THE BIRDS AND MAMMALS

OF THE

WESTERN SLOPE

OF THE

AZUERO PENINSULA

[REPUBLIC OF PANAMA]

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and
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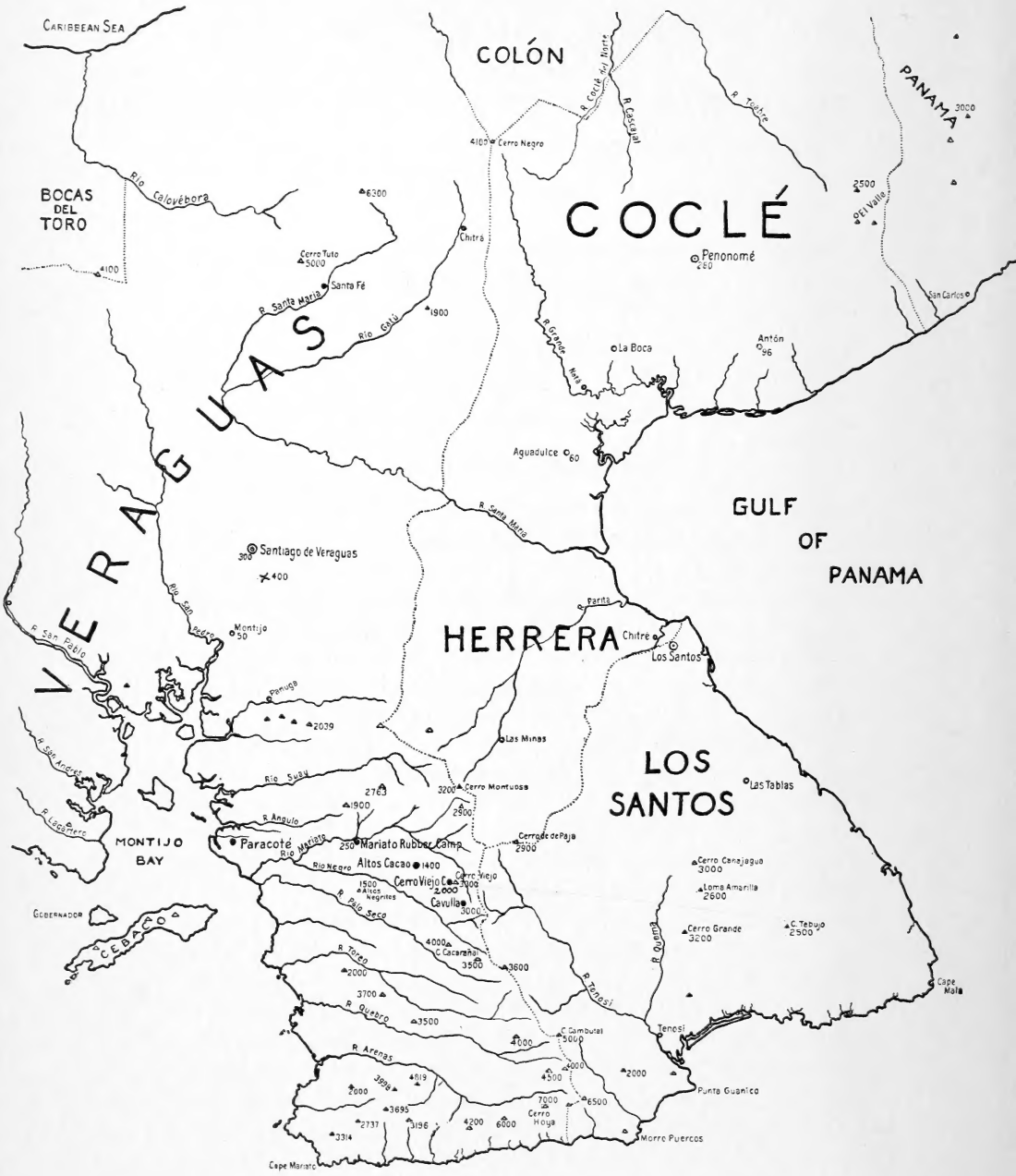

Map of a Section of Western Panama at the Azuera Peninsula
Showing Position of the Collecting Stations.

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BIRDS AND MAMALS OF THE WESTERN SLOPE OF THE AZUERO PENINSULA

INTRODUCTION

BY

J. W. ALDRICH AND B. P. BOLE, JR.

THE AZUERO PENINSULA

The Azuero Peninsula is a little-known part of Central America. It projects southwards into the Pacific Ocean from the main east-west axis of the Republic of Panama, forming the western shore of the Gulf of Panama and separating that body of water from Montijo Bay. It is 45 miles wide at its base, 70 miles wide across its sharply truncated end, and its greatest length is about 65 miles. Although there is a well marked peninsular axis or divide running at right angles to, but entirely separate from, the main cordillera of Panama, a clearer picture of the physiographic features of the peninsula may be gained by envisioning two somewhat isolated mountain masses, one in the southwestern and one occupying the southeastern parts of the peninsula. The peninsular divide runs through the length of the southwestern mass, which is much the loftier of the two. It forms the west boundary of the provinces of Herrera and Los Santos, and the eastern one of the huge land holding of the Boston-Panama Company, which lies within the large province of Veraguas. There is also a well marked divide running parallel to the main Panamanian cordillera and at right angles to the peninsular divide in the extreme southwest of the Azuero Peninsula. This ridge contains the highest peaks of the region and is everywhere from 3000 to 7000 feet in elevation. It meets the peninsular divide near Cerro Hoya, the highest peak, in the heart of a great cluster of mountains comprising the highest part of the southwestern mountain massif.

The southeastern mountain mass lies entirely to the east of the peninsular divide, within the province of Los Santos. It is connected to the other massif by a single ridge of nearly 2500 feet elevation.

PREVIOUS ZOÖLOGICAL EXPLORATIONS

So far as is known the only specimens of birds, besides those reported in this paper, to have been taken on the Azuero Peninsula are those of a collection numbering around 160 specimens obtained by Mr. Rex Benson for The American Museum of Natural History. Griscom[1] says, in reporting on this collection, that Rex Benson spent the summer of 1925 in the interior of the Cape Mala [=Azuero] Peninsula, which was found to be a mountainous region for the most part covered with heavy forest, but with only a very faint tinge of the subtropical zone. The avifauna was described as being for the most part exactly the same as that of the coastal forests farther west. From this collection Griscom described as new one bird, *Leptotila plumbeiceps malae*. Benson's collecting stations on the Azuero Peninsula were Cerro Montuosa and Cerro Largo, two small peaks a short distance north of our field of operation. It is believed that to date no zoölogical collecting has ever been done in the higher southern portion of the Azuero Peninsula range, where it is very likely that a much better representation of Subtropical Zone species would be found than were encountered by either Benson or by us, who were able to reach only the lower fringe of this zone.

Except for a group of howler monkeys collected by and for Dr. Thomas Barbour in Herrera, no mammals whatever have been recorded for the peninsula. The howlers became the basis of a hitherto unrecognized race, *Alouatta palliata trabeata* Lawrence.

In 1900-1901 J. H. Batty, who collected for The American Museum of Natural History and Walter Rothschild, secured specimens from Cebaco and Gobernador Islands just off the western coast of the Azuero Peninsula.

BOLE-ALDRICH EXPEDITION

It was the good fortune of the authors to spend the period from February 2, to April 4, 1932, collecting birds and mammals for The Cleveland Museum of Natural History on the western side of the Azuero Peninsula, in the Province of Veraguas. Collecting operations were confined to part of the land owned by the Boston-Panama

[1]Amer. Mus. Novit., No. 280, September 10, 1927, p. 1.

Company, which includes approximately 700,000 acres, bounded on the west by Montijo Bay, on the south by the Pacific Ocean, on the east by the drainage divide of the peninsula, and on the north by the River Suai. Only the drainages of the Mariato and Negro Rivers, and the uppermost parts of that of the Palo Seco River, were covered in the course of our investigations.

For the success of the expedition we are deeply indebted to the officers of the Boston-Panama Cocoanut Company, who kindly granted us permission to collect on their property and who rendered us valuable assistance in many other ways. To the resident manager, Mr. G. A. Richards, is due our deepest gratitude for his fine hospitality during our stay at the plantation headquarters, and for great assistance in obtaining the help and equipment necessary for our penetration of the rather inaccessible mountainous interior of the peninsula. The success of our collecting was furthermore enhanced through the experience and industry of Mr. P. A. Davies, our head guide and packer.

Collecting Stations

The localities given in the list of specimens under each species of bird and mammal discussed beyond, are all local native names for the places at which our various collecting stations were located. So far as is known, these are not shown on any previously published map, but the accompanying outline map will aid in their orientation. In this map the line of the sea coast and position of political boundaries were taken from the Millionth Map, Panama Sheet, Provisional Edition N. C.-17, published by the American Geographical Society, and U. S. Navy Hydrographic office charts 1018 and 1019, while the position of rivers and mountains as well as our collecting camps are according to our own field observations supplemented by the experience of our guide, Mr. P. A. Davies of Santiago, Veraguas. The rather full description of the location and nature of each collecting station seems desirable from an ecological standpoint.

Paracoté.—The native name for the small settlement at the cocoanut plantation headquarters, located about one-half mile inland from the shore of Montijo Bay and about one mile south of the Angulo River. The collecting was done in an area roughly one mile in

diameter with the settlement of Paracoté as its center. The types of habitat worked were: tidal mud flats, sandy beach, mangrove swamp, bottomland forest, cocoanut groves, and brushy roadsides, all at or very near sea level; second growth and virgin semi-deciduous forest, brushy and grassy savannahs and the vicinity of buildings at an elevation of 50 feet. The periods of collecting were February 5 to February 19, also March 20 to April 2.

Mariato River (or Rubber) Camp.—Collecting was carried on in heavy semi-deciduous forest 10 miles inland from Montijo Bay along the banks of the Mariato River, a small stream some 50 feet wide, at the point where it emerges from its steep-sided mountain valley on to the coastal plain; in second growth jungle on the site of an abandoned rubber camp; and in heavy semi-deciduous forest on the lower mountain slopes. The average elevation of the territory covered was 250 feet. The period of collecting was from February 21 to February 26.

Altos Cacao.—A small clearing some 16 miles east of Montijo Bay at 1500 feet elevation, on a steep-sided ridge between the Negro and Mariato River valleys, the site of an abandoned rubber camp. Most of the collecting was done on top of the ridge, but was occasionally carried on in the small draws that drain into the 2 rivers on both sides. The habitats covered included heavy tropical rain forest and a small cleared area of about 2 acres which had been cut over and burned 2 years previously and cultivated up to within a year of our arrival. The period of collecting was from February 28 to March 5.

Cerro Viejo Camp.—In heavy tropical rain forest at an altitude of 2000 feet on the southwest side of Cerro Viejo, 16 miles east of Montijo Bay. The period of collecting was from March 6 to March 9.

Cavulla Camp.—On top of the divide between the Azuero Peninsula's eastern and western watersheds, elevation 3000 feet; between the headwaters of the Negro and Mariato Rivers, about a mile southeast of Cerro Viejo peak and 18 miles east of Montijo Bay. The habitats in which collecting was done included open savannahs, which crowned some of the ridges, and Subtropical Zone forest between 3000 and 3200 feet in elevation. The period of collecting was from March 11 to March 14.

ECOLOGY OF THE REGION

Entirely too little time was spent in the field, aside from that necessary for the actual capture and preparation of specimens, to obtain much exact data on the nature of the biotic communities on the Azuero Peninsula. However, we believe that whenever possible it is desirable to correlate geographic distribution and geographic variation of species with ecological factors of which they are very often indicators; and for that reason, an ecological discussion of the few data available is here given.

To Dr. S. Charles Kendeigh the authors wish to express their gratitude for helpful criticisms and suggestions relative to this section of the paper.

TOPOGRAPHY AND VEGETATION

The portions of the shore-line of Montijo Bay explored by us are made up of pebbly beach, broken occasionally by mangrove bordered esteros and stream outlets with extensive mud flats exposed at low tide. Extending for about a half mile back from the bay is a low flat plain with interspersed lagoons, mangrove swamps, and bottom-land forest. This land has obviously been elevated above sea level in relatively recent geologic time, although the Montijo Bay region to the west has undergone recent submergence as evidenced by the disappearance of this coastal plain below sea level and the existence of fairly complete land mammal faunae on Coiba, Cebaco, and other islands of the region. It was on this coastal area that the cocoanut groves were planted, the original forest having been cut away for this purpose. The cocoanut plantings were kept drained by ditches in some of which tide water rose and fell. Rising rather abruptly, to about 50 feet above this low, damp, coastal strip is a rather flat or gently rolling secondary plain or piedmont, which extends eastward for about 10 miles, rising very gradually to the foot of the mountains. Here, at an elevation of approximately 250 feet above sea level, the land again begins to rise abruptly toward the crest of the divide. The plantation build-

ings and the houses of the natives who work in the cocoanut groves making up the little settlement at Paracoté are situated on the western or coastal edge of this low plateau. In the immediate vicinity of the plantation are open fields, cultivated lands, small areas of both second growth and virgin forest, and a few small llanos or grassy areas. The latter look as though they might have a natural origin, although it is entirely possible that they owe their origin to cutting followed by repeated fires during the dry season, at which time the grass becomes exceedingly dry. This is the hypothesis advanced by Cook[2] for the origin of similar areas further north in Central America and which theory is further verified by information which we obtained from residents of long standing in our particular region. As one progresses away from the plantation the forests become more unbroken and mature in character. Since the trees lose a large percentage of their leaves during the dry season, it seems likely that this semi-deciduous forest is somewhat similar to the "deciduous forests" described by Goldman[3] as characteristic of the arid division of the Lower Tropical zone of other regions on the Pacific side of Panama. However, it does not seem that the forests that we encountered were quite as completely deciduous as those that Goldman describes, since trees completely devoid of leaves were widely scattered. In the majority of cases the trees retained at least 50 per cent of their foliage. The forests of the lowlands of the western side of the Azuero Peninsula are, however, probably similar to the so-called "coastal forests" of Veraguas and Chiriqui described by Griscom.[4] The semi-deciduous nature of the forest disappears very rapidly as one rises from the low coastal plain into the mountains. At 1000 feet above sea level one can safely say that he is in the humid division of the Tropical Zone, where the trees retain most of their leaves throughout the dry season; although it is probably not as humid a habitat as certain forests of the Caribbean slope of Panama, which are said to receive an average of 180 inches of rain annually[5] and to have very little dry season. The bird population of the rain forest of the Azuero Peninsula is certainly infinitely more closely related to that of the Pacific coastal forests farther west than to the rain forest of the Caribbean slope of Panama.

[2]U. S. Dept. Agric., Bur. Plant Ind., Bull. 145, April 10, 1909, p. 11.
[3]Smithsonian Misc. Coll., Vol. LXIX, No. 5, 1920, p. 22.
[4]Bull. Mus. Comp. Zoöl., Vol. LXXVIII, No. 3, April, 1935, p. 277.
[5]Bull. Mus. Comp. Zoöl., Vol. LXXVIII, No. 3, April, 1935, p. 274.

Above 1000 feet, one is in the humid tropical forest up to 3000 feet, at which elevation indications of the Subtropical Zone (or cloud forest conditions), such as heavy festooning of moss on the branches of trees, begin to put in their appearance. After ascending through a narrow strip of this cloud forest, one emerges upon open grassy savannahs which clothe the peaks and a large part of the crest of the divide in the region explored by us. The forest extends in narrow tongues along the water-courses up into these highland savannahs, the trees becoming more and more stunted and gradually disappearing altogether. The reason for the presence of the grassland at this altitude, where according to most writers there should normally be enough moisture to support heavy "cloud forest", is not known. The climatic conditions seem to be favorable for typical Subtropical Zone forest since rain and mist were of almost daily occurence during our stay there, although it was then the height of the dry season in the lowlands. Furthermore, the presence of more or less typical conditions on the mountainsides a short distance below would seem to indicate that such a growth is possible. It is very likely that the repeated setting of fires by natives, which seems to be their custom here as well as elsewhere in Central America,[6] have kept this region in grassland. The only other explanation seems to be that perpetual strong winds sweeping across the crests of the mountains are unfavorable to tree growth, a condition which is suggested by the gnarled stunted tree development at the edges of these upland savannahs, which resemble the conditions found at timberline in the mountains of temperate regions.

The crest of the mountain range described above as the southwestern massif separating Veraguas from the two other provinces on the Azuero Peninsula, Herrera, and Los Santos is surmounted on its northern end by several low peaks. The highest peaks of the mountain mass in general lie west of the drainage divide, indicating that the rivers of the Veraguas side have eaten back eastward, far beyond the original crest of the range. The only peak climbed by us is Cerro Viejo, which according to our altimeter has an elevation of 3300 feet and which lies between the headwaters of the Mariato and Negro Rivers. As we stood on the bare top of this peak we could

[6]Cook, U. S. Dept. Agric., Bur. Plant Ind., Bull. 145, April 10, 1909, p. 11.

see another, Cerro Montuosa, which seemed to us somewhat less lofty than Cerro Viejo and about 10 miles to the north. To the south rises a series of peaks, the nearest of which is Cerro Cacarañal which we estimated to have an elevation of about 4000 feet. Much farther south than this, near the southern end of the Azuero Peninsula, rises the highest peak of all, Cerro Hoya, which has an elevation of about 7000 feet. Viewed from various angles in comparison with Cerro Hoya, three other peaks to the south of Cerro Viejo appeared to be at least 5000 feet above sea level. It seems, therefore, that we were able to reach only the lower portion of this Azuero Peninsula range; and it was with much regret that we realized that time did not permit our proceeding to the higher regions that lie to the south, where it seems very likely that a rather extensive area of Subtropical Zone conditions exists. Our guide, Mr. P. A. Davies, told us that the upper slopes of Cerro Hoya are densely clothed with low trees, the branches of which are so matted and interwoven that it is often possible to walk on the tops of them. He reported that during the so-called dry season, the climate is very cold and disagreeable up there.

CLIMATIC FACTORS

The western side of the Azuero Peninsula like all of the surrounding regions of the Pacific slope of Panama has two climatic seasons, the dry season occurring normally from December to April, and the rainy season from May to November. In the coastal lowlands rainfall is exceedingly scanty during the height of the dry season in February and March, but during the wet season a surprisingly heavy precipitation is recorded. An examination of Table I shows the surprising fact that a 14-year average annual rainfall for the Mariato weather station of the Canal Zone Department of Operation and Maintenance, which corresponds to our collecting station Paracoté, was 134.07, or 12.73 inches more than a 29-year average for Gatun on the humid Caribbean slope of Panama. However, Porto Bello, another station on the Caribbean slope has a 22-year average rainfall of 156.84 inches which is considerably more than the Mariato station. It is judged from Griscom's[7] figure of 180

[7]Bull. Mus. Comp. Zoöl., Vol. LXXVIII, No. 3, April, 1935, p. 270.

inches as the average annual rainfall for the whole Caribbean slope of Panama that, although high for the Pacific slope, the precipitation of the west side of the Azuero Peninsula is considerably less than that of the greater part of the Caribbean slope of Panama.

