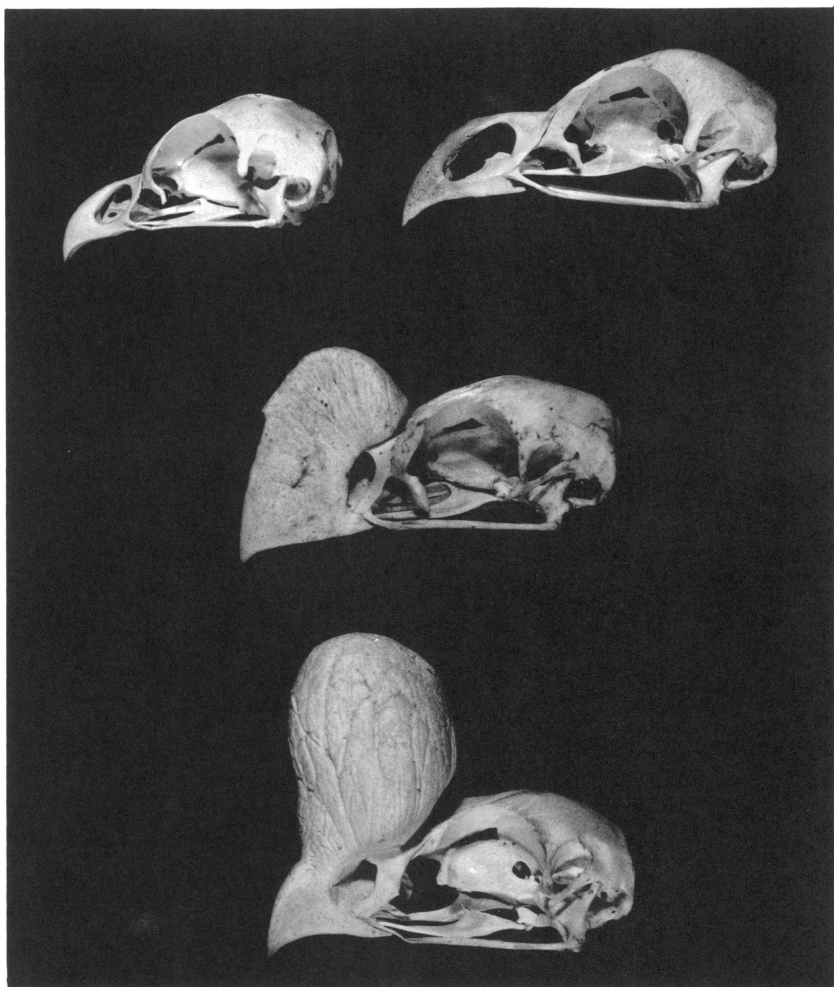


FIG. 1. Skulls of some species of the Cracidae. *Upper left: Nothocrax urumutum.* *Upper right: Crax globulosa.* *Center: Mitu mitu.* *Bottom: Pauxi pauxi.*

semi-erect as a rule. In *Mitu*, the crest is composed of very flat feathers (fig. 4) which broaden out distally, but do not curl, and remain depressed although they are erectile. This crest is well developed in only two species (fig. 4). The crest of *Pauxi unicornis* is very strange (fig. 5) and is composed of very short, erect, and stiff feathers, very metallic at the tip and very tightly curled forward, but *P. pauxi* has no crest. The crest grows much farther back in *P. unicornis*, on the nape and hind neck

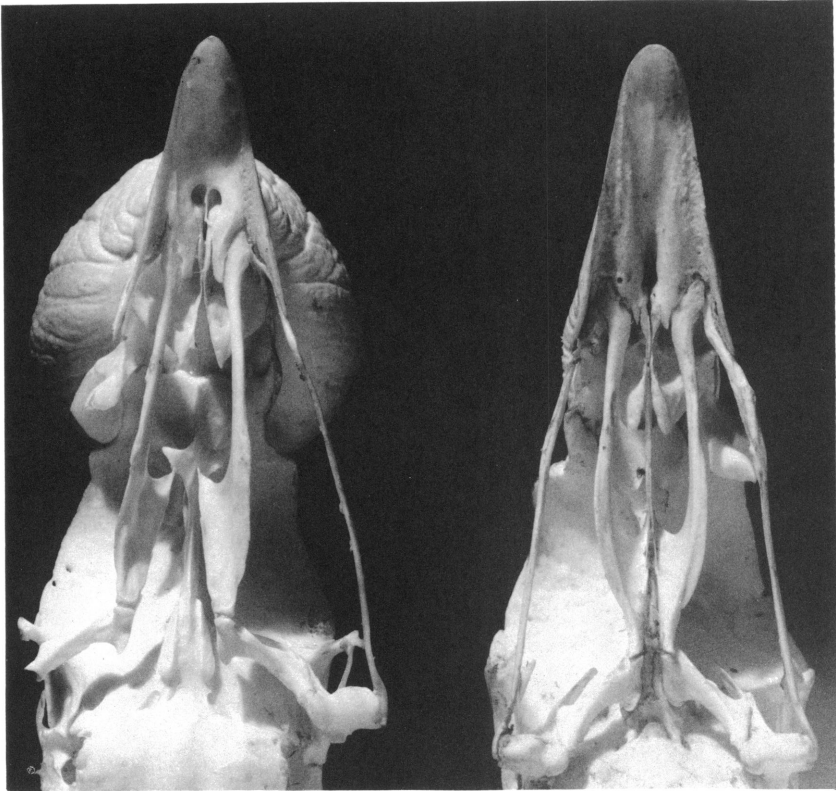


FIG. 2. Palates. Left: *Pauxi pauxi*. Right: *Mitu mitu*.

as well as on the crown, but the feathers grow only on the crown in *Crax*, and not beyond its center in *Mitu*. The crest is glossy in all these three genera, but not in *Nothocrax* in which it is composed of soft and loosely integrated feathers, which are narrow and very long.