Another interesting fact to be ascertained from an examination of the table is that the average annual rainfall of the west side of the Azuero Peninsula (Mariato) is about twice that of the eastern side (Cape Mala) and also of the Pacific side of the Canal Zone (Balboa). This condition has caused the streams to erode faster on the west slope of the Azuero Peninsula with the result that they now have their origin to the east of the higher peaks as mentioned above. Although more closely approximated in the matter of average annual precipitation by the Pacific slope of extreme western Panama (Blanco), the western side of the Azuero Peninsula has a considerably higher precipitation than even that region. These facts may have some bearing on the faunal relationship between the west side of the Azuero Peninsula and other parts of the Pacific slope of Panama described beyond. The annual average of 134.07 inches of rainfall would seem to be sufficient to produce, on the western side of the Azuero Peninsula, ecological conditions more nearly approaching those of the humid Caribbean slope of Panama, if average annual rainfall were as good a criterion of ecological conditions as has been assumed by numerous writers. The important factor here seems to be not the total precipitation, but the intensity of the dry season. An examination of Table II will be illuminating when it is noticed that at the Mariato station during the months of January, February, and March the average rainfall is considerably less than the average for the same months at Gatun. This difference, coming as it does during the critical drought period, is very likely of considerable ecological importance. During our stay in the Subtropical Zone of the Azuero Peninsula from March 11 to March 14 it rained or misted nearly every day, and it is very likely that the dry season is much shorter or less complete there than on the coastal lowlands.

TABLE I

*Monthly Precipitation Data for Representative Portions of the Republic of Panama for the Year 1933**

	Pacific Slope				Caribbean Slope		
	Blanco, Chiriqui	Mariato (Paracoté)	Cape Mala	Balboa	Barro Colorado	Gatun	Porto Bello
Number of Years of Record	4	14	16	35	8	29	22
January	2.22	2.44	.88	1.19	2.49	2.61	6.90
February	.31	.55	.00	.29	.05	.20	.82
March	1.37	.00	.00	.33	1.22	.98	2.26
April	1.38	1.13	1.73	3.77	.10	.31	.92
May	13.30	17.29	10.11	6.78	7.00	8.64	8.09
June	10.11	15.75	9.13	13.14	9.42	17.67	13.19
July	9.64	15.71	6.73	5.44	9.10	12.88	9.84
August	15.85	34.89	10.67	7.54	10.23	4.96	10.66
September	15.83	24.89	7.84	5.26	9.08	11.87	10.24
October	27.77	38.80	6.10	5.18	6.39	16.54	16.31
November	27.23	27.00	9.39	10.90	32.72	41.52	28.51
December	2.64	6.38	5.37	7.95	13.93	21.67	18.95
Total, 1933	127.65	184.83	67.95	67.75	101.73	139.85	126.69
Total, 1932		133.22	62.69	69.53	113.52	150.09	163.63
Annual Aver.	118.50	134.07	66.18	68.24	105.32	121.34	156.84

*From the Annual Report of the Panama Canal Department of Operation and Maintenance for 1933.

TABLE II

*Average Precipitation during Critical Dry Season Months for Mariato and Gatun**

Station	January	February	March
Mariato 17 years	.97	.32	.29
Gatun 32 years	3.10	2.40	1.70

*From data supplied by Mr. R. Z. Kirkpatrick, Chief of Survey of the Panama Canal Department of Operation and Maintenance.

Although no satisfactory amount of data is available, the fragmentary records of Mr. G. A. Richards, resident manager of the plantation at Paracoté, would indicate that the temperature of the lowlands of the western side of the Azuero Peninsula ranges from around 71° to 82° F. during the rainy season, and from 67° to 92° F. in the dry season. The range of annual mean minimum-maximum temperatures for Balboa Heights is 73°-87.4° F., while that for

Cristobal is 76°-85.3° F., indicating a somewhat greater variation of temperature on the Azuero Peninsula than on either the Caribbean or Pacific side of the Canal Zone. Although no actual readings have been obtained for the higher altitudes, it was noticeable that as we progressed upwards in the mountains, the average day and night temperatures, and particularly the latter, were considerably lower.

A very appreciable climatic difference between the uplands and lowlands is the amount of wind. On the coast there was seldom any wind at night, in the early morning, or late afternoon, but at about 10 o'clock in the morning a breeze would always spring up and blow briskly until about 4 o'clock in the afternoon, when it would be calm again. At our highest camp, Cavulla, the wind seemed to blow incessantly day and night, and occasionally with considerable violence. On one occasion at Cavulla our tent was blown down over our heads in the night and on leaving that station a loaded pack horse was actually blown off the trail while crossing the barren top of Cerro Viejo in a gale. Mr. G. A. Richards reports that at Paracoté the dry season is considerably more windy than the wet, and that, in fact, the rainy season is conspicuous for its lack of wind.

FAUNAL RELATIONSHIPS

Basing our comparisons chiefly on Griscom's check list of the birds of Panama[8], it is noticed that the avifauna of the Azuero Peninsula, as would be expected from its location, about equidistant between the Panama Canal Zone and the Pacific slope of extreme western Panama, is related taxonomically to both. There is, however, greater relationship between the birds of the Azuero Peninsula and western Chiriqui than between those of the former locality and the Canal Zone. Disregarding the characteristically mountain species, since there are no mountains in the Canal Zone, 5 species of birds recorded from the Azuero Peninsula have been found also in western Chiriqui, but not in the Canal Zone, while 3 species have been found also in the Canal Zone and not in western Chiriqui. Of the birds that have been recorded in all these regions, 10 have subspecies common to both the Azuero Peninsula and western Chiriqui and are represented by a different geographic race in the Canal

[8]Bull. Mus. Comp. Zoöl., Vol. LXXVIII, No. 3, April, 1935, pp. 1-382.

Zone, while 9 others have representatives common to both the Azuero Peninsula and the Canal Zone which differ subspecifically from those found in western Chiriqui. On the other hand there are 10 avian species represented on the Azuero Peninsula by subspecies different from those found in either the Canal Zone or western Chiriqui. In 2 of these cases, *Tinamus major* and *Ortalis garrula*, the subspecies is the same on the Pacific slopes of the Canal Zone and extreme western Panama, but different on the west side of the Azuero Peninsula. One distinct species *Leptotila plumbeiceps* is present on the Azuero Peninsula and Coiba Island, but is not represented in either the Canal Zone or western Chiriqui. The species of birds concerned in these relationships are shown in Table III.

TABLE III

Relationship between Azuero Peninsula Bird Species and Those of the Panama Canal Zone and of western Chiriqui.

Specifically Related

Species recorded from Azuero Peninsula and western Chiriqui, but not the Panama Canal Zone.	*Species recorded from the Azuero Peninsula and Panama Canal Zone, but not western Chiriqui.*
Chaetura vauxi	Myiozetetes cayanensis
Campylopterus hemileucurus*	Dendroica erithachorides
Saucerottia niveoventer*	Cacicus vitellinus
Hylocharis eliciae	
Momotus momota	
Thamnophilus bridgesi	
Turdus assimilis*	
Basileuterus culicivorus*	
Tangara gyrola*	
Eucometis penicillata	

Specifically Distinct from both western Chiriqui and Panama Canal Zone Forms

Leptotila plumbeiceps†

Subspecifically Related

Species common to Azuero Peninsula and western Chiriqui, but different from those found in the Panama Canal Zone.	*Species common to the Azuero Peninsula and Panama Canal Zone, but differing from those found in western Chiriqui.*
Phaethornis superciliosa cephala	Thamnophilus doliatus nigricristatus
Notharchus hyperrhynchus dysoni	Cercomacra tyrannina rufiventris
Ceophloeus lineatus mesorhynchus	Corapipo altera altera
Pipra mentalis ignifera	Myiarchus tuberculifer brunneiceps

Mangrove and Tidal Mudflats Bordering the Estero at Paracoté. Two White Ibises (*Guara alba*), the Most Common and Characteristic Species of Bird of This Community Can be Seen in the Lower Center.

The Cocoanut Plantation at Paracoté. Many Specimens of Birds and Mammals Were Taken in Situations Such As This, and the Type Specimen of *Oryzomys azuerensis* Was Captured in the Drainage Ditch Crossed by the Board Bridge Visible in the Center of the Picture.

Bottomland Forest of Tropical Zone —
Arid Division at Paracoté.

River Bottom Forest at Mariato Rubber Camp. — Tropical Zone—Arid Division.

Tropical and Subtropical Zone Rain Forest of the Upper Negro Valley, Looking From Near the Peak of Cerro Viejo South Toward Cerro Cacarañal.

Cloud Forest of Subtropical Zone Near Our Camp at Cavulla, Altitude 3200 Feet. Cerro Cacarañal is Seen in the Distance.

Upland Llanos with Encroaching Cloud Forest at Cavulla, Subtropical Zone.

Schiffornis turdinus verae-pacis
Attila spadiceus citreopygus
Rhynchocyclus brevirostris brevirostris
Elaenia viridicata accola
Hylophilus decurtatus decurtatus
Habia rubica aurantiicapilla
Coereba flaveola columbiana
Dendroica erithachorides aequatorialis
Ramphocelus dimidiatus isthmicus
Saltator striatipictus isthmicus
Arremonops striaticeps striaticeps

Subspecifically distinct from both western Chiriqui and Canal Zone Forms

Tinamus major brunneiventris
Crypturornis soui poliocephalus
Ortalis garrula olivacea
Chaetura vauxi ochropygia
Bombornis cuvierii saturatior§
Xiphorhynchus guttatus marginatus§
Sittasomus griseicapillus veraguensis§
Manacus aurantiacus flaviventris
Pipromorpha oleaginea lutescens§
Atlapetes gutturalis azuerensis

*Mountain forms.
†Found also on Coiba Island.
§Ranges north of the Azuero Peninsula into the main cordillera of Veraguas.

Of the 22 species and subspecies of mammals of which we secured specimens, and of 2 other species frequently observed, making 24 in all, 11 are found in all three of the above-considered regions, and 6 are confined to the Azuero Peninsula. There are 5 other forms found in Chiriqui and the western side of the Azuero Peninsula but not found in the Canal Zone so far as is known. There are 2 that occur in the Canal Zone and western side of the of the Azuero Peninsula, but not in Chiriqui. Thus there is an indication that the Azuero mammal fauna, like the avifauna, has drawn more heavily on Chiriqui stock than on that of the central part of Panama; and this opinion is further strengthened when the relationships of the Azuero *Proechimys*, described in detail beyond, are investigated. However, a mere listing of the species and subspecies common to the Azuero region and either Chiriqui or the Panama Canal Zone does not fully indicate the degree of faunal interrelationship involved. Thus in Table IV there appears *Marmosa mexicana mexicana* and *Sciurus hoffmanni chiriquensis*, forms which occur on the Azuero Peninsula and in Chiriqui but not in the Panama Canal Zone. Actually there is a species of *Marmosa* in the Canal Zone, but it is not the one found on the western slope of the Azuero Peninsula. No form of *Sciurus hoffmanni* has ever been reported for the Panama Canal Zone, a case similar to that of *Marmosa*. But *Sciurus variegatoides* appears there as a dif-

ferent subspecies only, and *Nytomys sumichrasti* belongs to a genus entirely unknown there, to date. Thus the Azuero Peninsula mammals differ from those of the main Panamanian cordillera districts in varying degree; some in subspecies, some in species, and some in genus. In some cases the exact extent of the relationship in question has been indicated by arbitrary taxonomy, which then becomes the means of emphasizing the limitations of our knowledge as well as of indicating its extent. The case of *Oryzomys azuerensis* may be cited as an excellent example and the reader is referred to the general account of that form. The lists could of course be supplemented by further collecting on the Azuero Peninsula of species recorded by us but not represented in our collection by specimens.

The presence of *Nyctomys* in Table IV is felt justified, despite the fact that Goldman[9] lists this genus as one confined to the Upper Tropical Zone. There now seems to be sufficient evidence at hand to show that *Nyctomys sumichrasti* is not confined to this zone, but extends downward to sea level in various parts of Central America.

The deer is also included in the list, as ample opportunity was provided during the course of the trip properly to identify the form, although no specimens were collected.

TABLE IV

Relationship between Azuero Peninsula Mammal Species and Subspecies and those of the Pacific Slope of Chiriqui and the Panama Canal Zone

Species or subspecies common to Azuero Peninsula and western Chiriqui, but differing from related forms found in the Panama Canal Zone.	*Species or subspecies common to Azuero Peninsula and the Panama Canal Zone, but differing from related forms in western Chiriqui.*
Marmosa m. mexicana*	Liomys adspersus†
Sciurus hoffmanni chiriquensis*	Zygodontomys cherriei ventriosus
Sciurus variegatoides melania	
Nyctomys sumichrasti ssp.*	
Pecari angulatus crusniger	

Species or subspecies distinct from both those found in western Chiriqui and those in the Panama Canal Zone.

Alouatta palliata trabeata
Ateles geoffroyi azuerensis
Aotus bipunctatus†
Proechimys semispinosus goldmani
Dasyprocta punctata pallidiventris
Oryzomys azuerensis†

*Closely related forms not reported from Canal Zone. See text above for further explanation.
†Closely related forms not reported from Chiriqui.

[9]Smithsonian Misc. Coll., Vol. 69, No. 5, 1920, p. 39.

Species or subspecies common to western Chiriqui, the western Slopes of the Azuero Peninsula and the Canal Zone.

Metachirops opossum fuscogriseus
Cebus capucinus imitator
Nasua narica panamensis
Lutra repanda
Herpailurus yaguaroundi panamensis
Felis pardalis mearnsi
Oryzomys talamancae
Sigmodon hispidus borucae
Tamandua tetradactyla chiriquensis
Odocoileus chiriquensis

The comparatively large amount of geographic variation of the birds and mammals of the western slope of the Azuero Peninsula from those of the surrounding mainland would seem to indicate that the region is to all intents and purposes insular in nature. Whether or not the highlands of the peninsula were at some time during the evolution of the present mammalian and avian forms actually separated from the mainland by water is not known. It is, however, a fact that the present tropical and subtropical rain forest communities of the region are ecologically isolated from those of the rest of the country by the arid savannahs which extend completely across the base of the peninsula to the north, thus affording almost as complete a barrier to the intermingling of rain forest elements of the Azuero Peninsula with those of the rest of Panama as would the presence of an intervening area of water of the same width. On the other hand, the semi-deciduous or gallery forests characteristic of the lowlands of the Azuero Peninsula, originally extended, according to Griscom,[10] in an unbroken belt along the Pacific coast from the Azuero Peninsula to southwestern Costa Rica. It is therefore impossible to explain on the basis of isolation the rather pronounced racial difference in certain species characteristic of this type of forest on the Azuero Peninsula from those of the same species in western Chiriqui. Such racial variation in the two regions as that found in *Tinamus major*, a rather uncommon inhabitant of the coastal forests, cannot be explained by isolation, but may very likely be due to climatic differences illustrated above by annual rainfall. The presence of the coastal gallery forest connection between the Azuero Peninsula and western Chiriqui probably does explain the greater number of forest inhabiting forms

[10]Bull. Mus. Comp. Zoöl., Vol. LXXVIII, No. 3, April, 1935, p. 270.

common to those two regions than those common to the former region and the Canal Zone between which there has been no direct forest connection.

COMMUNITY RELATIONSHIPS OF BIRD AND MAMMAL POPULATIONS

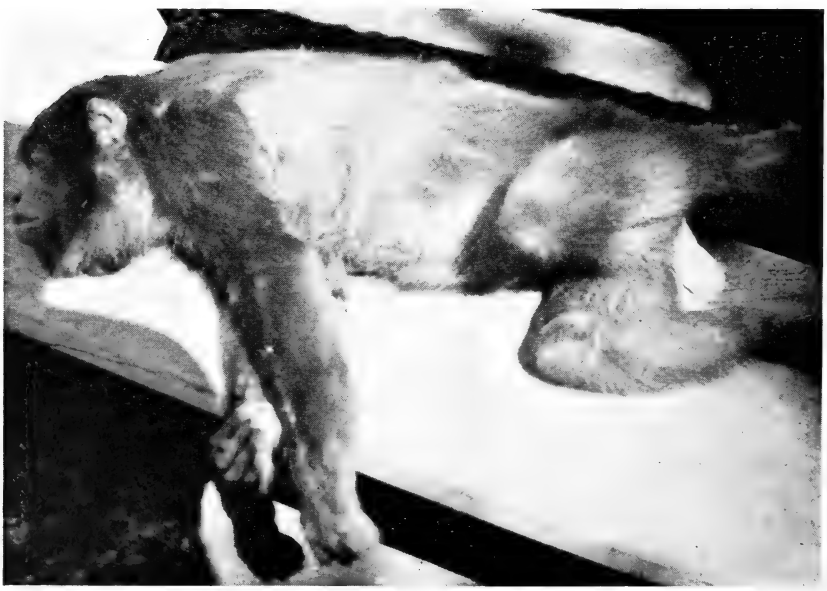
Only a fragmentary sketch can be given of the composition of the biotic communities of the Azuero Peninsula since the birds and mammals were the only forms of life studied in any detail. However, as these classes of vertebrates make up a very important part of the entire biotic community, it seems desirable at least to suggest a possible community classification based on the more obvious physiographic, floral, and faunal characteristics with special emphasis on the birds and mammals occuring during the winter and early spring. Inasmuch as the ecological importance of a species depends to a large extent on its abundance, an attempt has been made to classify the birds and mammals in two groups, "common" and "uncommon". It must be admitted that the line of distinction between these groups is an arbitrary one for the most part based upon general impressions rather than actual numerical data, although in the case of birds, the frequency with which the species was seen and collected is taken into consideration. The distribution of the various mammal species under the different headings is based partly on sight records, partly on collecting data, and to a large extent on information gathered from our guides and native hunters. The distinction between the various communities discussed is likewise a rather arbitrary one. In some cases the community as here delineated might be considered too heterogeneous, such as the one classified as brushy savannahs and forest margins. Obviously this might be divided into two or more different communities, yet the exactness of the bird and mammal data available at the present time does not warrant this division. On the other hand, the distinguishing of three different forest communities might be considered inadvisable due to the very great overlapping of species. Nevertheless, some very interesting differences between faunal and floral composition of the three different forest types are noticeable and it seems desirable to give them distinct community ranking. These three forest communities probably represent three different associations or climatic climaxes, while the other communities

South American Black Vultures (*Coragyps atratus foetens*) Feeding On the Skinned Carcasses of Birds and mammals in the Dooryard of Our Dwelling at Paracoté.

Coati-mundi (*Nasua narica panamensis*) Allen, Digging.
The Animal is a Young Male.

The Ocelot of the Mariato-Suay Region of the Azuero Peninsula. (*Felis pardalis mearnsi*) Allen.

Half-grown Fawn of the Panama White-tailed Deer (*Odocoileus chiriquensis*) Allen.



Herrera Howler Monkey (*Alouatta palliata trabeata*) Lawrence, Showing the Light-Colored Flanks Characteristic of This Race. The Scrotum is Ivory White in Color.

described should be classed as associes or seral communities which are stages in the succession to the climax. It must be remembered that only the lower fringe of the Subtropical Zone was worked so that the communities discussed under this heading must be considered as ecotones between tropical and subtropical communities. The terms used to designate the major community divisions are the "life zones", now familiar to most zoögeographers, rather than "formations" which are more commonly used by ecologists. The reason for this is two fold; firstly, to tie up the more modern community concept with the older life zone system, and secondly, because our fragmentary knowledge of the vegetation of the different communities does not give us a sound basis for differentiation into formations at the present time. Further investigation in the area may disclose the presence of three distinct formations; a cloud forest, a humid tropical forest, and an arid tropical forest formation.