The characters that are described and discussed above show that *Nothocrax* is very distinct indeed, and is much less closely related to *Mitu*, *Pauxi*, and *Crax* than these are to one another. The last three share two important characters (general size and the coloration of the males and of some females), but it is evident that the species in each have become modified along three different evolutionary lines. I believe the degree of relationship is clarified best by the recognition of three genera, whereas relationships become completely confused when all the species are placed in a single genus. *Crax* is the most evolved of the three genera, *Pauxi* is intermediate, and *Mitu* is the least evolved.

*MITU*

This genus, which is widely distributed in South America (fig. 3), consists of three closely related species forming a superspecies. These are *M. tomentosa* which ranges from Guyana westward through southern Venezuela to southeastern Colombia, and south to northern Brazil on the Rio Branco and upper and middle Rio Negro; *M. salvini* which ranges from southeastern Colombia to eastern Ecuador and northeastern Peru; and *M. mitu* which ranges, south of the Amazon, from eastern Para to Peru, central Bolivia, and about the fifteenth and sixteenth parallels in the Mato Grosso. The range of *M. mitu* included also northeastern Brazil, whence it was reported as early as 1648 by Marcgrave, but I believe that it is probably extinct now in that region.

Niceforo Maria and Olivares (1965) have reported that Niceforo Maria collected one specimen of *M. mitu* on April 14, 1957, at Puerto Nariño, which is 70 kilometers west of Leticia on the Amazon.<sup>1</sup> This places *M. mitu* north of the Amazon, but Niceforo Maria did not say under what circumstances he shot his bird. If the bird was collected from a flock, the fact would probably establish that the species inhabits this region, but, if it was alone, it may have been a bird that had wandered across the river, or perhaps escaped, as this species is often kept as a pet. The Amazon makes a very pronounced and sharp bend to the north opposite Puerto Nariño, and, at this point, its channel is greatly narrowed by several large islands which would facilitate crossing. This record, which is probably abnormal, is not shown on figure 3.

The three species are virtually allopatric, as the only region from which more than one has been reported is on the Rio Guayabero, south of the Cordillera de la Macarena, in Colombia. Olivares (1962) reported that *M. tomentosa* and *M. salvini* were collected there on February 18 and 22, 1959, and the locality concerned seems to be situated at about latitude 2° 12' N., longitude 73° 50' W., judged by the dates and maps by Olivares. I have not seen any specimen of *M. tomentosa* from Colombia, and it is probable that the two species do not ascend into the Cordillera, from which I have seen two specimens of *M. salvini* that were collected along its base, probably between 450 and 600 meters, about 100 kilometers north of the locality where the latter and *M. tomentosa* were taken.

The three species are about similar in general size (table 1), are black and glossy above, and have a similar color pattern, but they are well differentiated by alternate differences in the color of the lower abdomen,

<sup>1</sup> This record was inadvertently cited by de Schauensee (1966, p. 71) as "Mitu, Vaupès," but was later corrected by him to Puerto Nariño.

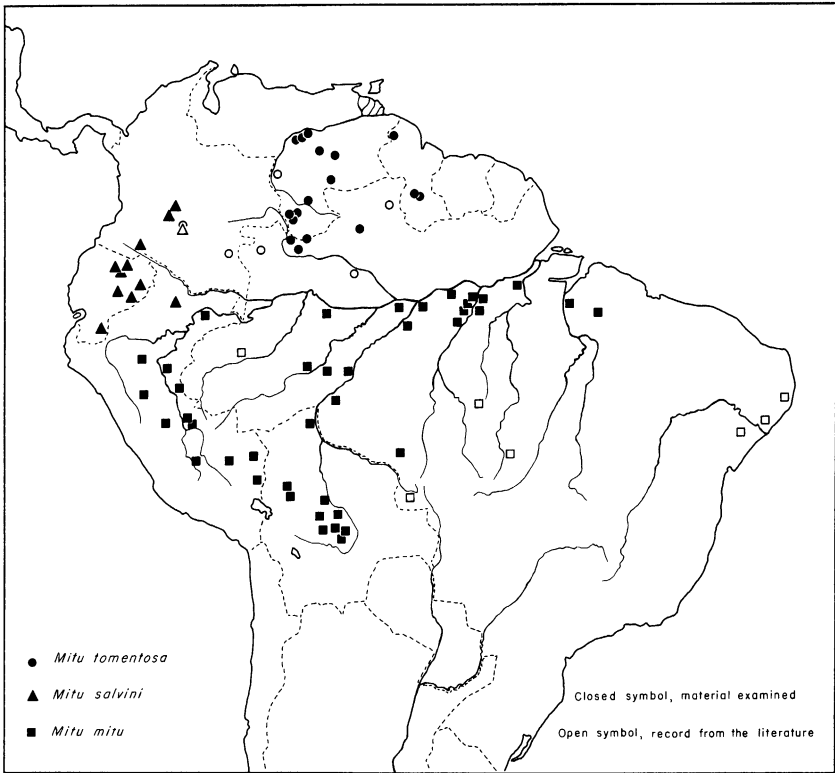


FIG. 3. Distribution of the genus *Mitu*.