I. TROPICAL ZONE—Arid Division.—Sea level to approximately 1000 feet altitude.

A. *Open water of Montijo Bay.*—Surface of water and air above it.

Common Birds	Uncommon Birds
Pelecanus occidentalis californicus	Fregata magnificens magnificens
Phalacrocorax olivaceus olivaceus	

B. *Tidal mud flats, sandy beaches, mangrove swamp, lagoons and tidal ditches.*—Includes several seral communities. Vegetation chiefly mangrove trees. Open portions used for feeding areas by large numbers of birds which breed in the mangroves or which migrate from the north.

Common Birds	Uncommon Birds
Phalacrocorax olivaceus olivaceus	Butorides virescens hypernotius
Leucophoyx thula thula	Casmerodius albus egretta
Hydranassa tricolor ruficollis	Nyctanassa violacea violacea
Guara alba	Mycteria americana (migrant)
Charadrius semipalmatus (migrant)	Ajaia ajaja
Actitis macularia	Buteogallus anthracinus subtilis
Totanus melanoleucus	Falco albigularis albigularis
Ereunetes pusillus	Aramides cajanea cajanea
Chaetura vauxi ochropygia	Squatarola squatarola (migrant)
Chloroceryle americana isthmica	Numenius hudsonicus
Iridoprocne albilinea	Catoptrophorus semipalmatus subsp. (migrant)
	Tringa solitaria subsp. (migrant)

Mammals

Procyon sp.

Uncommon

Birds

Limnodromus griseus subsp. (migrant)
Chloroceryle aenea aenea
Protonotaria citrea (migrant)
Dendroica erithachorides aequatorialis
Icterus galbula

Mammals

Oryzomys azuerensis

C. Cultivated cocoanut groves and the vicinity of houses.—A rather heterogeneous artificial community yet not readily divisable. Vegetation: large groves of cocoanut trees beneath which grow grass and brush; shade and fruit trees and cultivated shrubs.

Common

Birds

Coragyps atratus foetens
Cathartes aura subsp.
Buteo magnirostris ruficaudus
Columbigallina rufipennis rufipennis
Leptotila verreauxi verreauxi
Amazona autumnalis salvini
Aratinga ocularis
Crotophaga sulcirostris sulcirostris
Nyctidromus albicollis intercedens
Lepidopyga caeruleogularis caeruleogularis
Amazilia tzacatl tzacatl
Hylocharis eliciae
Chlorostilbon assimilis
Centurus rubricapillus wagleri
Thamnophilus doliatus nigricristatus
Tyrannus melancholicus chloronotus
Myiodynastes maculatus nobilis
Elaenia chiriquensis chiriquensis
Troglodytes musculus inquietus
Turdus grayi casius
Coereba flaveola columbiana
Thraupis episcopus diaconus
Ramphocelus dimidiatus isthmicus
Sporophila aurita aurita
Volatinia jacarini atronitens
Saltator maximus intermedius
Arremonops striaticeps striaticeps

Mammals

Zygodontomys cherriei ventriosus
Sigmodon hispidus borucae
Sylvilagus gabbi ssp.
Rattus rattus rattus
Herpailurus yaguaroundi panamensis

Uncommon

Birds

Cathartes aura teter (migrant)
Buteogallus anthracinus subtilis
Milvago chimachima cordatus
Actitis macularia (migrant)
Columbigallina minuta elaeodes
Brotogeris jugularis jugularis
Chaetura vauxi ochropygia
Florisuga mellivora mellivora
Bombornis cuvierii saturatior
Elaenia flavogastra pallididorsalis
Thraupis palmarum atripennis
Oryzoborus funereus

Mammals

Liomys adspersus

D. *Brushy savannahs and forest margins.*—Another heterogeneous community, yet not divisible even as to arid and humid divisions; probably including several distinct seral communities in the succession from open grassland to climax forest. Small grassy savannahs, shrubs, and small trees, particularly cecropias and "sandpaper" trees. Probably a fire subclimax condition.

Common	Uncommon
Birds	Birds
Crypturornis soui poliocephalus	Coragyps atratus foetens
Buteo magnirostris ruficaudus	Cathartes aura subsp.
Ortalis garrula olivacea	Odontriorchis palliatus
Crotophaga sulcirostris sulcirostris	Accipiter bicolor bicolor
Aratinga ocularis	Buteo platypterus platypterus
Brotogeris jugularis jugularis	Herpetotheres cachinnans cachinnans
Amazona autumnalis salvini	Columba speciosa
Nyctidromus albicollis intercedens	Columba rufina pallidicrissa
Lepidopyga caeruleogularis caeruleogularis	Pionus menstruus
	Piaya cayana incincta
Amazilia tzacatl tzacatl	Chaetura vauxi ochropygia
Hylocharis eliciae	Trogon massena massena
Chlorostilbon assimilis	Xiphorhynchus guttatus marginatus
Centurus rubricapillus wagleri	Tityra semifasciata costaricensis
Thamnophilus doliatus nigricristatus	Megarhynchus pitangua mexicanus
Tyrannus melancholicus chloronotus	Myiozetetes cayanensis harterti
Myiodynastes maculatus nobilis	Elaenis flavogastra pallididorsalis
Myiarchus ferox panamensis	Thryothorus modestus elutus
Elaenia chiriquensis chiriquensis	Dumetella carolinensis
Turdus grayi casius	Basileuterus delattrii mesochrysus
Polioptila plumbea bilineata	Oryzoborus funereus
Thraupis episcopus diaconus	Saltator striatipictus isthmicus
Ramphocelus dimidiatus isthmicus	
Sporophila aurita aurita	
Volatinia jacarini atronitens	Mammals
Saltator maximus intermedius	Bassariscus sumichrasti ssp.
Arremonops striaticeps striaticeps	Potos flavus ssp.
Mammals	
Herpailurus yaguaroundi panamensis	
Zygodontomys cherriei ventriosus	
Sigmodon hispidus borucae	
Sciurus hoffmanni chiriquensis	
Dasyprocta punctata pallidiventris	

E. *Semi-deciduous coastal forest.*—Probably the climatic climax. Characterized by large trees which lose a large percentage of their leaves during the dry season except on river borders and bottomland where conditions are similar to those in the rain forest community, and which probably accounts for the presence in the semi-deciduous forest region of many species which would not otherwise be there. The shrub stratum is occupied almost entirely by vines which hang from the branches of the trees. The forest floor is destitute of ground cover either herbaceous or otherwise at least during the dry season.

Common	Uncommon
Birds	Birds
Momotus momota lessonii	Tinamus major brunneiventris
Malacoptila panamensis panamensis	Crypturornis soui poliocephalus
Rhamphastos sulphuratus brevi-carinatus	Sarcoramphus papa
	Cathartes aura subsp.

Common Birds	Uncommon Birds
Thamnophilus bridgesi	Daptrius americanus guatemalensis
Myrmeciza exul occidentalis	Penelope purpurascens aequatorialis
Xenops minutus ridgwayi	Actitis macularia (migrant along streams)
Xiphorhynchus guttatus marginatus	Claravis pretiosa pretiosa
Chiroxiphia lanceolata	Leptotila plumbeiceps malae
Manacus aurantiacus flaviventris	Nyctidromus albicollis intercedens
Schiffornis turdinus verae-pacis	Phoethornis superciliosa cephala
Myiarchus crinitus boreus (migrant)	Saucerottia niveoventer
Myiarchus tuberculifer brunneiceps	Hylocharis eliciae
Myiobius atricaudus atricaudus	Trogon massena massena
Rhynchocyclus brevirostris brevirostris	Megaceryle torquata torquata (along streams)
Cyanocorax affinis zeledoni	Chloroceryle americana isthmica (along streams)
Hylophilus decurtatus decurtatus	Phloeoceastes melanoleucus malherbii
Vermivora peregrina (migrant)	Sittasomus griseicapillus veraguensis
Amblycercus holosericeus centralis	Pachyrhamphus polychropterus cinereiventris
Mammals	Terenotriccus erythrurus fulvigularis
Nasua narica panamensis	Atalotriccus pilaris wilcoxi
Lutra repanda	Elaenia viridicata accola
Sciurus variegatoides melania	Tyranniscus vilissimus parvus
Oryzomys talamancae	Thryothorus rufalbus castanonotus
Proechimys semispinosus goldmani	Vireosylva flavoviridis flavoviridis (migrant)
Dasyprocta punctata pallidiventris	Mniotilta varia
Alouatta palliata trabeata	Dendroica pensylvanica (migrant)
Cebus capucinus imitator	Oporornis formosus (migrant)
	Setophaga ruticilla (migrant)
	Tangara larvata franciscae
	Eucometis penicillata stictothorax
	Mammals
	Marmosa mexicana mexicana
	Tayra barbara ssp.
	Nyctomys sumichrasti ssp.
	Aotus bipunctatus

II. TROPICAL ZONE—Humid Division.—Altitude 1000-3000 feet, and extending down along the river bottoms onto the coastal plain.

A. *Rain forest community*.—A homogeneous climax community characterized by broad-leafed evergreen trees of great height and luxuriance. Espave, almiendro, and castilla rubber trees conspicuous. The shrub stratum is occupied by true shrubs, tree fern and small palms as well as vines. Herbaceous ground cover absent except along streams, at least during the dry season.

Common Birds	Uncommon Birds
Tinamus major brunneiventris	Sarchoramphus papa
Cathartes aura subsp.	Leucopternis albicollis costaricensis
Penelope purpurascens aequatorialis	Crax rubra rubra
Malacoptila panamensis panamensis	Leptotila plumbeiceps malae

Common
Birds
Rhamphastos sulphurastus brevicarinatus
Myrmeciza exul occidentalis
Xiphorhynchus guttatus marginatus
Pipra mentalis ignifera
Chiroxiphia lanceolata
Corapipo altera altera
Manacus aurantiacus flaviventris
Schiffornis turdinus verae-pacis
Myiarchus crinitus boreus (migrant)
Myiarchus tuberculifer brunneiceps
Pipromorpha oleaginea lutescens
Thryothorus rutilus hyperythrus
Turdus assimilis cnephosus
Cyanerpes cyaneus carneipes
Chlorophanes spiza arguta

Mammals
Cebus capucinus imitator
Alouatta palliata trabeata
Nasua narica panamensis
Lutra repanda
Nyctomys sumichrasti ssp.
Proechimys semispinosus goldmani

Uncommon
Birds
Antrostomus carolinensis (migrant)
Nyctidromus albicollis intercedens
Phaethornis superciliosa cephala
Saucerottia niveoventer
Amazilia tzacatl tzacatl
Hylocharis eliciae
Klais guimeti
Momotus momota lessonii
Ceophloeus lineatus mesorhynchus
Sittasomus griseicapillus veraguensis
Thamnophilus bridgesi
Myrmotherula fulviventris
Cercomacra tyrannina rufiventris
Attila spadiceus citreopygus
Pachyrhamphus polychropterus cinereiventris
Tolmomyias sulphurescens flavo-olivaceus
Elaenia viridicata accola
Ramphocaenus rufiventris sanctaemarthae
Vireosylva flavoviridis flavoviridis (migrant)
Vireosylva flavoviridis insulana
Vireosylva philadelphica (migrant)
Cyanerpes lucidus isthmicus
Oporornis formosus
Basileuterus culicivorus godmani
Phaeothlypis fulvicauda veraguensis (along streams)
Amblycercus holosericeus centralis
Tanagra laniirostris crassirostris
Habia rubica aurantiicapilla
Arremon aurantiirostris aurantiirostris

Mammals
Ateles azuerensis
Oryzomys talamancae

III. SUBTROPICAL ZONE—Altitude 3000 feet and above.—Only the lower fringe explored by us.

A. *Savannah and forest margin.*—Characterized by grassy savannah and small trees. No birds present in the open grassy areas. Probably a fire subclimax condition.

Common
Birds
Chaetura vauxi ochropygia
Arremonops striaticeps striaticeps
Atlapetes gutturalis azuerensis

Mammals
Sciurus hoffmannii chiriquensis
Sigmodon hispidus ssp.

Uncommon
Birds
Cathartes aura subsp.
Elanoïdes forficatus yetapa
Buteo platypterus platypterus (migrant)
Aramides cajanea cajanea (along streams)
Amazilia tzacatl tzacatl
Myiarchus ferox panamensis
Elaenia flavogastra pallididorsalis
Elaenia chiriquensis chiriquensis

B. *Cloud forest*.—The climatic climax, characterized by a luxuriant growth of trees heavily festooned with moss.

Common	Uncommon
Birds	Birds
Rhamphastos sulphurastus brevicarinatus	Elanoïdes forficatus yetapa
Corapipo altera altera	Leucopternis albicollis costaricensis
Pipromorpha oleaginea lutescens	Oreopeleia montana
Turdus assimilis cnephosus	Campylopterus hemileucurus
	Schiffornis turdinus verae-pacis
	Sittasomus griseicapillus veraguensis
Mammals	Myiarchus tuberculifer brunneiceps
Nyctomys sumichrasti ssp.	Elaenia viridicata accola
	Basileuterus culicivorus godmani
	Phaeothlypis fulvicauda veraguensis (along streams)
	Tangara gyrola bangsi
	Habia rubica aurantiicapilla

Certain of the species of mammals are very widely ranging and occur in all the terrestrial communities. The big game species—the three pigs, the deer and the large cats including the ocelot, fall into this category, as do *Didelphis*, *Metachirops*, and *Tamanduas*. Presumably the gray fox and armadillo would also fall into this group.

ANNOTATED LIST OF BIRDS OF THE WESTERN SLOPE OF THE AZUERO PENINSULA

BY J. W. ALDRICH

The species of birds discussed here were all observed by the writer on the western slope of the Azuero Peninsula and adjoining water of Montijo Bay. Of the 164 species recorded, 147 were collected and are represented in the collection of 509 specimens brought back and preserved in The Cleveland Museum of Natural Hustory.

The systematic status of all the species represented by collected specimens has, with but few exceptions, been carefully worked out by comparison with adequate series of specimens. Due to the inadequacy of Central American material in The Cleveland Museum of Natural History it was necessary to borrow a considerable number of specimens from other museums and private collections. For the loan of material for comparison the writer is indebted to the authorities of The Academy of Natural Sciences of Philadelphia, the American Museum of Natural History, Carnegie Museum, Field Museum of Natural History, Museum of Comparative Zoölogy, Museum of Zoölogy at the University of Michigan, United States Biological Survey, and United States National Museum; also to Mr. Herbert W. Brandt, and Mr. H. B. Conover. For useful advice on the status of certain forms and in the preparation of the manuscript, the writer is grateful to Dr. Herbert Friedmann, Mr. Ludlow Griscom, Mr. N. B. Kinnear, Dr. Harry C. Oberholser, Mr. James L. Peters, Mr. A. J. Van Rossem, and Dr. Josselyn Van Tyne. The kindness of Dr. Harry C. Oberholser and Mr. Ludlow Griscom in reading over the entire manuscript and making helpful suggestions is especially appreciated.

In the systematic study of the specimens all measurements were taken according to the methods recommended by Baldwin, Oberholser, and Worley[11] while descriptions of plumage coloration are based on Ridgway's key.[12] Common names are derived from Ridgway's "Birds of North and Middle America",[13] insofar as the forms involved were covered by that work. Where other forms were present in the collection, Brabourne and Chubb's "Birds of South Amer-

[11]Sci. Pub. Clev. Mus. Nat. Hist., Vol. II, 1931.
[12]Color Standards and Color Nomenclature, 1912, pp. I-IV, 1-44, 53 plates.
[13]Bull. U. S. Nat. Mus., No. 50, Parts 1-8, 1901-1919.

ica",[14] Swann's "Monograph of the Birds of Prey",[15] and Cory and Hellmayr's "Catalogue of the Birds of the Americas"[16] were resorted to.

Tinamus major brunneiventris, subsp. nov. BROWN-BREASTED TINAMOU.

Subspecific Characters.—Nearest *Tinamus major castaneiceps*, but under parts distinctly more brownish (more predominantly olive brown rather than grayish olive), and less distinctly barred; sides of head and neck much darker (outer portions of feathers auburn, rather than ochraceous tawny); chestnut of pileum averaging darker, and extending farther down on the sides of the head. It differs from *Tinamus major saturatus* in the same way as from *T. m. castaneiceps*, particularly in being more brownish below. Also it lacks the elongated crest of the former race.

Measurements.—*Adult male* (4 specimens from southern Veraguas): wing, 222-240 (average, 232.3) mm.; tail, 84-89 (86); exposed culmen, 30-32 (31.3); tarsus, 68-72 (69). *Adult female* (2 specimens from southern Veraguas): wing, 240-244 (average, 242) mm.; tail, 89-92 (90.5); exposed culmen, 30-32 (31); tarsus, 69-72 (70.5).

Type.—Adult male, No. 22002, Cleveland Museum of Natural History; Paracoté, elevation sea level, 1 mile south of the mouth of the Angulo River, Veraguas, Panama; March 21, 1932; P. A. Davies and J. W. Aldrich, original number, 1995.

Geographic Distribution.—The heavily forested region of southern Veraguas, Panama.

Remarks.—The brownish breast of *Tinamus major brunneiventris* is a very pronounced distinguishing character. The darker pigmentation of the sides of the head and neck are also very noticeable in typical examples of this form. Although there is a decided individual variation in the color of the under parts even among our specimens, any bird in the series from the Azuero Peninsula might be separated at a glance by this character from any specimen of any other race of *Tinamus major* that the writer has seen. In respect to breast color, the closest approach to the southern Veraguas birds

[14]Birds of South America, Vol. I, December 20, 1912.
[15]Monograph of the Birds of Prey, Parts 1-13, November 15, 1924 to December, 1935.
[16]Zoöl. Ser., Field Mus. Nat. Hist., Vol. XIII, Parts 2-9, March, 1918 to October 6, 1936.

is found in a specimen among the several seen from Divala. A single specimen in the American Museum of Natural History from Wilcox Camp in southern Veraguas on the west side of Montijo Bay, is typical of *T. m. brunneiventris* in the amount of brown on the under parts, and should be referred to that race, although tending toward *T. m. castaneiceps* in the amount of barring on the breast and in the color of the sides of head and neck.

Tinamus major castaneiceps intergrades with *Tinamus major saturatus* in eastern Panama, specimens from Jesusito being intermediate. The range of *T. m. castaneiceps* therefore must extend along the forested portions of the Pacific slope of the central cordillera from Costa Rica to eastern Panama, including the Pacific coastal forests of extreme western Panama. The range of the new race, *Tinamus major brunneiventris*, is, to the north, separated from that of *T. m. castaneiceps* in Veraguas by the savannahs of Panama, but intergrades with it in the coastal forests of Veraguas and Chiriqui west of the Azuero Peninsula.