under tail coverts, of the long tufts of feathers that grow from the base of the thighs, and of the tip of the tail, and also by differences in the shape of the bill and development of the crest.

In *M. tomentosa*, the lower abdomen, under tail coverts, tufts of feathers, and the tip of the tail are chestnut, as against snowy or creamy white in *M. salvini*; in *M. mitu*, the lower abdomen, under tail coverts, and the tufts are chestnut as in *M. tomentosa*, but the tip of the tail is white as in *M. salvini*.

The differences in the shape of the bill are illustrated in figure 4, which shows also the relative development of the crest. The bill of *M. tomentosa* is massive, strongly compressed laterally, and has a rounded blunt keel, but it is not swollen at the base, and is "normal" in shape. The bill of *M. salvini* is larger and higher than that of *M. tomentosa*, decurved at a different angle, has a sharper keel, is usually provided with



FIG. 4. Shape of the bill and the relative development and structure of the crest in the genus *Mitu*. *Top: Mitu tomentosa*. *Center: Mitu salvini*. *Bottom: Mitu mitu*.



an additional ridge at the top, and is also slightly swollen at the base. The bill of *M. mitu* is considerably larger than the bill of *M. salvini*, much more swollen at the base, especially above the nostril, the swollen bulbous base rising to form a sort of "casque," but the anterior part of the bill is very strongly compressed laterally and the keel is very sharp, hence the vernacular name, "Razor-billed Curassow," by which *M. mitu* is called in English.

The crest is very well developed in *M. salvini* and *M. mitu* but not in *M. tomentosa* (fig. 4). It is composed of flat, well-integrated, and glossy feathers, which broaden out distally to end in a well-rounded tip in *M.*

TABLE 1  
MEASUREMENTS OF ADULTS OF THE GENUS *Mitu*

Species	N	Wing	Tail	Tarsus
<i>M. tomentosa</i>				
Males	12	350-380 (367.2)	305-342 (326.1)	99-112 (104.1)
Females	10	338-363 (349.3)	290-320 (309.0)	93-105 (98.8)
<i>M. salvini</i>				
Males	15	352-398 (372.0)	285-335 (310.7)	98-114 (105.0)
Females	9	337-375 (354.3)	280-312 (296.7)	93-113 (99.7)
<i>M. mitu</i>				
Males	41	376-435 (398.7)	315-355 (333.7)	102-122 (110.5)
Females	30	348-385 (368.3)	290-340 (313.1)	94-112 (103.0)

*salvini* and *M. mitu*. The longest feathers average about 45 mm. in length, but are broader in *M. mitu*, averaging about 14 or 15 mm. in width, as against about 10 or 11 in *M. salvini*. A similar crest is present also in *M. tomentosa*, but it is much more poorly developed at best, and is rudimentary or scarcely present in some individuals. The longest feathers reach only about 20 mm. in length, and all of them are "shaggy," not well integrated, and are poorly glossed.

*Mitu mitu* seems to have been reported only three times from north-eastern Brazil in more than 300 years. It was first mentioned by Marcgrave, who described (1648, p. 194) a bird that he called "Mitu vel Mutu," and on which Linnaeus based *Crax Mitu* in 1766. Marcgrave's material was probably dispersed and lost long before the time of Linnaeus. The second account was by Burmeister (1856, p. 349), who defined the range as "forests of central Brazil, and, especially, north of Bahia, by Pernambuco, Para, and in the forests on the lower Amazon" (translation), but Burmeister did not mention any specimen, and the inclusion of north-eastern Brazil in the range may have been only conjecture derived from

the authors who followed Marcgrave. The third and last account is by Oliveira Pinto (1952), who reported that one specimen was collected on October 5, 1951, at São Miguel dos Campos, eastern Alagoas, which is, therefore, the only specimen known from northeastern Brazil.

This specimen, a female, was described and discussed in great detail by Oliveira Pinto (*loc. cit.*) who illustrated his account with photographs. He enumerated a number of differences that distinguish this specimen from the population of the Amazon Basin and said that these "prove" that the two forms are not conspecific. Thus, we would have two species where only one had been admitted, *M. mitu* Linnaeus, 1766, which is based on Marcgrave, in northeastern Brazil; and *M. tuberosa* Spix, 1825, type locality, Rio Solimões, in the rest of the range. However, Oliveira Pinto concluded later (1964) that he had been rash and that the two forms are only subspecies.

I have not seen the specimen from Alagoas, but its detailed description, illustrated with photographs, leaves no doubt that this bird was immature and that it does not differ in any respect from immature birds from the Amazon Basin.

The characters to which Oliveira Pinto seems to have attached the greatest significance are the "casque," which is not present in the specimen from Alagoas, and the white tips of the tail, which are poorly developed in this specimen. He may have emphasized these characters because they were not mentioned by Marcgrave. These omissions probably led Oliveira Pinto to believe that the population of northeastern Brazil had no "casque" and little or no white at the tip of the tail. He derived some support also from the account of Burmeister, who also did not mention a "casque," and said that the feathers of the crest were not well developed, as is the case with the female from Alagoas. However, the lack of the "casque" and the poor development of the tips of the tail and of the crest are all signs of immaturity. The other characters that Oliveira Pinto described, such as the presence of "fuscous" margins on most of the body feathers and remiges, a rufous tinge on the throat, and small measurements, indicate also very clearly that the bird from Alagoas was not adult when it was shot, and its characters are therefore not diagnostic.

It is quite possible that the population of northeastern Brazil was subspecifically distinct from that of the Amazon Basin, especially if it was isolated geographically (as may have been the case), but unfortunately this has not been established by the specimen from Alagoas, which appears to have been one of its last survivors.

I refer to this population as extinct, because the account of Oliveira

Pinto leaves no doubt that it was on the extreme edge of extinction in 1951, doomed by the rapid destruction of the last remnants of its habitat, on which Oliveira Pinto commented sadly.

#### PAUXI

This genus is composed of two species, *P. pauxi* and *P. unicornis*, which are extremely isolated geographically. *Pauxi pauxi* consists of two slightly differentiated populations: *gilliardi* in the Sierra de Perija in Venezuela and Colombia; and nominate *pauxi* which is distributed from the central and coastal cordilleras of Miranda, Venezuela, westward along the lower slopes of the Andes to extreme southeastern Norte de Santander and neighboring extreme northern Boyaca in Colombia, but the range probably extends a little farther south to the upper Rio Cravo Norte in western Arauca, or to about latitude 7° 30' N. This last record, which is based on a report by local hunters, has not been verified but is probably valid. *Gilliardi* is known from the Montes de Oca at the northern end of the Sierra de Perija, south to the Rio Tucuco, or about latitude 10° 10' N., but very probably occurs farther south, and its range may be found to be continuous with that of nominate *pauxi*. *Pauxi unicornis* was discovered in 1937 and is known so far from only two specimens, which were taken above Bolivar, near El Palmar, in the Yungas of Cochabamba in Bolivia, a distance of about 2900 kilometers in a straight line from the known range of *P. pauxi*.

The two species are very distinct and differ in coloration and pattern, in the presence or lack of a crest, and in the shape of the helmet. *Pauxi pauxi* is much more glossy than *P. unicornis*, and is dark green with a distinct Prussian-blue tinge. The gloss is more highly developed on the back and wings and is interrupted by the dull black crescentic edges of the feathers, which are about 5 mm. in width and create a sharp scalloped or squamated pattern. *Pauxi unicornis* is much duller, dark olive green, and appears to be virtually uniform, because the dull edges of the feathers are very narrow and indistinct and contrast only faintly with the glossy part of the feathers. *Pauxi unicornis*, on the other hand, is highly glossed on the crown and nape, as against velvety black in *P. pauxi* (fig. 5), and the feathers are erect, stiffened, and very tightly curled forward, forming a very strange crest. The feathers have a slight sheen in *P. pauxi* when seen under shifting light, and are erect also, but they are short and soft and do not curl forward to form a crest.

The helmet is cylindrical in *P. unicornis*, but is broader at the base, tapers upward, and is shaped like a horn, whereas it is swollen at the top in *P. pauxi* and is shaped like an inverted fig. The differences were

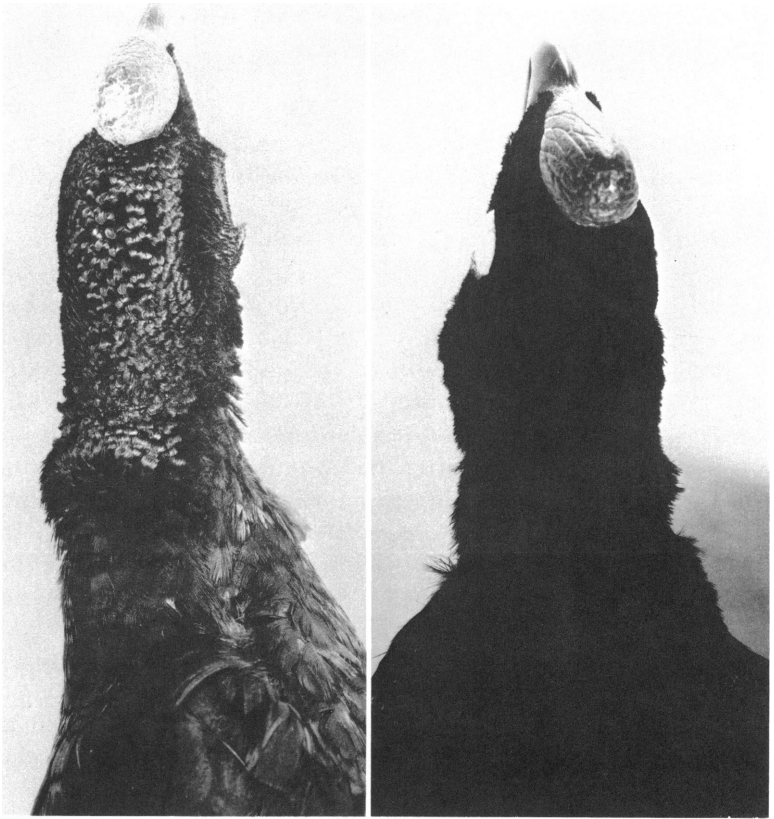


FIG. 5. Development and structure of the crest in the genus *Pauxi*. Left: *Pauxi unicornis*. Right: *Pauxi pauxi* (no crest).