The material examined in the study of this species consisted of 14 specimens of *Tinamus major castaneiceps* from southwestern Costa Rica and western Chiriqui (Divala), and 3 from eastern Panama (Cerro Azul and Jesusito); 12 of *Tinamus major saturatus*, including the type, from eastern Panama (Port Obaldia, Cana, and Mt. Pirri); and 6 *Tinamus major brunneiventris*, from southern Veraguas, Panama.

Brown-breasted tinamous were fairly common in the deep Tropical Zone forests at all altitudes visited, but more so in the more humid portions above 1000 feet. It was not seen, however, in the cloud forest at 3000 feet. The birds were occasionally flushed, but were more often heard. They were most frequently encountered along stream beds, particularly during the hotter part of the day, at which time they apparently stay near water. As they flushed, the roar of their wings was very reminiscent of the ruffed grouse of our more familiar North American woodlands. Their musical, whinnying whistle was most frequently heard in the latter part of the afternoon, particularly about sunset, but occasionally late at night.

Specimens Collected

C. M. N. H. Number	*Sex*	*Locality*	*Elevation*	Date
22001	♀	Altos Cacao	1500 feet	March 5, 1932
22002	♂	Paracoté	Sea level	March 21, 1932
22003	♂	Paracoté	Sea level	March 21, 1932
22004	♀	Paracoté	Sea level	March 28, 1932

Crypturornis soui poliocephalus, subsp. nov. GRAY-HEADED TINAMOU.

Subspecific Characters.—Nearest *Crypturornis soui panamensis*, but the male with head much paler and more grayish (less brownish); the female with head slightly more grayish (less brownish), and under parts more purely cinnamon rufuous (less washed with brownish) particularly on chest and flanks. From *Crypturornis soui modestus* it is distinguishable by a very marked sex color difference (there being, as pointed out by Griscom,[17] practically no difference in the color of the male and female of *C. s. modestus*); male with a very much paler gray head (mouse gray instead of dark mouse gray on the sides of head, neck, and lores); pileum dark mouse gray, washed with brown, instead of fuscous black; body much more tawny (less grayish) below, and more reddish brown (bister rather than clove brown) above. Both sexes are separable from *Crypturornis soui harterti* by their paler (less dusky) coloration throughout.

Measurements.—Adult male (4 specimens from the Azuero Peninsula): wing, 123.5-132 (average, 127.3) mm.; tail, 37.5-43 (40.1); exposed culmen, 19-20.5 (19.5); tarsus, 38.5-41 (39.8). *Adult female* (2 specimens from the Azuero Peninsula): wing, 136-139 (average, 137.3) mm.; tail, 42.5-43.5 (43); exposed culmen, 19.5-20.5 (20); tarsus, 42.5-43.5 (43).

Type.—Adult male, No. 22006, Cleveland Museum of Natural History; Paracoté, elevation sea level, east shore of Montijo Bay, 1 mile south of the mouth of the Angulo River, Veraguas, Panama, March 28, 1932; P. A. Davies and J. W. Aldrich, original number 2065.

Geographic Distribution.—Probably all of the Pacific slope of Veraguas, and possibly eastern Chiriqui, Panama.

[17]Bull. Mus. Comp. Zoöl., Vol. LXXII, No. 9, January, 1932, p. 310.

Remarks.—A comparison of our series with 15 specimens of *Crypturornis soui panamensis*, including the type and 4 topotypes, showed that the subspecific characters of *Crypturornis soui poliocephalus* are rather constant, particularly the pale gray head of the male. A single male in the U. S. National Museum collection, from Nata, in the Province of Coclé, a locality almost exactly half way between the type locality of *C. s. poliocephalus* and Loma del Leon, whence came the type of *C. s. panamensis*, is, in the color of its head, almost exactly intermediate between the two races, but is probably better referred to the latter. No specimens have been seen that would determine the northern and western limits of the range of *Crytpurornis soui poliocephalus*. However, since Griscom[18] has found that the bird of the Caribbean coast of Panama is *Crypturornis soui harterti*, the central cordillera is probably the northern limit of the range of our new form. To the west, intergradation with *Crypturornis soui modestus* probably occurs somewhere between the Azuero Peninsula and western Chiriqui.

Since, after considerable study, Dr. H. C. Oberholser is convinced that tinamous of the *soui* group as well as other species are generically distinct from the two species that belong to the genus *Crypturellus*, I prefer to use his proposed name of *Crypturornis*[19] for the species under consideration, instead of *Crypturellus*, the name recently applied to this as well as to all the other species included in the genus formerly called *Crypturus*.

The low bushy tangles and young forests about the plantation at and near sea level were the only localities which seemed to supply the proper habitat for this little gray-headed tinamou, but in such haunts it was fairly common.

A male and a female, collected on April 2, were found together at the edge of a small woodland and were apparently a mated pair. The female, on dissection, was found to contain an egg almost ready for laying. Judging from this evidence and from the fact that there was a very noticeable increase in the frequency of the songs during the first part of April, this month appears to fall within the breeding season of the gray-headed tinamou.

[18]Bull. Mus. Comp. Zoöl., Vol. LXXII, No. 9, January, 1932, p. 309.
[19]Proc. Biol. Soc. Washington, Vol. 35, March 20, 1922, pp. 73-75.

Specimens Collected

C. M. N. H. Number	*Sex*	*Locality*	*Elevation*	*Date*
22005	♂	Paracoté	Sea level	March 24, 1932
22006	♂	Paracoté	Sea level	March 28, 1932
22007*	♀	Paracoté	Sea level	March 30, 1932
22008	♂	Paracoté	50 feet	April 2, 1932
22009	♂	Paracoté	50 feet	April 2, 1932
22010	♀	Paracoté	50 feet	April 2, 1932

*Contained egg almost ready to be laid.

Pelecanus occidentalis californicus Ridgway. CALIFORNIA BROWN PELICAN.

Brown pelicans were seen rather frequently flying over Montijo Bay, and occasionally resting in the outer edge of the mangroves fringing the estero at Paracoté.

Since the name of the subspecies of brown pelican which occurs on the Pacific coast of Panama is apparently open to difference of opinion, and since no specimens were taken by us, it is not possible to allocate definitely the birds that we saw. However, the probabilities strongly favor *Pelecanus occidentalis californicus*. Griscom[20] uses that name for the brown pelican that occurs along the entire Pacific coast of Panama, "breeding abundantly". Murphy,[21] on the other hand, refers the birds on the Pacific coast of Panama to *Pelecanus occidentalis carolinensis*, but admits that adequate material is not available at the present time to make any very definite statement as to the status of the birds of that region.

Phalacrocorax olivaceus olivaceus (Humboldt). BRAZILIAN CORMORANT.

The single specimen is an immature bird apparently in transition from the first year to the second year plumage, since the sides of the head, throat, neck, and chest are white, flecked with brown feathers. The sides and belly are almost black but with a whitish wash in the center of the latter, from which there is anteriorly a gradual transition to the white of the chest. The tail is in process of molt. The measurements of this specimen are interesting, inasmuch as they are rather large for this form: wing, 280 mm.; tail, 159; exposed culmen, 55; tarsus, 53.

[20]Bull. Mus. Comp. Zoöl., Vol. LXXVIII, No. 3, April, 1935, p. 292.
[21]Oceanic Birds of South America, Vol. II, February 21, 1936, pp. 807-808.

Brazilian cormorants were common along the beaches and salt water lagoons bordering Montijo Bay, as well as on the open water of the bay itself.

Specimens Collected

C. M. N. H. Number	*Sex*	*Locality*	*Elevation*	*Date*
22011	♀	Paracoté	Sea level	February 14, 1932

Fregata magnificens magnificens Mathews. MAN-O'-WAR BIRD.

Man-o'-war birds were seen occasionally wheeling on motionless pinions over Montijo Bay.

Peters[22] refers the birds of this species that occur along the Pacific coast of Panama and that breed on the Pearl Islands to *Fregata magnificens magnificens*. Murphy,[23] however, is unwilling to recognize the bird of the Pacific coast of Panama as distinct from the Caribbean coast form, *Fregata magnificens rothschildi*, since considerable numbers of these superb flyers are known to pass regularly back and forth across the Isthmus of Panama. In the writer's opinion the freedom of passage of the breeding form of the Caribbean coast back and forth across the Isthmus of Panama would not interfere with the occurence of a different subspecies as the breeding form of the Pacific coast of Panama any more than the mingling, during the non-breeding season, interferes with the well established status of geographic races of such migrant species as the horned lark (*Otocoris alpestris*) and the Savannah Sparrow (*Passerculus sandwichensis*). Inasmuch as we collected no specimens, it is impossible to say definitely whether the occasional man-o'-war birds that we saw over Montijo Bay belonged to the breeding colonies of the Pearl Islands or to those of the Caribbean Sea. However, the probabilities strongly favor the former case.

Butorides virescens hypernotius Oberholser. PANAMA GREEN HERON.

The single specimen obtained measures as follows: wing, 173 mm.; tail, 61; exposed culmen, 60; tarsus, 50. These measurements seem to be closer to the averages of *Butorides virescens hypernotius*, as given

[22]Check List of Birds of the World, Vol. 1, October 6, 1931, p. 95.
[23]Oceanic Birds of South America, Vol. II, February 21, 1936, p. 920.

by Oberholser,[24] than to those of *Butorides virescens virescens*. Furthermore, the date (April 2) is late for an individual of the latter race to be so far south of its breeding range. Should I follow the example of Peters[25] and other recent writers and consider our specimen referable to *Butorides virescens maculatus*, which name seems to be currently used to embrace most of the green herons of eastern and southern Central America, I would be obscuring the facts. The wing measurement of our bird is closer to the average of *B. v. virescens* than to the average given by Peters[26] for *B. v. maculatus*. But to refer our specimen to *B. v. virescens* would involve giving this race a discontinuous range, since the locality of our specimen and that of topotypical *B. v. hypernotius* of the Canal Zone are cut off from *B. v. virescens* by the smaller forms, *Butorides virescens mesatus* of western Nicaragua, and so-called *B. v. maculatus* of the eastern coast of Central America as far south as Almiranti.[27] It seems, therefore, that, although *B. v. hypernotius* is admittedly close to *B. v. virescens*, differing only in averaging smaller, since its range is isolated by intervening still smaller forms of the green heron, it ought to be considered a distinct subspecies. There are many parallel cases of commonly recognized subspecies, which though resembling one another very closely, are separated by a more distinct form. Examples which come to mind occur in the species *Otocoris alpestris* and *Atlapetes gutturalis*. In the case of the latter, this phenomenon of parallelism will be discussed later in the present paper.

The back of our specimen is rather more purplish than any specimen of any race examined, except some examples of *Butorides virescens margaritophilus*, of which I have seen 20 specimens from the Pearl Islands; our Panama specimen was, however, considerably larger than any of these. The color of the back may, nevertheless, indicate some intergradation towards the Pearl Islands bird even though the size points in the opposite direction, being slightly greater than the average of *B. v. hypernotius*.

Green herons were seen occasionally in the mangrove borders of the estero at Paracote, but were not nearly as abundant as most of the other species of herons and ibises with which they associated.

[24]Proc. U. S. Nat. Mus., Vol. XLII, August 29, 1912, p. 550.
[25]Bull. Mus. Comp. Zoöl., Vol. LXXI, No. 5, February, 1931, pp. 305-307.
[26]Check List of Birds of the World, Vol. I, October 6, 1931, pp. 103-104.
[27]Peters, Bull. Mus. Comp. Zoöl., Vol. LXXI, No. 5, February, 1931, pp. 305-307.

Specimens Collected

C. M. N. H. Number	*Sex*	*Locality*	*Elevation*	*Date*
22015	♀	Paracoté	Sea level	April 2, 1932

Casmerodius albus egretta (Gmelin). AMERICAN EGRET.

Although not as common as the smaller species of herons such as the snowy egret, Louisiana, and yellow-crowned night herons, the American egret was seen on at least two occasions in the mangroves bordering the estero at Paracoté. On one of these occasions the handsome white bird was walking about among the mangrove roots in close companionship with a roseate spoonbill, the contrast of pink and white making a combination very pleasing to the eye. No specimens of the American egret were collected.

Leucophoyx thula thula (Molina). SNOWY EGRET.

The single specimen taken is apparently an immature male in the first nuptial plumage, described by Bent,[28] as there is only a trace of the plumaceous condition of the back feathering.

Snowy egrets were rather common on the mud flats and in the outer edge of the mangroves bordering the estero at Paracoté.

Specimens Collected

C. M. N. H. Number	*Sex*	*Locality*	*Elevation*	*Date*
22014	♂	Paracote	Sea Level	March 29, 1932

Hydranassa tricolor ruficollis (Gosse). LOUISIANA HERON.

The only specimen obtained is an adult female in full breeding plumage.

Louisiana herons were fairly common, mixed in groups of other species of herons feeding at the edges of the mud flats at low tide and in the mangroves fringing the bay.

Specimens Collected

C. M. N. H. Number	*Sex*	*Locality*	*Elevation*	*Date*
22013	♀	Paracote	Sea Level	March 29, 1932

[28]Bull. U. S. Nat. Mus., No. 135, March 11, 1927, p. 151.

Nyctanassa violacea violacea (Linnaeus). YELLOW-CROWNED NIGHT HERON.

The only specimen taken was apparently a two year old female in what Bent[29] describes as the second nuptial plumage. The measurements seem to indicate an intergradation toward *Nyctanassa violacea bancrofti* in this region. However, this specimen is nearer the average of *N. v. violacea*, and is therefore referred to that race. It measures: wing, 301 mm.; tail, 113; tarsus, 100; culmen, 70; height of bill at base, 24; width of bill at base, 20.

Yellow-crowned night herons were seen occasionally in the mixed groups of herons and ibises that frequented the mud flats at low tide.

Specimens Collected

C. M. N. H. Number	*Sex*	*Locality*	*Elevation*	*Date*
22012	♀	Paracoté	Sea Level	March 30, 1932

Mycteria americana Linnaeus. WOOD IBIS.

The wood ibis was seen only during the period from February 5 to 19, at one large but rapidly drying lagoon where the single specimen was collected, and in small flocks flying northward over the plantation. It was evident that these birds were migrating at this time, and they had all left the region before we returned to the plantation from our mountain trip on March 19.

Specimens Collected

C. M. N. H. Number	*Sex*	*Locality*	*Elevation*	*Date*
22016	♂	Paracoté	Sea Level	February 15, 1932

Guara alba (Linnaeus). WHITE IBIS.

The white ibis seemed to be the most abundant species of the ibis-heron aggregation to be found on the mud flats at low tide. Both the adult and immature plumages were represented in these groups. This species was found also in the mangrove swamps bordering the bay, most abundantly at the outer edge.

[29]Bull. U. S. Nat. Mus., No. 135, March 11, 1927, p. 216.

Specimens Collected

C. M. N. H. Numbe	*Sex*	*Locality*	*Elevation*	*Date*
22017	♂	Paracoté	Sea Level	March 29, 1932
22018	♂	Paracoté	Sea Level	March 30, 1932
22019	♂im.	Paracoté	Sea Level	March 30, 1932
22020	♀	Paracoté	Sea Level	March 30, 1932
22021	♀im.	Paracoté	Sea Level	March 30, 1932

Ajaia ajaja (Linnaeus). ROSEATE SPOONBILL.

The single specimen taken was in first winter plumage, with feathered head. Another roseate spoonbill was observed feeding in the shallow water among the mangroves. The method of feeding was to move the bill from side to side at the surface of the water, rapidly opening and closing the mandibles in much the same manner that a duck feeds on floating matter. The species was not common.

Specimens Collected

C. M. N. H. Number	*Sex*	*Locality*	*Elevation*	*Date*
22022	—im.	Paracoté	Sea Level	March 30, 1932

Sarcoramphus papa (Linnaeus). KING VULTURE.

Since I have been unable to find a complete description of the remarkable head coloring of the king vulture in any of the literature, I give the following description of the colors of the bill and bare skin of the head of the below recorded specimen, No. 22023, taken less than one hour after the death of the bird.

Nape (greatly thickened and wrinkled skin) yellow; posterior auricular region flesh color washed with purplish red; sides of throat reddish orange; middle of throat yellowish orange; area of thickened and greatly wrinkled skin on side of head running in a reverse S-shaped curve from nape to angle of jaw, reddish orange on dorsal fourth, bluish gray on adjoining fourth (on same plane with eye), and gray on remaining (ventral) half; crown reddish orange; ring around eye red; remainder of sides of head purplish red; cere and caruncle orange; anterior two thirds of bill dull red; posterior third black; iris white. This description was compared with that of specimen 22024, taken about a week later, with which it coincided perfectly.

This species was first encountered on February 25 at the Mariato River camp, where a single individual came to feed with the turkey vultures on skinned carcasses of monkeys placed on the dry river bed. This individual appeared as a circling black and white speck in the sky, which suddenly began to grow rapidly larger, accompanied by a steadily increasing hissing sound as the vulture plunged downward with partially closed wings. As the great bird approached the earth, the hissing of the air between its quills assumed the proportions of the sound caused by a diving airplane which has had its motor shut off. The vulture terminated its mighty plunge from the clouds in a graceful upward sweeping curve and landed in the top of a giant fig tree which towered above our camp on the river bank. Later, when this bird was collected, a porcupine quill was found imbedded in the bare skin of its neck in the region of the crop, bearing mute testimony to the nature of some former meal.

At Altos Cacao on March 4, as many as seven of these vultures were seen in the air at once. Here, also, they came to feed on skinned carcasses with the turkey vultures. The arrival of these big scavengers was always announced by the characteristically loud and prolonged swish of the air through their plumage, caused by their plunging descent. When one or more king vultures were present at the carrion, the turkey vultures stood respectfully aside until the heavier bodied fellows had finished.

Specimens Collected

C. M. N. H. Number	*Sex*	*Locality*	*Elevation*	*Date*
22023	—	Mariato River Camp	250 Feet	February 25, 1932
22024	♂	Altos Cacao	1500 Feet	March 4, 1932

Coragyps atratus foetens (Lichtenstein). SOUTH AMERICAN BLACK VULTURE.

In order to determine the status of the Panama black vulture, the writer has examined, in all, eight specimens from that country as follows: the specimen listed below from the Azuero Peninsula; one specimen from Saboga Island, Bay of Panama, in the Museum of Comparative Zoölogy; and six specimens from Port Obaldia on the Caribbean coast of extreme eastern Panama, in the collection of

Mr. Herbert W. Brandt. These specimens measure as follows: wing, 381-415 (average, 397.9) mm; tail, 153-172 (165.9); culmen without cere, 21-24 (22.5); tarsus, 76-81 (78.6). Eight specimens from South Carolina, Florida, and Texas measure: wing, 415-444 (average 428.1) mm.; tail, 177-195 (184.7); culmen without cere, 22-24 (23); tarsus, 81-99 (85). Account is not taken of the sex in the case of the measurements, inasmuch as there seems to be no significant sex difference in size in this species. In view of the fact that Todd and Carriker,[30] and Friedmann[31] are inclined to believe that the South American form, *Coragyps atratus foetens*, is not distinguishable from *Coragyps atratus atratus* of North America, because of an insufficient difference in size, comparison of these measurements of Panama birds with those of the North American specimens is rather interesting.