discussed and illustrated by Wetmore and Phelps (1943) when they described *gilliardi*, the helmet of the latter being smaller, less swollen than that of nominate *pauxi*, and more or less intermediate in shape between the helmet of nominate *pauxi* and that of *unicornis*. The best indication of its size seems to be the circumference, which was measured by Wetmore and Phelps as 93–117 mm. in 11 specimens of nominate *pauxi*, 63–85 in 13 of *gilliardi*, and 66, 75 in the two of *P. unicornis*. Wetmore and Phelps stated that the bill is smaller in *gilliardi*, the culmen measuring 29–36, as against 32–39 in nominate *pauxi*, but these measurements combine those of the two sexes to an unknown degree, overlap, and their mean is not given. A difference in size in the bill or in other

TABLE 2  
 MEASUREMENTS OF ADULTS OF THE GENUS *Pauxi*  
 (The number in parentheses in the range denotes the size of the sample.  
*Pauxi unicornis* is known from only two specimens.)

Species and Subspecies	Wing	Tail	Tarsus	Culmen
<i>P. p. pauxi</i> (♂)				
Mean	394.37	336.71	102.62	32.75
Range	382-427 (8)	320-362 (7)	97-112 (8)	31-35 (8)
<i>P. p. pauxi</i> (♀)				
Mean	373.67	319.0	101.66	30.34
Range	363-385 (6)	304-335 (6)	90-107 (6)	25-34 (6)
<i>P. p. gilliardi</i> (♂)				
Mean	394.75	330.0	103.25	33.50
Range	366-410 (4)	296-355 (3)	96-112 (4)	31-37 (4)
<i>P. p. gilliardi</i> (♀)				
Mean	372.40	316.20	101.66	31.10
Range	345-390 (5)	305-322 (4)	89-111 (5)	28-33 (5)
<i>P. p. unicornis</i> (♂)	402	335	108	33
<i>P. unicornis</i> (♀)	381	310	100	33

measurements is not confirmed by those that I have taken which are virtually identical (table 2). It is possible that *P. unicornis* is somewhat larger than *P. pauxi*, but this is not certain as only two specimens exist. The circumference of the helmet is not given in table 2, because I failed to take this measurement when I examined some specimens that are no longer available to me.

Wetmore and Phelps (*loc. cit.*) believed that the three forms were conspecific, because they considered that *gilliardi* was intermediate between nominate *pauxi* and *P. unicornis*. *Gilliardi* is not, however, intermediate, as it is perfectly identical to nominate *pauxi* in every respect other than the size and shape of the helmet. The differences in coloration and pattern, and the development of a crest, seem to be more important than the size and shape of the helmet, on which attention has been chiefly concentrated, and show, I believe, that *P. pauxi* and *P. unicornis* are not conspecific. The greatly disjunct distribution also argues that they are two species, especially when we take into consideration the pattern of speciation in the Cracidae. Many species that come into contact, or approach closely, are far less differentiated morphologically than *P. pauxi* and *P. unicornis* are from each other.

It is difficult to account for the enormous gap in distribution, other than by extinction, because it seems that *Pauxi* has really disappeared

between Colombia and Bolivia. The expeditions that have been active along the lower flanks or base of the Andes from Arauca to Madre de Dios in southern Peru have failed to find it, and it is unknown also to the Indians or settlers. This latter fact is significant, because *Pauxi* is a subject of curiosity everywhere because of the "stone" that it bears on its head. Niceforo Maria (1955), who has contributed valuable information on the distribution in Colombia, says that the "stone" is kept as a trophy, and the helmets are prized by the Indians for adornment and probably also for magic, as they are worn by them on the hunt strung in necklaces. In fact, the existence of *Pauxi* in the Sierra de Perija was discovered in this fashion, when such necklaces were bought from the Indians before the bird had been discovered and collected.

*Pauxi* has been reported also from other regions, such as Santa Marta, eastern Peru, the Rio Negro, southern Venezuela, and French Guiana, but such reports are all hearsay and erroneous, and testify only to the wide fame of this strange bird.

The female of *P. pauxi* has two completely different color phases: a "black and white" phase<sup>1</sup> and a brown phase. The latter has never been reported in the males and is certainly a female plumage only, although some authors are equivocal on this point. The brown phase was described as the female plumage by Sclater and Salvin (1870) and Ogilvie-Grant (1893) and was well illustrated by Sclater (1875a, pl. 53, fig. 2). I believe it represents the original coloration of the female, which has been replaced now chiefly by the black and white plumage which is identical to that of the male. This appears to be a case of secondary modification. The loss of the white tips of the tail in the male of *Crax rubra* probably represents another instance of secondary modification in the Cracidae.