The black vultures of South America as a whole may not be distinguishable from those of North America, as Dr. Friedmann's[32] investigations and the three South American specimens that I have seen would seem to indicate; but the above given measurements show that the Panama birds are certainly subspecifically distinct from the North American form. The question now arises as to whether the Panama black vultures are referable to *C. a. foetens* or are undescribed. Comparison with adequate topotypical material of *C. a. foetens* from Paraguay will be necessary to determine this, and so far I have been able to see but one specimen from that country.

Comparing the wing measurements of Panama black vultures with those given by Friedmann for specimens from Argentina, Chile, Ecuador, and Brazil, namely 412-432 (average 421) mm., together with two specimens from Chile and one from Paraguay in the collection of Herbert W. Brandt which I have examined, with wing measurements of 431-453 (average 439.7) mm., it appears that the birds of southern Central America are smaller than those of South America, at least when the latter are considered as a whole. Furthermore, it seems to lend strength to the suggestion, by Wetmore,[33] of the existence of more than two forms of the black vulture, and the suspicion of Peters[34] that the birds of this species from southern South America are larger than those from the northern part of that continent.

[30]Ann. Carnegie Mus., Vol. XIV, October, 1922, p. 142.
[31]Proc. Biol. Soc. Washington, Vol. 46, October 26, 1933, pp. 187-189.
[32]Proc. Biol. Soc. Washington, Vol. 46, October 26, 1933, pp. 187-188.
[33]Bull. U. S. Nat. Mus., No. 133, February 1, 1926, p. 91.
[34]Bull. Mus. Comp. Zoöl., Vol. LXIX, No. 12, October, 1929, p. 415.

Assuming that the southern South American black vultures are larger than those from northern South America and southern Central America, the question then arises, into which group do topotypical Paraguay birds fall? The single Paraguay specimen in the Brandt collection which I have examined measures as follows: wing, 431 mm; tail, 189; culmen without cere, 23; tarsus, 75. These measurements indicate a bird as large as the average of the North American form. However, even if the topotypical *Coragyps atratus foetens* is shown by further material to belong to a larger southern group, it seems that that form might still be maintained as a valid race, which, although very similar to typical *Coragyps atratus atratus* of North America, if it exhibits any tangible character, should be considered distinct from that subspecies because of being completely cut off from it by a still smaller undescribed race in southern Central America and northern South America. If more material from Paraguay is found to exhibit size characters similar to the single individual mentioned above I should have no hesitation in giving a different name to the small Panama bird. Meanwhile, there seems to be no other course open than to refer the Panama birds to *Coragyps atratus foetens* on the basis of distinctly smaller size which is the character designated by supporters of the validity of *C. a. foetens* as distinguishing it from *C. a. atratus*.

On the Azuero Peninsula the black vulture was very common about the plantation, being much more in evidence than the turkey vulture, and replacing that species entirely around the houses. However, the condition was reversed away from civilization, and only one black vulture was seen in the mountains. That one came with the king and turkey vultures to feed on the skinned mammal bodies at Altos Cacao camp.

Specimens Collected

C. M. N. H. Number	*Sex*	*Locality*	*Elevation*	*Date*
22026	♂	Paracoté	50 Feet	February 16, 1932

Cathartes aura teter Friedmann. WESTERN TURKEY VULTURE.

From measurements it seems that the single specimen of the turkey vulture obtained must be referred to *Cathartes aura teter*, the race that breeds in western North America.[35] Dr. Herbert Friedmann, the

[35]Friedmann, Proc. Biol. Soc. Washington, Vol. 46, October 26, 1933, pp. 188-189.

describer of *Cathartes aura teter*, has been kind enough to examine the specimen, and he assures me that I am correct in this belief. The only alternative is to consider the bird as representing a transition between *Cathartes aura aura* and a larger South American form such as *Cathartes aura ruficollis*. There is in this example no indication of transition in color toward the black South American birds, however. This specimen measures as follows: wing, 513 mm.; tail, 256; culmen without cere, 23; tarsus, 65.

It is interesing to find *Cathartes aura teter* in Panama, especially in view of Dr. F. M. Chapman's[36] theory that the turkey vultures that, at a certain time in the spring, travel over Barro Colorado Island in Gatun Lake of the Panama Canal Zone, are the migratory birds from the northern part of the range of the species in North America. This is, I believe, the first reported specimen to substantiate that theory.

It is unfortunate that none of the resident turkey vultures were collected, since they were probably encountered fairly regularly throughout our stay in the country. Of course to be absolutely sure that they were residents, one would have to wait until all migrant birds had gone north. This species was less common on the plantation than was the black vulture, *Coragyps atratus foetens*, and the two birds apparently did not associate with one another to any extent. Turkey vultures never came to the feasts of skinned animals that we spread out beside our house on the plantation, and that were well attended by the black vultures. On the other hand, away from the plantation the turkey vulture was more common than the black vulture, and almost entirely replaced the latter species in the mountains, where our offerings were accepted by them readily enough. When a king vulture appeared on the scene, however, the turkey vultures would stand aside until the heavier bird had finished.

Specimens Collected

C. M. N. H. Number	*Sex*	*Locality*	*Elevation*	*Date*
22025	♀	Paracoté	Sea Level	March 27, 1932

[36]The Auk, Vol. L, No. 1, January 4, 1933, p. 32.

Elanoïdes forficatus yetapa (Vieillot). SOUTHERN SWALLOW-TAILED KITE.

A pair of these graceful hawks was observed gathering nesting material near our mountain camp at Cavulla. Branches were broken from a dead tree by the birds while on the wing, and carried down the mountainside presumably to a nest located somewhere in the heavy forest of the Rio Negro Valley.

Odontriorchis palliatus (Temminick). BRAZILIAN KITE.

Since I have not had access to adequate material, I have followed Griscom[37] in recognizing only one race of this species. He has examined fifty specimens, including birds from the entire range, and can detect no adequate reason for separating the species into races.

The only specimen seen was collected from a small tree standing by the side of a dried lagoon near the shore of the bay, where the bird was all but concealed by very dense foliage.

Specimens Collected

C. M. N. H. Number	*Sex*	*Locality*	*Elevation*	*Date*
22039	♀ im.	Paracoté	Sea Level	February 15, 1932

Accipiter bicolor bicolor (Vieillot). FOUR-BANDED HAWK.

The only individual of this species seen was flying over an open field toward the forest, not more than twenty feet from the ground. Its method of flight was typical of the genus *Accipiter*, direct, and by means of alternate periods of flapping the wings and gliding.

Specimens Collected

C. M. N. H. Number	*Sex*	*Locality*	*Elevation*	*Date*
22027	♂ im.	Paracoté	50 Feet	February 7, 1932

Buteo platypterus platypterus (Vieillot). BROAD-WINGED HAWK.

Several broad-winged hawks were seen at various times both at sea level and in the mountains up to 3000 feet.

[37] Bull. Mus. Comp. Zoöl., Vol. LXXII, No. 9, January, 1932, p. 312.

Specimens Collected

C. M. N. H. Number	*Sex*	*Locality*	*Elevation*	*Date*
22028	♀ im.	Altos Cacao	1500 Feet	February 28, 1932
22029	- im.	Paracoté	Sea Level	February 17, 1932

Buteo magnirostris ruficaudus (Sclater and Salvin). RED-TAILED LARGE-BILLED HAWK.

The specimens collected have been compared with adequate series of all the races known to inhabit Panama and have been found to be perfectly typical *Buteo magnirostris ruficaudus*.

By far the commonest hawk in the open scrubby country at sea level and on the cocoanut plantation, this handsomely marked raptor was seen on almost every trip through this type of habitat. As has been noted by other writers[38] who have observed this species in other regions, this large-billed hawk is tame to the point of stupidity. The birds would sit quietly on some cocoanut palm or other small isolated tree, allowing me to walk up to within easy collecting range. This hawk was never seen in the forest or in the open country at higher altitudes.

Specimens Collected

C. M. N. H. Number	*Sex*	*Locality*	*Elevation*	*Date*
22030*	♂	Paracoté	Sea Level	February 5, 1932
22031	♂	Paracoté	Sea Level	February 7, 1932
22032	♂	Paracoté	Sea Level	February 8, 1932
22033	♀	Paracoté	Sea Level	February 13, 1932
22034	♂	Paracoté	Sea Level	February 18, 1932
22035	♀	Paracoté	Sea Level	March 21, 1932

Leucopternis albicollis costaricensis W. L. Sclater. COSTA RICAN WHITE-COLLARED HAWK.

The single specimen obtained is not different from birds examined from Costa Rica or those from eastern Panama.

This individual was collected in the bottomland forest at Paracoté. It had apparently been attracted by the cries of a wounded capuchin monkey, as its eyes were intently fixed on this mammal

[38]Peters and Griscom. Proc. New Eng. Zoöl. Club, Vol. XI, August 30, 1929, p. 43.

which was lying about a hundred feet away from me and the bird paid no attention to me although it was in the tree directly over my head.

The only other evidence of the presence of this beautiful white hawk was a single wing-quill found in the cloud forest not far from our camp at Cavulla at an altitude of 3000 feet.

Specimens Collected

C. M. N. H. Number	*Sex*	*Locality*	*Elevation*	*Date*
22038*	♂	Paracoté	Sea Level	February 5, 1932

Buteogallus anthracinus subtilis (Thayer and Bangs). GORGONA BLACK HAWK.

Current opinions regarding the relationships of the Panama hawks of the genus Buteogallus do not appear to be entirely satisfactory. After a careful consideration of the problem, involving the examination and measuring of 36 specimens of black hawks from Costa Rica and Panama, as well as the type of *Buteogallus anthracinus subtilis*, I have come to the conclusion that there is only one species of this genus represented in Panama, instead of two as is indicated by the recent writings of several authors, notably Peters[39] and Griscom.[40] Notice should be taken here that Chapman pointed out in 1926[41] that intergradation existed between *Buteogallus anthracinus anthracinus* and *B. a. subtilis*; and that Griscom in his "Ornithology of the Republic of Panama",[42] although listing *Buteogallus subtilis* binomially, remarks in a footnote that it is "probably a race of *anthracinus*."

I am unable to find a single character of *B. a. subtilis* which does not show intergradation with *B. a. anthracinus*. In the first place it should be pointed out that all of the supposed characters used to separate *B. a. subtilis* from *B. a. anthracinus* are subject to a great deal of individual variation even in birds of the same age. Secondly, there is a considerable amount of variation in birds of the same region due to age or adventitious effects. Despite these complications, however, there are decided average differeces in birds of the same age which may be correlated with geographic distribu-

[39]Check-list of Birds of the World, Vol. I, 1931, pp. 244-245.
[40]The Auk, Vol. L, No. 3, July 6, 1933, p. 303.
[41]Bull. Amer. Mus. Nat. Hist., Vol. LV, October 1, 1926, p. 233.
[42]Bull. Mus. Comp. Zoöl., Vol. LXXVIII, April, 1935, p. 300.

tion. The most noticeable of these is that of size, but color differences are also important. The following discussion of these characters relates to only adult birds in the black plumage, since I have not seen adequate material to distinguish the races when in juvenal plumage, which varies greatly in birds from the same region.

The width of the median white band on the tail is an extremely variable character, but apparently has some subspecific value, averaging broader in *B. a. anthracinus* than in either *B. a. subtilis* or *Buteogallus anthracinus cancrivorus*. The range of the last form, incidentally, extends into Panama on the Caribbean coast at least as far west as Port Obaldia. The width of the terminal white band on the tail is, except in fresh plumage of no diagnostic value because of the great amount of variation due to abrasion. The buff color of this band was used by Swann[43] as a distinguishing characteristic of *B. a. subtilis*, but here again a great deal of individual variation is found to exist in both *B. a. anthracinus* and *B. a. subtilis*. An examination of the type of the latter form shows that its tail is in molt, and that the old feathers are deeply buff on the tips while in the freshly grown quills this area is pure white. This would seem to indicate that buffiness is an adventitious character. That *B. a. subtilis* seems to have tail tips averaging more deeply buff than *B. a. anthracinus* is possibly due to the fact that the former lives more in the region of tide-water, where, walking about on the mud in search of its favorite food, crabs, it is more liable to soil the tips of its tail-feathers. The supposed characteristic of the duller coloration of *B. a. subtilis* is probably also adventitious, and due to fading; at any rate, some individuals of *B. a. subtilis* are as blackish as typical *B. a. anthracinus*.

In the extent of the rufous barring on the secondaries complete intergradation is shown in individuals of the same age between *B. a. subtilis* and *B. a. anthracinus*, but the former subspecies has on the average more rufous. The type of *Buteogallus anthracinus subtilis*, from Gorgona Island, Colombia, has the most rufous, while the specimens of that race examined from the coast of Costa Rica have the least. Intergradation in this character might also be considered as taking place through *B. a. cancrivorus*, which is intermediate in this respect between *B. a. anthracinus* and *B. a. subtilis*.

The character of less white at the base of the primaries used by Swann[43] to separate his supposed race *Urubitinga* [=*Buteogallus*] *anthracina bangsi* from the Pearl Islands, is valid in *B. a. subtilis*, but complete intergradation in this respect with *B. a. anthracinus* is found.

Size is the most reliable character separating *B. a. subtilis* from *B. a. anthracinus*, the former averaging smaller. Intergradation in size between *B. a. subtilis* and *B. a. anthracinus* in Costa Rica and Panama, and between *B. a. subtilis* and *B. a. cancrivorus* in Panama is amply shown, however, by the following tables. Measurements of specimens in the United States National Museum taken by Dr. Herbert Friedmann were kindly supplied by that institution and are included in this table. Measurements of specimens in the National Museum from Tlalixtaquilla, Guerero; Puerto Angel, Oaxaca; San Benito and El Carrizal, Chiapas were omitted from the table because, although they seem to be those of *B. a. subtilis*, the specimens have not been examined with respect to other characters. Measurements of specimens (not examined for other characters) from Pigres on the Gulf of Nicoya, Costa Rica were included under *B. a. subtilis* on the basis of the geographic position of that locality. It is quite possible, however, that the larger specimens allegedly from Pigres were taken sufficiently far from the Pacific coast to be within the range of *B. a. anthracinus*.

TABLE V

Measurements of Subspecies of Buteogallus anthracinus

Buteogallus anthracinus anthracinus

Sex	*Locality*	*Wing*	*Tail*	*Culmen without Cere*	*Tarsus*
♂	Fort Clark, Texas	360	207	26.5	88
♂	Santa Efigenia, Oaxaca, Mexico	376	214	27	88.5
♂	Rivera, Northern Vera Cruz, Mexico	364	200	25.5	
♂	Chihuahua, Mexico	377	209	28	83
♂	San Louis Mountains, Chihuahua, Mexico	390	207		76
♂	Galindo, Tamaulipas, Mexico	375	208	25	90
♂	Changuinola Canal, Bocas Del Toro, Panama	366	205	28	89
♂	Western River, Bocas Del Toro, Panama	377	206	28	89
♂	Banana River, Bocas Del Toro, Panama	360	195	26	92
	Average Male	370.6	205.7	26.8	86.9
♀	Starr County, Texas	375	209	25	89
♀	Mirador, Vera Cruz, Mexico	371	203	26	89
♀	Acapulco, Guerrero, Mexico	384	248	28	94

[43]Monograph Birds of Prey, Vol. I, Part VIII, January, 1930, p. 460.

Sex	*Locality*	*Wing*	*Tail*	*Culmen without Cere*	*Tarsus*
♀	Cajon, Bonita Creek, Sonora, Mexico	389	233	28.5	87
♀	La Ceiba, Honduras	379	216.5	28.5	92
♀	Penate, Guatemala	367	207	28	89.5
♀	Talamanca, Costa Rica	383		28	90
♀	Cerro Santa Maria, Costa Rica	401	230	27	94
♀	Bolson, Costa Rica	374	212	29	95
♀	Guayabo, Costa Rica	400	229	30.5	92
	Average Female	382.3	220.8	27.9	91.2

Buteogallus anthracinus subtilis

Sex	*Locality*	*Wing*	*Tail*	*Culmen without Cere*	*Tarsus*
♂	Pigres, Nicoya, Costa Rica	354	196	28	
♂	Paquera, Nicoya, Costa Rica	369	205	27	89
♂	Paquera, Nicoya, Costa Rica	367	203	27	90
♂	Ballena, Guanacaste, Costa Rica	365	200	27	89
♂	Humo, Guanacaste, Costa Rica	355	197	28	87
♂	I. del Caño, Guanacaste, Costa Rica	353	186	26	82
♂	I. del Caño, Guanacsate, Costa Rica	340	185	26	91
♂	I. del Caño, Guanacaste, Costa Rica	342	170	25	85
♂	Azuero Peninsula, Panama	337	182	23	81
♂	Azuero Peninsula, Panama	330	174	25	80
♂*	Pearl Islands, Panama	368	192	29	89
♂†	Gorgona Island, Colombia	343	183	28	85
	Average Male	351.9	189.4	26.6	86.2
♀	Pigres, Nicoya, Costa Rica	355	197	27	84
♀	Pigres, Nicoya, Costa Rica	380	218	28	88.5
♀	Pigres, Nicoya, Costa Rica	377	210	29	91
♀	Pigres, Nicoya, Costa Rica	368	217	28	85
♀	Ballena, Guanacaste, Costa Rica	367	205	28	89
♀	Punta Jiminez, Pen. de Oso, Costa Rica	355	185	25	90
♀	I. del Caño, Costa Rica	349	185	28	88
♀	I. del Caño, Costa Rica	337	182	26	88
♀	I. del Caño, Costa Rica	330	173	27	91
	Average Female	357.6	196.9	27.3	88.3

Buteogallus anthracinus cancrivorus

Sex	*Locality*	*Wing*	*Tail*	*Culmen without Cere*	*Tarsus*
♂	Port Obaldia, Panama	365	195	26	92
♂	Port Obaldia, Panama	361	197	25	88
♂	Port Obaldia, Panama	355	192	26	83
♂	Port Obaldia, Panama	370	195	27	93
♂	Port Obaldia, Panama	352	187	27	81
♂	Port Obaldia, Panama	363	205	27	89
	Average Male	361.0	196.8	26.3	87.7
♀	Port Obaldia, Panama	367	206	29	90
♀	Port Obaldia, Panama	367	205	29	87
♀	Port Obaldia, Panama	378	205	28	88

Sex	*Locality*	*Wing*	*Tail*	*Culmen without Cere*	*Tarsus*
♀	Port Obaldia, Panama	367	202	28	88
♀	Port Obaldia, Panama	360	202	28	84
♀	Port Obaldia, Panama	367	210	28	91
♀	St. Vincent Island, West Indies	378	207	27	92
	Average Female	369.1	207.3	28.1	88.6

*Type of *Urubitinga anthracina bangsi*.
†Type of *Urubitinga subtilis*.

The most reliable difference between *B. a. subtilis* and *B. a. cancrivorus* is the lack of buff and white bases of the anterior dorsal feathers in the adult birds of the former race, in which respect it is like *B. a. anthracinus*. *B. a. cancrivorus* does average larger than *B. a. subtilis*, but the overlapping in this respect is considerable.

On the basis of the characters mentioned above, a tentative delineation of the ranges of the subspecies of *Buteogallus anthracinus* might be suggested as follows:

Buteogallus anthracinus anthracinus.—Southern Arizona and central southern Texas to western Panama (Almirante Bay) excepting edge of Pacific coast line from southern Mexico southeastward.

Buteogallus anthracinus cancrivorus.—Caribbean coast of Venezuela together with Trinidad and the nearest of the Lesser Antilles (at least north to St. Vincent), west along the Caribbean coast of Colombia to eastern Panama (Port Obaldia).

Buteogallus anthracinus subtilis.—Pacific coast and islands of Central and South America from Guerrero, Mexico to Ecuador.

A peculiarity in the range of *B. a. subtilis* is that it seems to be confined almost entirely to the narrow belt of coastal mangrove swamps of the Pacific coast and islands, while that of *B. a. anthracinus* includes the upland as well as the Caribbean coast region. In Costa Rica, as soon as the immediate vicinity of the Pacific coast is left, the birds approach *B. a. anthracinus* in appearance very rapidly, as is shown by the specimen of that subspecies from Bolson, Costa Rica, which is only 20 miles inland at the base of the Peninsula de Nicoya.

The above given statement of ranges does not take into account South American specimens which authors have referred to *B. a. anthracinus*. It is possible, of course, that the range of this form runs through the interior of Panama into the interior of Colombia, but, having seen no specimens from these regions, the writer cannot say whether or not this is the case. If specimens exist from these areas and were examined in the light of possible intergradation between *B. a. subtilis* and *B. a. cancrivorus*, it might be found that this would be a better explanation of their status than referring them to *B. a. anthracinus*.

The Pearl Islands specimen used by Swann[44] as the type of *Urubitinga anthracinus bangsi*, as mentioned above, was referred to *Buteogallus anthracinus anthracinus* by Peters.[45] The writer has examined this bird and agrees that it resembles that form except in length of tail and in the amount of white on the primaries, in which respects it is nearer to *B. a. subtilis*. Therefore he prefers to consider the type of *Urubitinga anthracina bangsi* a large example of *Buteogallus anthracinus subtilis*.

The Gorgona black hawk was observed on several occasions on the Azuero Peninsula along tidal ditches and at the edge of the mangrove swamp. On one of these occasions an individual was standing on a small plank bridge over a tidewater irrigation ditch among the cocoanut palms. The bird was eating a crab, and allowed a rather close approach before flying away and leaving the shell of the crab for examination.

Specimens Collected

C. M. N. H. Number	*Sex*	*Locality*	*Elevation*	*Date*
22036	♂	Paracoté	Sea Level	February 10, 1932
22037	♂	Paracoté	Sea Level	March 29, 1932

Herpetotheres cachinnans cachinnans (Linnaeus).
LAUGHING FALCON.

The 2 specimens collected have been compared with 8 specimens from the Pacific coast of Costa Rica. Six of the Costa Rica birds are more whitish below and 2 are of a deeper buff than our specimens.

[44]Monograph Birds of Prey, Vol. I, Part VIII, January, 1930, p. 460.
[45]Check List of Birds of the World, Vol. I, October 6, 1931, p. 244.

No topotypical specimens of *Herpetotheres cachinnans cachinnans* or *Herpetotheres cachinnans fulvescens* were seen. However, Griscom[46] seems to have worked out the status of the subspecific relationships of this hawk about as well as is possible with a species so subject to individual variation, and I here abide by his conclusions in referring our specimens to the typical form *H. c. cachinnans*.

The 2 specimens collected were the only examples of this bird seen. Both were sitting quietly on the lower limbs of trees at the forest margin when discovered, and allowed a rather close approach without showing any sign of alarm.

Specimens Collected

C. M. N. H. Number	*Sex*	*Locality*	*Elevation*	*Date*
22043	♀	Paracoté	Sea Level	February 15, 1932
22044	♀	Paracoté	Sea Level	March 27, 1932

Daptrius americanus guatemalensis (Swann). NORTHERN RED-THROATED CARACARA.

The 2 males that we obtained have wing measurements of 357 mm. and 363 mm. respectively and thus seem to be referable to the northern form *Daptrius americanus guatemalensis*. Comparison was made with a male of *D. a. guatemalensis* from Costa Rican and a female of *D. a. americanus* from French Guiana the wings of which measure 365 mm. and 320 mm. respectively. Furthermore, the dimensions of our birds fall well within the limits given by Peters[47] for *D. a. guatemalensis*, and are greater than the maximum given by that author for *D. a. americanus*.

The 2 specimens were the only individuals of this species seen. They were discovered by the terrific din that they were making in the forest. When one of the birds was shot the other flew over, squawking raucously, and began hopping excitedly from one branch to another so close to me that I hesitated to shoot for fear of damaging it for a specimen.

[46]Bull. Amer. Mus. Nat. Hist., Vol. LXIV, May 7, 1932, pp. 159-161.
[47]Proc. Biol. Soc. Washington, Vol. 44, February 21, 1931, p. 25.

Specimens Collected

C. M. N. H. Number	*Sex*	*Locality*	*Elevation*	*Date*
22040*	♂	Paracoté	Sea Level	March 24, 1932
22041*	♂	Paracoté	Sea Level	March 24, 1932

*Bill yellow. Cere bluish gray. Feet, iris, and bare skin of head red. Claws black.

Milvago chimachima cordatus Bangs and Penard. PANAMA CARACARA.

The single specimen obtained was the only example of the species seen. It was observed perched on the top of a cocoanut palm beside our house on the plantation.

Specimens Collected

C. M. N. H. Number	*Sex*	*Locality*	*Elevation*	*Date*
22042	♂(?) juv.	Paracoté	50 Feet	February 19, 1932

Falco albigularis albigularis Daudinn. WHITE-THROATED BAT FALCON.

The only record for this species is 1 specimen collected at the outer edge of the mangrove swamp fringing Montijo Bay.

Specimens Collected

C. M. N. H. Number	*Sex*	*Locality*	*Elevation*	*Date*
22045*	♀	Paracoté	Sea Level	April 2, 1932

*Cere and bare skin around eye yellowish green.

Crax rubra rubra Linnaeus. RED CURASSOW.

It seems obvious from an examination of the literature that the systematic status of the species *Crax rubra* is not well understood. With only one pair of birds available the writer can contribute little to its elucidation except to describe the appearance of these 2 birds with the hope that in the future this may be of assistance to some worker who attempts a revision of the forms of this group. Meanwhile, I shall follow Miller and Griscom[48] who seem to have worked out the status of the Panama examples of this species about as well as is possible in such a variable form and with but few specimens available. They refer Panama birds to *Crax globicera* which

[48]Amer. Mus. Novit., No. 25, December 9, 1921, pp. 7-8.

is shown by Peters[49] to be a synonym of *Crax rubra*. Our specimens may be described as follows:

Adult male: head, neck, back, wings, tail, chest, and thighs, black with a slight greenish gloss on the back, wings, chest, and upper surface of the tail; middle of breast brownish black; posterior flanks, abdomen, and under tail-coverts, pure white; bill pale buff at tip, with a dark brown band around the middle (at nostril), yellow at base, with yellow caruncle on the base of the culmen. Length of wing, 392 mm.; tail, 327; exposed culmen, 56; tarsus, 126.

Adult female: head and neck, black barred with white, the long crest feathers with a single white band, shorter feathers of neck and throat usually with two white bands; anterior back and chest, deep chestnut; remainder of back and chest and wings, chestnut; primaries and secondaries barred and spotted with black; breast pale chestnut on the sides, shading to ochraceous tawny in the center; abdomen ochraceous buff; upper surface of tail chestnut barred with black and pale ochraceous buff; under surface of tail brownish black with traces of chestnut at base and tip, crossed by pale ochraceous buff bars flecked with black; bill buffy at tip, brown at base. Wing, 379 mm.; tail, 304; exposed culmen, 46; tarsus, 116.

It is worthy of note that the male does not have a white tip to the tail; also that the female, although apparently fully adult in other respects, does have distinct black barring on the wings. The white tip on the tail of the male and the lack of barring on the wings were characters used by Ogilvie-Grant[50] in separating *Crax panamensis* from *Crax globicera*.

The two birds listed below were the only examples seen. They were evidently a pair as they were found together on the ground beside a spring in the deep forest at Cerro Viejo Camp. They ran along the ground together when disturbed by my approach, not attempting to fly until I discharged my gun. When the female was shot the male flew into the lower branches of a tree near by, where he stood craning his neck in the direction of his fallen mate until he also was collected. This seemed like a remarkable exhibition of tameness for a species so persistently hunted for food by the

[49]Check List of the Birds of the World, Vol. II, June 15, 1934, p. 12.
[50]Catalogue of Birds in the British Museum, Vol. XXII, December, 1893, pp. 479-480.

natives as is this species. It is called "pavo real" by the natives to distinguish it from the more common "pavo" (*Penelope purpurascens*).

Specimens Collected

C. M. N. H. Number	*Sex*	*Locality*	*Elevation*	*Date*
22046*	♂	Cerro Viejo Camp	2000 Feet	March 9, 1932
22047	♀	Cerro Viejo Camp	2000 Feet	March 9, 1932

*Caruncle and base of bill lemon yellow.

Penelope purpurascens aequatorialis Salvadori and Festa. EQUATORIAL GUAN.

The 3 specimens collected are not distinguishable from 2 from western Ecuador in the collection of Mr. H. B. Conover, and thus can be considered typical of the race *Penelope purpurascens aequatorialis*.

The "pavo", as the natives called this species, was much sought after as food in Panama, and so was much more abundant away from than near the plantation. It was encountered fairly regularly in the humid tropical forests on the mountain slopes, particularly at Cerro Viejo camp where a flock of 7 birds flew through camp one day, and where on another occasion a group of five was observed in one tree, feeding on its fruit. It was not observed in the cloud forest at 3000 feet elevation.

Specimens Collected

C. M. N. H. Number	*Sex*	*Locality*	*Elevation*	*Date*
22048*	—	Paracoté	Sea Level	February 16, 1932
22049	—	Mariato River Camp	250 Feet	February 26, 1932
22050	♀	Paracoté	Sea Level	March 19, 1932

*Bare skin on throat brick red.

Ortalis garrula olivacea, subsp. nov. AZUERO GUAN.

Subspecific Characters.—Similar to *Ortalis garrula cinereiceps* but somewhat larger; distinctly darker olive brown on back, wings, upper tail-coverts, and chest; tail darker, greenish black; primaries more deeply rufescent. Very different from *Ortalis garrula frantzii*, being distinctly larger, much paler throughout, and more olive (less reddish) brown.

Measurements.—Adult male (4 specimens from the Azuero Peninsula): wing, 212-227 (average, 218.5) mm.; tail, 222-240 (230.5); exposed culmen, 25-26 (25.8); tarsus, 65-69 (67.3). Adult female (1 specimen from the Azuero Peninsula); wing, 205; tail, 228; exposed culmen, 26; tarsus, 64.

Type.—Adult male, No. 22052, Cleveland Museum of Natural History; Paracoté, elevation 50 feet, eastern shore of Montijo Bay, 1 mile south of the mouth of the Angulo River, Veraguas, Panama; February 10, 1932; John W. Aldrich, original number 1683.

Geographic Distribution.—As far as is known, confined to the Azuero Peninsula, Southern Veraguas, Panama. Possibly occuring also in other parts of the Pacific coast of Veraguas, and Chiriqui, Panama.

Remarks.—Peters[51] gives as the type locality of *Ortalis garrlau cinereiceps* (*Ortalida cinereiceps* G. R. Gray), " 'north-west coast of America' error=Pearl Islands (?). Type collected by Kellett and Wood." Mr. Peters writes me as follows, "The question mark after Pearl Islands in my second volume under *Ortalis g. cinereiceps* is meant to express doubt as to whether the type of *Ortalida cinereiceps* Gray came from the Pearl Islands. The type was collected by Kellett and Wood and most of Kellett and Wood's Central American birds probably came from the Pearl Islands, but some of them may possibly have come from Panama. The Herald, under Captain Kellett, was at the Pearl Islands and Panama, March 23-April 16, 1846. See Seeman's narrative of the Voyage of the Herald, Vol. 1."

Mr. N. B. Kinnear has kindly examined for me the type of *Ortalida cinereiceps* in the British Museum, and writes, "I am afraid it is not possible to say where the type of *O. cinereiceps* came from as it has no proper collector's label.

"Of the three Panama birds we have, only one has an exact locality, Paraiso Station, but in color they are all the same, and so too are our Veraguas skins. I cannot say that the type of *O.cinereiceps* differs from these birds."

In view of the apparent impossibility of determining positively the exact source of the type specimen of *Ortalis garrula cinereiceps*

[51]Check List of Birds of the World, Vol. II, June 15, 1934, p. 20.

and since it seems desirable to have the type locality fixed in view of the presence of more than one geographic race of the species in Panama, I designate San Miguel, Pearl Islands, Bay of Panama, as the type locality of *Ortalis garrula cinereiceps* (Gray). This action is in accordance with the commonly accepted procedure in designation of type locality, since Kellet and Wood are known to have visited this archipelago and could have obtained the bird there.

Examining a series of specimens from several localities in Panama and Costa Rica the writer found that a bird from Boruca, Costa Rica, in the Museum of Comparative Zoölogy collection, although slightly darker and more rufescent above than 3 specimens from the Pearl Islands is closer to these birds than to those from the Azuero Peninsula and should doubtless be referred to *O. g. cinereiceps*. This fact together with the findings of Thayer and Bangs,[52] and Kinnear (see above) that examples from the Pacific side of the Canal Zone, Veraguas (interior) and Chiriqui are inseparable from the Pearl Island birds, leads me to believe that the range of *O. g. cinereiceps* includes not only the Pearl Islands, but also the mainland of Panama and Costa Rica, at least on the Pacific side, from the Canal Zone westward to Boruca, but omitting the Azuero Peninsula which is occupied by *O. g. olivacea*. Eight specimens from eastern Costa Rica in the collection of Mr. H. B. Conover are much smaller and darker than Pearl Island examples and are taken to be representative of *Ortalis garrula frantzii*. Although no topotypical specimens of this race have been seen, 5 of the 8 specimens examined were from Jiminez and Guapiles which are near Bonilla, from which region came specimens referred by Miller and Griscom[53] to *Ortalis garrula saturata*. This form has been listed by Peters[54] as a synonym of *O. g. frantzii*.

I am unable satisfactorily to place 2 specimens in the collection of the U. S. Biological Survey from Gatun on the Caribbean side of the Canal Zone. They are distinctly darker and more rufescent, both above and below, than typical *O. g. cinereiceps* from the Pearl Islands, being in fact almost directly intermediate in color between them and the series of *O. g. frantzii* from western Costa Rica. They differ from the Azuero Peninsula series of *O. g. olivacea* chiefly in being more rufescent, particularly on the chest, and of a somewhat

[52]Bull. Mus. Comp. Zoöl., Vol. XLVI, No. 8, September, 1905, p. 145.
[53]Amer. Mus. Nat. Hist. Novit., No. 25, December 9, 1921, pp. 1-2.
[54]Check List of Birds of the World, Vol. II, June 15, 1934, p. 20.

darker gray on the head. No specimens of *Ortalis garrula mira* from the Caribbean coast of eastern Panama have been seen, so it cannot be said what relationship the Gatun specimens bear to this form. If a larger series of specimens from the Caribbean slopes of central and western Panama should show the bird from this region to be distinct, it would be another case like those of *Tinamus major* and *Crypturornis soui* in which the comparatively tiny geographic area of the Canal Zone is favored with 2 races of the same species, one on the more humid Caribbean side and the other on the less humid Pacific side.

The Azuero guan was not uncommon along the edge of the forest adjoining the cocoanut plantation at Paracoté. A group of 6 birds was observed on one occasion noisily feeding in certain trees which were loaded with ripe fruit. The loud calls of these birds were frefuently heard at dawn and sunset, at which times they apparently vied with the howler monkeys for dominance of sound. The "faisano," as the natives called this little guan, was entirely absent from the deep forest, where it was replaced by the big crested guan (*Penelope purpurascens*).

Specimens Collected

C. M. N. H. Number	*Sex*	*Locality*	*Elevation*	*Date*
22051	♂	Paracoté	50 Feet	February 7, 1932
22052	♂	Paracoté	50 Feet	February 10, 1932
22103	♀	Paracoté	50 Feet	February 10, 1932
22054	♂	Paracoté	50 Feet	March 27, 1932
22055	♂	Paracoté	50 Feet	March 27, 1932

Aramides cajanea cajanea (P. L. S. Müller). CAYENNE WOOD RAIL.

The single specimen obtained has been compared with examples of *Aramides cajanea latens* from the Pearl Islands and with *Aramides cajanea cajanea* from eastern Panama, and seems to be typical of the latter form. The colors of the soft parts as noted from the newly killed bird are: skin around eye, iris, corners of mouth and feet, red; inner half of bill brownish yellow; outer half pale bluish green.

These interesting rails were seen on a few occasions along the tidal drainage ditches on the cocoanut plantation at or near sea

level. Their weird cries were heard frequently at night. Our guide, P. A. Davies, a resident of Santiago, Veraguas, and a better than average observer of wild life, told us that the curious noise was made by two birds standing face to face and calling in unison, accompanying the sound by vigorously raising and lowering their heads. The cry is loud and might be described as a series of short gurgling laughs. This call was heard once at dusk at an altitude of 3000 feet in the mountains, coming from the vicinity of a small stream bed at the edge of the forest.

Specimens Collected

C. M. N. H. Number	*Sex*	*Locality*	*Elevation*	*Date*
22056	♂	Paracoté	50 Feet	April 2, 1932

Charadrius semipalmatus Bonaparte. SEMIPALMATED PLOVER.

The little semipalmated plover was a very common constituent of the droves of shore-birds that paraded up and down the mud-flats bordering Montijo Bay.

Squatarola squatarola (Linnaeus). BLACK-BELLIED PLOVER.

A few black-bellied plovers were detected among the shore-bird aggredations that swarmed over the mud bars at the mouth of the estero at Paracote. This species was still present on March 29, 1932, which was the last day of collecting in that habitat.

Numenius hudsonicus Latham. HUDSONIAN CURLEW.

Several Hudsonian curlews were seen on March 29, 1932 on the mud-flats bordering Montijo Bay, which were exposed at low tide.

Actitis macularia (Linnaeus). SPOTTED SANDPIPER.

Several spotted sandpipers were seen on February 13, 1932 on the beach at Paracoté. A single individual was seen on February 20 in a small gravel pit in a pasture at Paracoté. Several more were seen teetering along the sand-bars among the rocks on the Mariato River 10 miles east of Montijo Bay during our stay in camp on that river, February 21-26.

Catoptrophorus semipalmatus, (subsp.?). WILLET.

A few willets were present on the mud-flats bordering Montijo Bay on March 29, 1932. Failure to obtain specimens makes it impossible to state to which subspecies these individuals should be referred.

Tringa solitaria, (subsp.?). SOLITARY SANDPIPER.

Several individuals of this species were noted on the beach at Paracoté. As no specimens were collected, it is impossible to say to which subspecies they belonged.

Totanus melanoleucus (Gmelin). GREATER YELLOW-LEGS.

The greater yellow-legs was a common species among the large shore-bird gatherings on the sand-bars at the mouth of the estero at Paracoté.

Limnodromus griseus, (subsp.?). DOWITCHER.