The females of the brown phase are black on the head, neck, and outer tail feathers, but the rest of the plumage, including the remiges and central tail feathers, is reddish brown above and on the breast, grading into dark ochraceous and pale rufous below the breast, and is vermiculated, mottled, and barred with blackish brown or dark brown. These dark markings form rather regular concentric bars on the breast and mantle, and the plumage is interrupted further by the broad buffy white tips of the upper wing coverts, and of some of the scapulars, which form conspicuous but irregular bars.

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<sup>1</sup> *Pauxi* is usually described as black and white in the literature, and I use this term here for convenience, but, as stated above, it is really dark bottle green, not pure black, except on the head and neck.

The brown phase has become rare, but it seems to have been common about 100 years ago in northern Venezuela when the country was visited by Dr. N. Funck, the director of the zoological garden of Cologne. The latter wrote to Sclater (1875b) to comment on the account and illustration that Sclater had published (1875a), saying that *Pauxi* "is abundant in the forests from San Estevan (one league from Puerto Cabello) up to the Cumbre of Valencia, *i.e.* from 1000 to 3000 feet in altitude, and likewise in the mountains of Noigua [Nirgua] and Montalban in the same province . . . [and that he] had killed upwards of 50 individuals; amongst these were many females, [that were in brown plumage] shot at the side of the males," on his trip from Puerto Cabello to Valencia and Trujillo. Sclater, who had said that the "*normal*" (italics in original) coloration of the female was black and white, remarked that, after receiving Funck's letter, he was "now inclined to believe" that the black and white plumage is "abnormal." The date of Funck's visit to Venezuela was not mentioned by Sclater, but it must have been before 1875.

I believe with Amadon, with whom I have discussed these plumages, that the original ("normal" of Sclater) coloration of the female was brown, because this plumage seems too complex to have arisen as a single mutation. The "mutant" is probably the black and white plumage which has now largely replaced the brown plumage. Only two brown birds were collected in Venezuela between 1941 and 1957, out of a total of 11 females, whereas the two phases appear to have been about equally abundant in the days of Funck. These two brown females were taken in the Sierra de Perija, in 1953 and 1957, not in the region visited by Funck where the brown females have apparently disappeared.

The reason for this apparent rapid decrease is obscure, but it was probably hastened by the destruction of the habitat and by excessive hunting. This is suggested by the fact that brown females existed in the 1950's in the Sierra de Perija, and also in southeastern Norte de Santander, according to Niceforo Maria (1955), which are very sparsely settled regions, but not in more densely inhabited northern Venezuela where the species has been virtually exterminated, according to Schäfer (1953). A great decrease in the size of the population sometimes favors the spread of a mutation. A total of six females were collected in the Sierra de Perija from 1941, when the species was discovered in this region, to 1957, and of these four are black and white and two are brown. This ratio corresponds, perhaps, to the proportions of the two phases shot by Funck.

Phelps and Phelps (1962) have reported that they traced four brown birds out of a total of 64 of both sexes in various museums, but if we

eliminate the males and the two specimens of *P. unicolor* that were included by Phelps and Phelps, the females in their series numbered about 25.<sup>1</sup> Two of these four brown females are those from the Sierra de Perija mentioned above that were collected in 1953 and 1957, but the other two are so very ancient that they throw no light on the rate of decrease. One of these, which is in the collection of the American Museum of Natural History, is probably at least 100 years old, and the other was in the collection of the British Museum before 1846 when G. R. Gray illustrated it in his "Genera of Birds." The latter is the same specimen that was illustrated again by Sclater in 1875.

### ACKNOWLEDGMENTS

This study was based on the collection of the American Museum of Natural History, and on the collections of the Academy of Natural Sciences of Philadelphia, the British Museum (Natural History), the Carnegie Museum, the Field Museum of Natural History, and the United States National Museum of the Smithsonian Institution. I express my appreciation to the authorities of these institutions for their help and friendly reception during my visits. Rare selected specimens were also lent to me by the Academy of Natural Sciences of Philadelphia through Mr. Rodolphe M. de Schauensee, and by the United States National Museum through Dr. George E. Watson, to both of whom I am indebted for this cooperation. I am indebted also to Dr. Dean Amadon and Mr. Jean Delacour for suggestions made when discussing with me the birds studied in this paper, and to Mr. William H. Phelps, Jr., Mr. Rodolphe M. de Schauensee, Mr. Paul A. Schwartz, and Mr. Richard L. Zusi for information.

### SPECIMENS EXAMINED

#### *Nothocrax urumutum*

VENEZUELA: Land between the confluence of the Guainia and Casiquiare rivers, 1 ♂, 1 ♀; Mt. Duida, 1 unsexed.

COLOMBIA: Vaupés, Caño Curucure, 1 ♂; Caqueta, Morelia, 1 ♀.