Several dowitchers were seen among other shore-birds on the mud-flats of Montijo Bay on March 29, 1932. Since no specimens were collected, however, it is impossible definitely to allocate them subspecifically.

Ereunetes pusillus (Linnaeus). SEMIPALMATED SANDPIPER.

Large numbers of these little sandpipers were seen on several occasions both on the beach at Paracoté and on the extensive mud-flats at the mouth of the Paracoté estero.

Columba speciosa Gmelin. SCALED PIGEON.

A single specimen of this species, called "paloma del monte" by the natives, collected on the cocoanut plantation, was the only individual observed on the entire trip. Color notes on the soft parts of this specimen are as follows: bill red, except tip, which is pale horn; feet purplish gray, skin around eye purplish red.

Specimens Collected

C. M. N. H. Number	*Sex*	*Locality*	*Elevation*	*Date*
22057	♂	Paracoté	50 Feet	March 28, 1932

Columba rufina pallidicrissa Chubb. PALE-VENTED PIGEON.

Two specimens, taken in the vicinity of the cocoanut plantation by P. A. Davies were the only ones recorded for the entire trip.

Specimens Collected

C. M. N. H. Number	*Sex*	*Locality*	*Elevation*	*Date*
22058*	♂	Paracoté	Sea Level	March 28, 1932
22059	♂ im.	Paracoté	Sea Level	March 28, 1932

*Skin around eye and feet, purplish red.

Columbigallina minuta elaeodes (Todd). PLAIN-BREASTED GROUND DOVE.

From an examination of 47 specimens from British Honduras, Costa Rica, Panama, Colombia, Venezuela, Peru, and Bolivia, it seems evident that there is more geographic variation in this species than is shown by the currently recognized nomenclature. In the first place, two males and one female from Lima, Peru, in the Carnegie Museum are so very distinctly paler than a series of *Columbigallina minuta minuta* from Venezuela that it seems desirable to consider them as representing a distinct subspecies for which the name of *Columbigallina minuta amazilia* (Bonaparte) is available, according to Todd[55] who also noted this paler condition in a specimen from Lima. A single male from the Department of Vera Cruz, Bolivia, is intermediate in pallor between Venezuela and Peru birds, but has more white on the greater coverts than either.

The difference between *C. m. minuta* and *C. m. elaeodes* is very well marked in the series examined; the 14 specimens from Costa Rica, including 4 from Buenos Aires (topotypical *C. m. elaeodes*), being approximately as much darker throughout than the Venezuelan birds as the latter are darker than the specimens from Lima,Peru.

There also seem to be less conspicuous geographic differences among the Central American examples. Seven birds from the Pan-

[55]Ann. Carnegie Mus., Vol. VIII, Nos. 3-4, March, 1913, pp. 557-578.

ama Canal Zone average darker and more brownish (less grayish) olive brown above, with the olive brown patch on the crown more extensive than in Costa Rica specimens.

The single adult male from the Azuero Peninsula is paler than any other Central American bird seen. In fact it is as pale as the average of the Venezuela specimens, but more brownish, (less grayish) olive brown above and has the under tail-coverts much more buffy. The two females from the Azuero Peninsula, however, are as dark as the Canal Zone birds and like them more brownish than the Costa Rica specimens.

Three specimens in the Carnegie Museum from All Pines, British Honduras, are larger and darker than Costa Rica examples, and like the Canal Zone specimens have a much more extensive crown patch. They are like the Costa Rica birds, however, in having a more grayish cast to the olive brown above. Below they have a more grayish appearance than any of the other examples of this species examined. Guatemala and British Honduras birds have been named by Griscom *Columbigallina minuta interrupta*.

The Canal Zone birds like those from Guatemala and British Honduras may eventually prove to be worthy of separation from *C. m. elaeodes*, but, at the present time, the writer hesitates to recommend such a course because the considerable amount of individual variation makes it imperative to have larger series than have been available before the true relationships can definitely be determined.

Field experience with this species on the Azuero Peninsula proved it to be not nearly as common as the slightly larger ruddy ground dove (*Columbigallina rufipennis*). In fact it was seen only in a rather restricted area of low brushy growth among the cocoanut palms on the plantation.

Specimens Collected

C. M. N. H. Number	*Sex*	*Locality*	*Elevation*	*Date*
22074	♀	Paracoté	Sea Level	February 13, 1932
22075	♂	Paracoté	Sea Level	February 17, 1932
22076	♀	Paracoté	Sea Level	February 17, 1932
22077	♀ juv.	Paracoté	Sea Level	March 21, 1932

Columbigallina rufipennis rufipennis (Bonaparte). RUDDY GROUND DOVE.

Although presenting considerable individual variation in color, both in males and in females, the specimens of *Columbigallina rufipennis rufipennis* that we obtained on the Azuero Peninsula show no average difference from examples from surrounding regions of Central America. They have not, however, been compared with topotypical specimens from Carthagena, Colombia.

This little ground dove was one of the commonest species about the houses, in the pastures, and among the cocoanut palms on the plantation. Small flocks of from six to a dozen birds were frequently seen in our dooryard, walking about briskly with the characteristic head-bobbing motion of the pigeon tribe. They seemed to be endowed with a great amount of nervous energy and were constantly on the move.

Specimens Collected

C. M. N. H. Number	*Sex*	*Locality*	*Elevation*	*Date*
22069	♂	Paracoté	50 Feet	February 7, 1932
22070	♂	Paracoté	50 Feet	February 10, 1932
22071	♀	Paracoté	50 Feet	February 10, 1932
22072	♀	Paracoté	50 Feet	March 21, 1932
22073	♂	Paracoté	50 Feet	March 29, 1932

Claravis pretiosa pretiosa (Ferrari-Perez). BLUE GROUND DOVE.

The single female specimen collected was the only example of this species noted on the entire trip.

Specimens Collected

C. M. N. H. Number	*Sex*	*Locality*	*Elevation*	*Date*
22068	♀	Mariato River Camp	250 Feet	February 24, 1932

Leptotila verreauxi verreauxi (Bonaparte). VERREAUX DOVE.

Our Azuero Peninsula series of 5 birds is very little more brownish than a specimen from Cayenne, French Guiana; in fact, it is closer to that specimen than to two birds from Divala and Bugaba, Western Panama. These last two specimens are decidedly more brownish

above than the Guiana specimen and so show a tendency to intergrade with *Leptotila verreauxi riottei* of eastern Costa Rica.

The Verreaux dove was a very common bird about the houses, among the cocoanut palms, and in more open situations about the plantation. It was entirely absent from the heavy forest away from the plantation and from the mountains.

Specimens Collected

C. M. N. H. Number	*Sex*	*Locality*	*Elevation*	*Date*
22062*	♂	Paracoté	50 Feet	February 13, 1932
22063*	♀	Paracoté	50 Feet	February 13, 1932
22064*	♀	Paracoté	50 Feet	February 14, 1932
22065	♂	Paracoté	50 Feet	March 22, 1932
22066	♂	Paracoté	50 Feet	March 28, 1932

*Feet red. Skin around eye grayish blue. Iris orange.

Leptotila plumbeiceps malae Griscom. CAPE MALA DOVE.

The two specimens collected very well substantiate the characters of this form which was described by Griscom[56] from a single female collected by Rex Benson at Cerro Montuosa, not more than 10 miles from where our birds were taken. Our specimens are therefore virtually topotypes, and their capture exactly tripled the number of existing examples of this form in collections.

This Cape Mala dove is a bird of the deep tropical rain forest, where it was occasionally flushed with a loud partridge-like whir of wings from the trails ahead of us as we walked along. It was not common anywhere.

Specimens Collected

C. M. N. H. Number	*Sex*	*Locality*	*Elevation*	*Date*
22060*	♀	Mariato River Camp	250 Feet	February 23, 1932
22061	♂	Cerro Viejo Camp	2000 Feet	March 7, 1932

*Feet red.

Oreopeleia montana (Linnaeus). RUDDY QUAIL DOVE.

The only one of this species seen was a female taken in the forest at 3000 feet elevation. The interesting colors of the unfeathered parts are as follows: base of bill red; feet, with scales red, skin be-

[56]Amer. Mus. Novit., No. 280, September 10, 1927, p. 4.

tween scales flesh color; iris golden brown (same color as feathers around eye); bare skin around eye gray, with reddish on eyelids in front of and under eye.

Specimens Collected

C. M. N. H. Number	*Sex*	*Locality*	*Elevation*	*Date*
22067	♀	Cerro Viejo, Cavulla	3000 Feet	March 14, 1932

Aratinga ocularis (Sclater and Salvin). VERAGUA PAROQUET.

Our series does not differ appreciably in size or color from specimens taken in other parts of the limited range of this species.

The Veragua paroquet was a common bird on the plantation, moving in flocks of from two to a dozen birds, and frequenting the scrubby cutover land. Toward evening the flocks would fly back and forth with considerable vocal clatter.

Specimens Collected

C. M. N. H. Number	*Sex*	*Locality*	*Elevation*	*Date*
22083	♂	Paracoté	50 Feet	March 22, 1932
22084	♂	Paracoté	50 Feet	March 22, 1932
22085	♂	Paracoté	50 Feet	March 22, 1932
22086	♀	Paracoté	50 Feet	March 22, 1932
22087	♀	Paracoté	50 Feet	March 22, 1932
22088	—	Paracoté	50 Feet	March 22, 1932

Brotogeris jugularis jugularis (Müller). TOVI PAROQUET.

This was a common bird on the plantation, traveling about in large bands, and feeding usually in the tops of certain tall trees at the edge of the forest where it found small red fruit much to its liking. When fired at repeatedly, the whole flock would fly off noisily each time, then circle around and come back to the same tree and start feeding again.

Specimens Collected

C. M. N. H. Number	*Sex*	*Locality*	Elevation	*Date*
22089	♂	Paracoté	Sea Level	March 27, 1932
22090	♂	Paracoté	Sea Level	March 27, 1932
22091	♂	Paracoté	Sea Level	March 27, 1932
22092	♀	Paracoté	Sea Level	March 27, 1932
22093	♀	Paracoté	Sea Level	March 27, 1932
22094	♀	Paracoté	Sea Level	March 27, 1932
22095	♀	Paracoté	Sea Level	March 27, 1932
22096	♀	Paracoté	Sea Level	March 27, 1932
22097	♀	Paracoté	Sea Level	March 29, 1932

Amazona autumnalis salvini (Salvadori). SALVIN PARROT.

Two of the 4 specimens collected have a trace of yellow on the lores which indicates a slight tendency toward intergradation with *Amazona autumnalis autumnalis*.

This was the commonest parrot on the plantation. Groups of two or three individuals would start flying late in the afternoon and would course back and forth over the treetops, giving vent to raucous calls as they flew. Occasionally individuals would come into the orange trees earlier in the day and feed on the ripening fruit. At such times they were very quiet. Sometimes birds of this species would be frightened by some one from certain fruit-bearing trees on the edge of the forest. On such occasions the birds would invariably wait until he had passed the tree, when they would fly off with loud cries, but always keep a screen of foliage between themselves and the intruder until well out of range. Salvin parrots were shyer and more difficult to collect than almost any other species encountered on the plantation. They were absent from the heavy forest and mountain regions visited.

Specimens Collected

C. M. N. H. Number	*Sex*	*Locality*	*Elevation*	*Date*
22078	♂	Paracoté	50 Feet	February 10, 1932
22079*	♂	Paracoté	50 Feet	February 18, 1932
22080	♂	Paracoté	50 Feet	March 24, 1932
22081	♂	Paracoté	50 Feet	March 27, 1932

*Iris orange.

Pionus menstruus (Linnaeus). BLUE-HEADED PARROT.

Only 1 individual of the blue-headed parrot was seen on the entire trip. It was taken at the edge of a clearing in the forest at an altitude of 1500 feet.

Specimens Collected

C. M. N. H. Number	*Sex*	*Locality*	*Elevation*	*Date*
22082	♂	Altos Cacao	1500 Feet	March 2, 1932

Piaya cayana incincta Griscom. PANAMA SQUIRREL CUCKOO.

The 2 specimens obtained have been compared with 1 nearly topotypical example of *Piaya cayana incincta* from Port Obaldia and

8 supposedly typical specimens of *Piaya cayana thermophila* from Mexico: 3 from Vera Cruz, 1 from Tabasco, 1 from Chaiapas, 1 from Campeche, and 2 from Oaxaca.

The Azuero Peninsula birds are decidedly nearer *P. c. incincta* than to *P. c. thermophila* in the following respects: generally darker coloration above, with a more pronounced violaceous gloss on the back, wings, and upper surface of the tail; more blackish abdomen and under tail-coverts; longer, stouter, and more highly arched bill; and narrower black tips on the tail-feathers.

The larger and more highly arched bill was not noted by Griscom[57] as one of the distinguishing characters of *P. c. incincta*, but was mentioned by Van Rossem[58] as characteristic of Panama and Costa Rica specimens. The series available shows this difference to be one of the most pronounced and constant of those separating the 2 forms. The color of the under surface of the rectrices, on the other hand, although used by Griscom[57] as one of the most important characters of *P. c. incincta*, is found to be the one most subject to individual variation and of no value in separating the 2 Azuero Peninsula birds from the Mexican series, since they are identical in this respect. In fact, one of the Azuero specimens had median rectrices with under surfaces as blackish as the extreme of the 3 specimens from Vera Cruz.

Although the Azuero Peninsula specimens are definitely referable to *P. c. incincta* they are by no means typical of that form. They are somewhat intermediate in every character mentioned between the Obaldia specimen and the Mexican series. Two specimens from western Costa Rica (El Pozo and El General) are almost exactly intermediate between the representatives of these 2 races, but seem a shade nearer *P. c. incincta* on the basis of size of bill, and coloration of upper parts.

The 2 specimens listed below were the only ones seen on the trip. One was taken at the edge of the forest on the plantation and the other in a similar situation on the ridge at Altos Cacao. My attention was attracted to the latter bird by its extremely squirrel-like scolding notes.

[57]Bull. Mus. Comp. Zoöl., Vol. LXXII, No. 9, January, 1932, p. 324.
[58]Trans. San. Diego Soc. Nat. Hist., Vol. VI., No. 12, September 30, 1930, p. 210.

Specimens Collected

C. M. N. H. Number	*Sex*	*Locality*	*Elevation*	*Date*
22098	♂	Paracoté	Sea Level	February 11, 1932
22099	♀	Altos Cacao	1500 Feet	March 2, 1932

Crotophaga sulcirostris sulcirostris Swainson. GROOVE-BILLED ANI.

This was a very common species in the low, coastal, brushy savannahs and on the cocoanut plantation proper, where small flocks were frequently noticed with the individual birds grouped closely together, usually all in the same bush. It was absent from the forested regions and upland savannahs.

Specimens Collected

C. M. N. H. Number	*Sex*	*Locality*	*Elevation*	*Date*
22100	♂	Paracoté	50 Feet	February 5, 1932
22101	♂	Paracoté	50 Feet	February 7, 1923
22102	♂	Paracoté	50 Feet	February 7, 1932
22103	♀	Paracoté	50 Feet	February 7, 1932
22104	♀	Paracoté	50 Feet	February 7, 1932

Antrostomus carolinensis (Gmelin). CHUCK-WILL'S-WIDOW.

This North American migrant was flushed from the trail that runs along a forested ridge at 1500 feet elevation. The big goatsucker flew to a shrub near by where it perched and whence it was collected.

According to Griscom[59] there are only three records for the chuck-will's-widow in Panama, two from Chiriqui and one from Permé. The capture of this specimen is therefore of particular interest.

Specimens Collected

C. M. N. H. Number	*Sex*	*Locality*	*Elevation*	*Date*
22105	♀	Altos Cacao	1500 Feet	March 17, 1932

Nyctidromus albicollis intercedens Griscom. CENTRAL AMERICAN PAURAQUE.

Compared with 3 specimens of *Nyctidromus albicollis intercedens* from Honduras our 5 Azuero Peninsula specimens of this goatsucker show some differences. In size they are apparently exactly

[59]Bull. Mus. Comp. Zoöl., Vol. LXXVIII, No. 3, April, 1935, p. 317.

intermediate between *N. a. intercedens* and *N. a. albicollis*, and in this respect are similar to *Nyctidromus albicollis gilvus*. In color they are much closer to 3 Honduras specimens of *N. a. intercedens* than to 10 French Guiana specimens of *N. a. albicollis*. Although no specimens of *N. a. gilvus* were seen, it is judged from the description of that form that the Azuero Peninsula series is far too dark and heavily barred below, to be referable to it, being, if anything, darker and more heavily barred than are the Honduras birds.

At dusk the pauraques would start to limber up their voices, hesitating at first, but gradually gaining more smoothness and volume. Judging from the sounds they were common on the plantation. Individuals were often seen on the beach road during the short twilight, where they would sit on the open dusty areas, frequently jumping up into the air a few feet and then landing on the bare earth again. Presumably they were catching night flying insects which emerged from the brush that lined the road-sides.

The species was encountered twice in the forest away from the more open or brushy country of the plantation. Once a bird was flushed from the floor of the forest in daylight on the Mariato River, 10 miles from the coast. On another occasion a pair was found in the forest during the day at 1500 feet above sea level. This pair, from their behavior, which consisted of fluttering about close to me with trailing wings, gave the impression of attempting to lure me away from a nest or young birds. A search for these was fruitless, however. Judging from the frequency and intensity of the calls heard, the entire time of our stay fell within the breeding season of this species.

Specimens Collected

C. M. N. H. Number	*Sex*	*Locality*	*Elevation*	*Date*
22106	♂	Paracoté	Sea Level	February 9, 1932
22107	♂	Mariato River Camp	250 Feet	February 21, 1932
22108	♂	Altos Cacao	1500 Feet	March 2, 1932
22109	♀	Altos Cacao	1500 Feet	March 2, 1932
22110	♀	Paracoté	Sea Level	March 21, 1932

Chaetura vauxi ochropygia, subsp. nov. PALE-RUMPED SWIFT.

Subspecific Characters.—Similar to *Chaetura vauxi richmondi,* but averaging slightly smaller; rump and upper tail-coverts decidedly paler grayish brown, being much lighter than under parts instead of concolor as in *C. v. richmondi.* Similar also to *Chaetura vauxi gaumeri,* but with slightly paler rump and upper tail-coverts, and distinctly darker back, pileum, and under parts, and longer tail spines.

Measurements.—Adult male (2 specimens from the Azuero Peninsula): wing, 111.5-112 (average, 111.8) mm.; tail, 33-34.5 (33.8); exposed culmen, 5-5.5 (5.3); tarsus, 10-11.5 (10.8). Adult female (2 specimens from the Azuero Peninsula): wing, 109-112 (average, 110.5) mm.; tail, 34.5-37 (35.8); exposed culmen, 5; tarsus, 11.

Type.—Adult female, No. 22113, Cleveland Museum of Natural History; Paracoté, sea level, 1 mile south of the mouth of the Angulo River, east shore of Montijo Bay, Veraguas, Panama; February 15, 1932; John W. Aldrich, original number 1738.

Geographic Distribution.—Known from only the Azuero Peninsula, southern Veraguas, Panama. Probably intergrading with *Chaetura vauxi richmondi* in Chiriqui.