ECUADOR: Sarayacu, 1 unsexed adult [♂], 1 unsexed; headwaters of Rio Tigre, Napo-Pastaza, 2 ♂, 1 ♀; Concepcion, 1 ♂; Ouca Yaco, Loreto, 1 ♂; Verde Yaco, 1 ♀; Lagarto Cocha, 1 ♂, 1 ♀; Rio Suno above Avila, 1 ♂; Rio Suno, "abajo," 1 ♂; Cerro Galeras, 1 ♀.

PERU: Apayacu, 1 ♂; Boca del Rio Santiago, 1 ♀.

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<sup>1</sup> I have assumed that half of the 24 unsexed birds reported by Phelps and Phelps are females.



BRAZIL: Serra Curicuriari, Rio Negro, 1 ♂; Lago Andira, 1 ♂; Labrea, Rio Purus, 1 ♀; São Carlos, Mato Grosso, 1 unsexed adult [♂]; Rio Negro, no locality, 1 unsexed adult [♂].

NO LOCALITY: 1 ♀, 1 unsexed.

*Mitu tomentosa*

VENEZUELA: Caicara, 1 ♂, 2 chicks; Quiribina de Caicara, 2 ♂, 1 ♀; areas of El Tigre, Cedeño, and Las Guacas, 2 chicks; Nichare, 1 ♀; Altagracia, Orinoco, 1 ♂, 1 ♀; Buena Vista, Casiquiare, 1 ♀; Solano, left bank of the Casiquiare, 1 ♀; Caño Leon, Sierra Duida, 1 ♂; Sierra Imeri, 1 ♂; Curare, Casiquiare, 1 ♂; Salto de Hua, 1 ♀; upper Caura River, 1 unsexed adult [♀].

GUYANA (FORMER BRITISH GUIANA): Upper Takutu Mountains, 1 unsexed adult [♂], Rupununi River, 1 ♀; Ourumee, 1 ♂; Great Savannas, 1 unsexed adult [♂]; no locality, 1 ♂, 1 ♀.

BRAZIL: Araca, upper Rio Catrimani, 1 ♂; Cachoeira Destacamento, Rio Cauaburi, 1 ♀; Marabitanas, 1 ♂; Rio Negro, no locality, 1 unsexed.

*Mitu salvini*

COLOMBIA: Entrada Camp, Sierra de la Macarena, 1 ♂; Sierra de la Macarena, 1 unsexed; Umbria, Putumayo, 1 ♂.

ECUADOR: Andoas, 1 ♀; Sarayacu, 2 unsexed adults [♂]; Rio Suno above Avila, 1 ♀; Rio Suno, "abajo," 1 ♂, 1 ♀; Montes del Suno, 1 ♂, 1 ♀; headwaters of the Rio Tigre, Napo-Pastaza, 1 ♂, 3 ♀; Rio Tigre, 1 ♂, 1 ♀; Raya Chigta, 1 ♂; Raya Yaco, 1 ♂; Concepcion, 1 ♂.

PERU: Mouth of the Rio Curaray, 4 ♂.

NO LOCALITY: 1 ♂, 1 ♀.

*Mitu mitu*

BRAZIL: Resacca, right bank of the Rio Capim about 100 miles above its mouth, 2 ♀; Baião, Rio Tocantins, 2 ♂, 2 ♀, 1 immature ♂; Recreio, Majahary, near Porto de Moz, Rio Xingu, 3 ♂, 2 ♀; Tauary, Rio Tapajoz, 1 ♂, 1 ♀; Limontuba, Rio Tapajoz, 3 ♂; Boim, Rio Tapajoz, 1 ♂; Pinhel, Rio Tapajoz, 2 ♂, 1 ♀; Caxiricatuba, Rio Tapajoz, 3 ♂; Villa Braga, Rio Tapajoz, 1 ♂; Lago Andira, 6 ♂; Rosarinho, Lago Sampaio, Rio Madeira, 2 ♂, 1 ♀, 1 immature ♀; Igarapé Auara, Rio Madeira, 2 ♂, 1 ♀; Jamarysinho, Rio Madeira, 1 ♂; São Carlos, Rio Madeira, Mato Grosso, 1 unsexed adult [♂]; Lago Janauaca, Rio Solimões, 1 ♂; Labrea, Rio Purus, 2 ♀; Hyutanahã, Rio Purus, 1 ♀; Boca do lago, Tefé, 1 ♀; Morinho Lyra, near Vilhena, Mato Grosso, 1 ♂; Diamantina, "lower Amazon" (not located), 1 unsexed.<sup>1</sup>

PERU: Orosa, Rio Amazonas, 1 ♂, 1 ♀; between Moyobamba and Balsapuerto, 1 unsexed; Sarayacu, Rio Ucayali, 1 ♀; Yarinacocha, Rio Ucayali, 1 ♂; Santa

<sup>1</sup>I have examined also one female that was allegedly collected by the Olallas on September 28, 1929, at Yauanari on the Rio Negro, but this record is not authentic, as *Mitu mitu* does not occur north of the Amazon, Yauanari being at latitude 0° 30' S., longitude 64° 48' W. In two other papers on the Cracidae, I (1965, p. 16; 1967) have also rejected the authenticity of some of the records of the Olallas from Brazil.

Rosa, alto Ucayali, 1 ♂; mouth of the Rio Urubamba, 2 ♂, 2 ♀; Rio Comerciato, 1 ♂, 2 ♀; Chuchurras, 1 ♀, 2 unsexed; Cosnipata, 1 unsexed [♂]; Pizana, upper Huallaga, 1 unsexed; Chanchamayo, 1 immature ♀; Collpa, Rio Tambopata, Madre de Dios, 1 ♂; Condamo, Madre de Dios, 1 ♀; mouth of the Rio Inambari, Madre de Dios, 1 ♂; Huacamayo, Sandia, 1 ♀.

BOLIVIA: Chifñiri, Rio Kaka, 1 ♂; lower Beni River, no locality, 1 immature ♀; San Ernesto, upper Rio Beni, 1 ♂; Todos Santos, Rio Chaparé, Cochabamba, 1 immature ♂; mouth of the Rio Chaparé, 1 ♀; El Palmar, Cochabamba, 1 ♀; Buenavista, Santa Cruz, 2 ♂, 1 ♀; Rio Yapacani, Santa Cruz, 3 ♂, 1 ♀; Rio Surutu, Santa Cruz, 1 ♂; Rio Ichilo, 1 ♂, 1 ♀.

SOUTH AMERICA: No locality, 2 unsexed [♂], 1 unsexed.

*Pauxi pauxi pauxi*

VENEZUELA: *Aragua*, Maracay, 1 ♀. *Carabobo*: Cumbre de Valencia, 1 ♂. *Yaracuy*: Lagunita de Aroa, 1 immature ♀. *Merida*: Capaz, 3 ♂, 1 unsexed; Montañas de Limones, 2 ♂, 1 immature ♂; La Azulita, 1 ♂. Northwestern Venezuela, no locality, 1 ♀ (brown phase). No locality, 2 ♂, 2 ♀ (one in brown phase).

*Pauxi pauxi gilliardi*

VENEZUELA: *Zulia*: Cerro Yintaina, 1 ♂.

COLOMBIA: El Bosque, above Carraipia, 1 unsexed; Tierra Nueva, Sierra Nigra, 1 ♂ (type of *gilliardi*); Monte Elias, Sierra Nigra, 1 ♀, 1 immature ♀; Eroca, Sierra de Perija, 1 ♀. Two "specimens," consisting of the upper bill, helmet, and part of the scalp, were examined also. These formed part of necklaces acquired from Indian hunters: one is from the Manastara tribe, in the Sierra de Perija, west of Machiques; the other is from La Sabana, Sierra de Perija.

*Pauxi unicornis*

BOLIVIA: Hills above Bolivar, near El Palmar, Cochabamba, 1 ♂ (type of *unicornis*), and 1 ♀.

*Oreophasis derbianus*

GUATEMALA: Volcan de Fuego, 4 ♂, 3 ♀, 3 unsexed; Hacienda Capetillo (at the foot of Fuego), 1 unsexed, 1 immature; Volcan San Lucas, 1 ♀; Volcan Santa Maria, 1 unsexed; Volcan Tajumulco, 8 ♂, 3 ♀; Chichoy, Chimaltenango, 1 ♀; Santa Elena, Chimaltenango, 1 ♂; Chichavac, Chimaltenango, 1 immature ♂; Chibul, Quiché, 1 ♂, 1 immature ♀; Coban, Alta Vera Paz, 1 ♂; no locality, 1 ♂, 4 unsexed; "Lake Peten," 1 ♂; "Costa Rica" (error), 1 unsexed.

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### CORRECTIONS FOR "SYSTEMATIC NOTES ON THE BIRD FAMILY CRACIDAE"

The following corrections should be made in the papers published in this subseries:

Number 2 (American Museum Novitates No. 2222), page 3, fourth paragraph. The correct locality of a specimen of *Ortalis leucogastra* in the collection of the British Museum (Natural History), labeled "Tuxtla, Chiapas, Richardson, March 17, 1897" (which I assumed referred to Tuxtla Gutierrez, the capital of Chiapas), was questioned by me because this species occurs on the coast, not in inland Chiapas where Tuxtla Gutierrez is situated. I stated that I believed this specimen had probably been taken in the coastal lowlands, and my belief was confirmed as the locality concerned is Tuxtla Chico, latitude 14° 56' N., longitude 92° 10' W., in the lowlands near the border of Guatemala.<sup>1</sup>

Number 3 (American Museum Novitates No. 2232), page 20, line 36: For "Oliveira Pinto, Oliveiro Mario de," read "Oliveira Pinto, Oliverio Mario de."

Number 3 (American Museum Novitates No. 2232), page 20, line 39: For "Departamento de Zoologia", read "Departamento de Zoologia."

Number 4 (American Museum Novitates No. 2237), page 4, lines 17-19 (of table 1): The correct measurements of the tail length of *Ortalis garrula* are 262.1 for the mean, 250-280 (19) for the range, and 8.97 for the standard deviation; not "262.6/250-288 (19)/10.24."

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<sup>1</sup> This correction was supplied to me by Dr. Allan R. Phillips of Mexico City, who has recently studied the itinerary of Richardson during a visit to the British Museum. Dr. Phillips was traveling with the financial assistance of the Frank M. Chapman Memorial Fund of the American Museum of Natural History. I am grateful to Dr. Phillips for his interest and help.