Remarks.—An excellent series of 34 specimens of *C. v. richmondi* from Mexico, Guatemala, Honduras, and Costa Rica, and 4 specimens of *C. v. gaumeri* from Yucatan were available for comparison, and the distinguishing characters of *C. v. ochropygia* mentioned above were found to be reasonably constant. The color of the rump and upper tail-coverts of each of the 4 specimens of *C. v. ochropygia* was found to be paler than any of the 34 specimens of *C. v. richmondi* which were rather uniform in respect to this character, although varying slightly geographically, the palest examples being from El General and Santa Maria de Dota, Costa Rica, and the darkest from Guatemala. A single topotypical specimen of *C. v. richmondi* from Guayabo, Costa Rica, is average for that race in respect to the color of the rump and upper tail-coverts. The color of the remainder of the upper parts and of the lower parts seems to be identical in *C. v. richmondi* and *C. v. ochropygia.* Compared to *C. v. gaumeri,*

C. v. ochropygia is distinctly darker throughout except on the rump and upper tail-coverts, where the latter averages even slightly paler, with this paleness extending farther anteriorly on the back. The tail spines of *C. v. ochropygia* are longer than those of *C. v. gaumeri*, but are of the same length as those of *C. v. richmondi*.

Although not having seen specimen showing complete intergradation, the writer follows Griscom[60] in considering *C. richmondi* and *C. gaumeri* as conspecific with *Chaetura vauxi*.

This interesting new race of the Vaux swift extends the range of that species about 160 miles farther toward South America, since it was previously known to occur only as far as western Chiriqui. The writer has not examined any specimens from that region and so cannot say to which race they belong, but would assume that they would be somewhat intermediate between *C. v. richmondi* and *C. v. ochropygia*.

The pale-rumped swift was rather a common bird both at sea level and at the higher altitudes, and at certain times it was much more in evidence than at others. Flocks were observed along the shore of Montijo Bay, over the horse pasture at Paracoté, over the clearing at Altos Cacao, and about the peak of Cerro Viejo. Toward the latter part of the afternoon was the most favorable time to see the largest concentrations of these swifts, and on a few occasions the air seemed to be fairly swarming with the birds.

Specimens Collected

C. M. N. H. Number	*Sex*	*Locality*	*Elevation*	*Date*
22111	♂	Paracoté	Sea Level	February 15, 1932
22112	♀	Paracoté	Sea Level	February 15, 1932
22113	♀	Paracoté	Sea Level	February 15, 1932
22114	♂	Cerro Viejo, Cavulla	3000 Feet	February 15, 1932

Phaethornis superciliosa cephala (Bourcier and Mulsant). NICARAGUAN HERMIT.

Assuming that Griscom[61] is correct in referring the birds of this species from Costa Rica and western Panama to *Phaethornis superciliosa cephala* and those from eastern Panama to *Phaethornis superciliosa cassini*, the single specimen obtained on the Azuero Peninsula

[60]Bull. Amer. Mus. Nat. Hist., Vol. LXIV, May 7, 1932, p. 196.
[61]Bull. Mus. Comp. Zoöl., Vol. LXXII, No. 9, January, 1932, p. 329.

should be referred to the former race. Although of slightly deeper buff below than the average of a series of 21 specimens from Costa Rica and Chiriqui, Panama, it is closer to these birds than to a series of 10 specimens from eastern Panama.

The Nicaraguan hermit was encountered in the forest on 3 occasions at as many different camps, and each time behaved in the same manner. I was, on all three occasions, unaware of its presence until it suddenly appeared before me on the trail, not more than 10 feet distant, motionless in the air except for rapidly vibrating wings and a nervous twitching of its long tail. The first 2 times this happened I tried to back away from the bird to obtain a safer distance for a shot, but on both occasions the curiosity of the bird was apparently satisfied before I could back far enough, and off it went as straight as an arrow through the forest. The third time I decided not to take a chance again and fired at point blank range with the result that the specimen is badly mutilated.

Specimens Collected

C. M. N. H. Number	*Sex*	*Locality*	*Elevation*	*Date*
22148	♀	Paracoté	50 Feet	March 25, 1932

Campylopterus hemileucurus (Lichtenstein). DE LATTRE SABRE-WING.

After having examined a long series of this species from various parts of Central America including Chiriqui, the type locality of *Campylopterus hemileucurus mellitus* Bangs, together with our specimen from the Azuero Peninsula, the writer can see no reason for separating the birds of southern Central America from those of the northern part either on the basis of the characters described by Bangs[62] or any other character. The great variation in the amount of green on the males seems to be entirely due to age or individual variation. The writer therefore agrees with Ridgway[63] and Griscom[64] in recognizing but 1 form of this species.

Only 1 individual of this handsome hummingbird was seen, and that was in the forest at our highest camp on Cerro Viejo at an altitude of 3000 feet.

[62]Proc. New Eng. Zoöl. Club, Vol. III, January 30, 1902, p. 28.
[63]Bull. U. S. Nat. Mus., No. 50, Part V, November 29, 1911, p. 358.
[64]Bull. Mus. Comp. Zoöl., Vol. LXXVIII, No. 3, April, 1935, p. 320.

Specimens Collected

C. M. N. H. Number	*Sex*	*Locality*	*Elevation*	*Date*
22146	♂	Cerro Viejo, Cavulla	3000 Feet	March 13, 1932

Florisuga mellivora mellivora (Linnaeus). JACOBIN HUMMINGBIRD.

The single specimen collected was the only one of this species encountered.

Specimens Collected

C. M. N. H. Number	*Sex*	*Locality*	*Elevation*	*Date*
22147	♀	Paracoté	Sea Level	February 11, 1932

Bombornis cuvierii saturatior (Hartert). COIBA ISLAND HUMMINGBIRD.

Although I have been unable to obtain any topotypical specimens of *Bombornis cuvierii saturatior* from Coiba Island for comparison, I refer the above specimen to that form because its under parts are slightly darker than any of the 15 specimens studied of typical *Bombornis cuvierii cuvierii* from the Canal Zone. The measurements of our specimen, however, seem to fall within the range of those of Canal Zone birds. Our specimen does not show any of the characters which differentiate *Bombornis cuvierii maculicauda*, except a more greenish breast than that of typical *B. c. cuvierii*. This, however, is also characteristic of *B. c. saturatior*. My conviction that the Azuero Peninsula specimen should be referred to *B. c. saturatior* is strengthened by the view of Griscom[65] that the birds of the "heavy coastal forests of Veraguas" belong to that form, which was formerly supposed to be confined to Coiba Island.

The specimen collected was the only individual of this species observed.

Specimens Collected

C. M. N. H. Number	*Sex*	*Locality*	*Elevation*	*Date*
22145	♀	Paracoté	Sea Level	March 23, 1932

[65]Bull. Mus. Comp. Zoöl., Vol. LXXII, No. 9, January, 1932, p. 332.

Lepidopyga caeruleogularis caeruleogularis (Gould).
DUCHASSAIN HUMMINGBIRD.

The determination of the systematic status of our specimens of this form has not been wholly satisfactory because of my inability to obtain a single certainly typical specimen of *Lepidopyga caeruleogularis caeruleogularis* from Chiriqui for comparison. A single female from Costa Rica is more brassy on the back than any of the Azuero Peninsula specimens. Furthermore, compared with a series of 21 topotypical and nearly topotypical specimens of *Lepidopyga caeruleogularis confinis* from eastern Panama our specimens average almost as pure green on the back, in fact, some Obaldia specimens are more brassy on the back than ours. Comparing the color of the middle rectrices, those of the Azuero Peninsula specimens come well within the range of the series of *L. c. confinis* with respect to bronziness and purplish black tipping. In extent and intensity of the violet coloration of the throat, the Azuero Peninsula males are equal to or more extreme than the eastern Panama birds. In fact every character mentioned by Griscom[66] as important in separating *L. c. confinis* is found in equal intensity in a goodly number of the Azuero Peninsula birds. Not having seen any topotypical specimens of *L. c. caeruleogularis* I shall not hazard the suggestion that *L. c. confinis* is not recognizable; however, I can say with a reasonable amount of assurance that the characters upon which it is separated are subject to a great deal of individual variation and, if the form is recognizable, it is on the basis of rather finely drawn average characters. As for the status of our Azuero Peninsula specimens, I can only say that they average approximately the same in all of the characters I have discussed, as a series of 12 Canal Zone specimens which are generally considered to be referable to *L. c. caeruleogularis*.

This was the commonest species of hummingbird secured among those collected at random from the flowering trees on the plantation, and this probably represents its true status of comparative abundance in that region. It was a frequent visitor to the flowering bougainvillea bush in front of our house. Duchassain hummingbirds were not encountered away from the immediate vicinity of the cocoanut plantation.

[66]Bull. Mus. Comp. Zoöl., Vol. LXXII, No. 9, January, 1932, p. 333.

Specimens Collected

C. M. N. H. Number	*Sex*	*Locality*	*Elevation*	*Date*
22121	♀	Paracoté	Sea Level	February 8, 1932
22122	♂	Paracote	Sea Level	February 11, 1932
22123	♂	Paracoté	Sea Level	February 13, 1932
22124	♀	Paracoté	Sea Level	February 17, 1932
22125	♂	Paracoté	Sea Level	February 21, 1932
22126	♂	Paracoté	Sea Level	February 21, 1932
22127	♂	Paracoté	Sea Level	February 21, 1932
22128	♀	Paracoté	Sea Level	February 21, 1932
22129	♂	Paracoté	Sea Level	February 22, 1923
22130	♀	Paracoté	Sea Level	February 23, 1932

Saucerottia niveoventer (Gould). SNOWY-BREASTED HUMMINGBIRD.

Specimens of *Saucerottia niveoventer* from Boquete, Panama, which are nearly topotypical, match ours very closely.

The 3 specimens taken at as many different camps and altitudes indicate that this species is fairly well distributed over the forested portion of the lower tropical zone of the Azuero Peninsula in spite of the fact that it is supposed to be found chiefly above 3000 feet in Chiriqui and Veraguas.[67]

Specimens Collected

C. M. N. H. Number	*Sex*	*Locality*	*Elevation*	*Date*
22136	♀	Paracoté	Sea Level	February 17, 1932
22137	♂	Mariato River Camp	250 Feet	February 23, 1932
22138	♂	Altos Cacao	1500 Feet	March 3, 1932

Amazilia tzacatl tzacatl (De La Llave). RIEFFER HUMMINGBIRD.

Except for possibly a slightly more grayish, less brownish abdomen, our specimens from the Azuero Peninsula do not differ from individuals from Mexico, and this character is subject to so much individual variation in both series that it is not considered of any subspecific importance with respect to the birds from the regions under question.

From the list of specimens collected at random it would seem that this is one of the commonest and most widely distributed hum-

[67]Griscom, Bull. Mus. Comp. Zoöl., Vol. LXXVIII, No. 3, April, 1935, p. 321.

mingbirds of the Azuero Peninsula having been taken at 3 stations from sea level to 3000 feet, both on the plantation and in the wilder sections.

Specimens Collected

C. M. N. H. Number	*Sex*	*Locality*	*Elevation*	*Date*
22139	—	Altos Cacao	1500 Feet	March 5, 1932
22140	♂	Cerro Viejo, Cavulla	3000 Feet	March 13, 1932
22141	♂	Paracoté	Sea Level	March 21, 1932
22142	♂	Paracoté	Sea Level	March 21, 1932
22143	♂	Paracoté	Sea Level	March 21, 1932
22144	♂	Paracoté	Sea Level	April 2, 1932

Hylocharis eliciae (Bourcier and Mulsant). ELICIA GOLDEN-TAIL.

The Elicia golden-tail is apparently fairly common and evenly distributed throughout the forested portions of the Azuero Peninsula, as well as about the clearings of the plantation. It was taken at two forest camps, one of them at an altitude of 250 feet, the other at 2000 feet. This was one of the commoner species observed at the Bougainvillea bush in front of our house on the plantation.

Specimens Collected

C. M. N. H. Number	*Sex*	*Locality*	*Elevation*	*Date*
22131	♀	Paracoté	Sea Level	February 10, 1932
22132	♂	Paracoté	Sea Level	February 17, 1932
22133	♂	Paracoté	Sea Level	March 23, 1932
22134	♀	Mariato River Camp	250 Feet	February 21, 1932
22135*	♂	Cerro Viejo Camp	2000 Feet	March 6, 1932

*Bill red with black tip.

Chlorostilbon assimilis Lawrence. ALLIED EMERALD.

No constant difference was detected between the Azuero Peninsula series and birds from the Canal Zone.

The allied emerald was one of the 4 commonest hummingbirds observed in the flowering trees and shrubs about the plantation. The 3 other rivals for abundance were the Duchassain and Rieffer hummingbirds and the Elicia golden-tail. Although no field census notes are available, the number of specimens collected more or less at random shows the allied emerald to be second only in numbers to the Duchassain hummingbird in the immediate vicinity of the

cocoanut plantation, where like the latter species, this little emerald seemed to be confined. The Rieffer hummingbird and Elicia goldentail, the only close rivals of the allied emerald for second place honors in abundance on the plantation were apparently more widely distributed throughout the wilder, forested areas as well.

Specimens Collected

C. M. N. H. Number	*Sex*	*Locality*	*Elevation*	*Date*
22115	♀	Paracoté	Sea Level	February 9, 1932
22116	♀	Paracoté	Sea Level	Debruary 11, 1932
22117	♀	Paracoté	Sea Level	February 13, 1932
22118	♂	Paracoté	Sea Level	February 17, 1932
22119	♂	Paracoté	Sea Level	March 21, 1932
22120	♂	Paracoté	Sea Level	March 23, 1932

Klais guimeti (Bourcier and Mulsant). GUIMET HUMMINGBIRD.

All that can be said regarding the distribution of this species on the Azuero Peninsula is that our specimen, taken in a heavily forested area at an elevation of 2000 feet was the only one observed.

Specimens Collected

C. M. N. H. Number	*Sex*	*Locality*	*Elevation*	*Date*
22149	♂	Cerro Viejo Camp	2000 Feet	March 7, 1932

Trogon massena massena Gould. MASENA TROGON.

Two topotypical specimens of *Trogon massena massena* from Guatemala, which were available for comparison, were apparently radically altered in color by age, as the red of the posterior under parts was many shades paler, and the green of the breast, back, and head was much more brassy than was the case in our 2 specimens. For adequate systematic work on this species it would evidently be more than ordinarily desirable to use specimens for comparison which were collected at approximately the same time.

Attention is called to the field note on the color of the naked eyelid in our specimens, which was red rather than "sky blue" as given by Ridgway[68] for this species.

Only 3 individuals of this brilliantly colored trogon were seen on the entire trip. Two of these were found on the plantation in

[68]Bull. U. S. Nat. Mus., No. 50, Part V, November 29, 1911, p. 744.

small patches of forest and the other was at the edge of a dense thicket in the clearing at Altos Cacao. In each case the bird was rather quiet and sluggish in its behavior.

Specimens Collected

C. M. N. H. Number	*Sex*	*Locality*	*Elevation*	*Date*
22150*	♂	Paracoté	Sea Level	February 10, 1932
22151	♂	Altos Cacao	1500 Feet	March 3, 1932

*Eyelids red. Iris light brown.

Megaceryle torquata torquata (Linnaeus). RINGED KINGFISHER.

A pair of these big kingfishers made its headquarters on the Mariato River near our camp, but all attempts to collect the birds failed.

Chloroceryle americana isthmica (Goldman). ISTHMIAN GREEN KINGFISHER.

This little kingfisher was seen rather frequently along the road through the mangrove swamp and at the edge of the mangroves along the estero at Paracoté, also occasionally along the Mariato River at our camp on that stream.

Specimens Collected

C. M. N. H. Number	*Sex*	*Locality*	*Elevation*	*Date*
22158	♀	Mariato River Camp	250 Feet	February 21, 1932
22159	♂	Paracoté	Sea Level	March 27, 1932
22160	♀	Paracoté	Sea Level	March 27, 1932
22161	♂	Paracoté	Sea Level	March 29, 1932
22162	♂	Paracoté	Sea Level	March 29, 1932
22163	♀	Paracoté	Sea Level	March 29, 1932
22164	♂	Paracoté	Sea Level	March 30, 1932

Chloroceryle aenea aenea (Pallas). LEAST GREEN KINGFISHER.

The single specimen collected was taken in the mangrove fringe of the estero at Paracoté. It was the only individual of this species observed.

Specimens Collected

C. M. N. H. Number	*Sex*	*Locality*	*Elevation*	*Date*
22165	♂	Paracoté	Sea Level	March 30, 1932

Momotus momota lessonii Lesson. LESSON MOTMOT.

An examination of 55 specimens of *Momotus momota lessonii* from various parts of its range shows very clearly the existence of two color phases, as noted by Griscom,[69] a rufous phase and a bluish green phase, in which respectively these two colors predominate. There is, however, every stage of intergradation between the two, and they seem to be independent of sex, age and geographic distribution.

It is the writer's opinion that *Momotus lessonii* and its subspecies are geographic races of *Momotus momota*, as suggested by Peters.[70] Intergradation through individual variation was found to exist between our Azuero Peninsula series of *lessonii* and examples of the *momota* group from the Amazon valley. No indication was found, however, of intergradation with *Momotus subrufescens connexus* from the Canal Zone.

Although *Momotus momota lessonii* has been repeatedly characterized as a Subtropical Zone form, particularly in the southern part of its range, the writer's observations on the Azuero Peninsula, which is, so far as known, the extreme southernmost extension of the range of this form, tend to show that, there at least, this bird is rather common in the lower tropical forests even down to sea level. This fact would tend to invalidate Chapman's[71] theory that the apparent absence of a representative of the *Momotus lessonii* group between the subtropical zone of western Panama and the same zone of north-western Colombia is due to the subsidence of a subtropical zone bridge which once connected these two regions. Since the Lesson motmot seems to be perfectly at home in the Tropical Zone forests, at least in some parts of the range, the lowland forests of the Isthmus of Panama would hardly be a barrier to the bird's dispersal.

Chapman,[72] without indicating the fact by nomenclature, stated that "*Momotus aequatorialis* is clearly the representative in the Andean Subtropical Zone of the Middle American *Momotus lessonii*." Austin[73] stated definitely that "*aequatorialis* of Colombia is a race of *lessoni*, but the strange thing is its apparent affinity for the southern Mexican bird rather than its nearest neighbor in

[69]Bull. Amer. Mus. Nat. Hist., Vol. LXIV, May 7, 1932, p. 182.
[70]Bull. Mus. Comp. Zoöl., Vol. LXIX, No. 12, October, 1929, p. 425.
[71]Bull. Amer. Mus. Nat. Hist., Vol. XLVIII, 1923, pp. 51-52.
[72]Bull. Amer. Mus. Nat. Hist., Vol. XLVIII, 1923, p. 34.
[73]Bull. Mus. Comp. Zoöl., Vol. LXIX, No. 11, September, 1929, p. 375.

Panama." On the basis of these findings it would seem that all the forms of the *lessonii* and *aequatorialis* groups should be considered as subspecies of *Momotus momota*, but the members of the *subrufescens* group should be maintained as a distinct species.

The Lesson motmot was a fairly common species in the forest at Paracote and the Mariato River camp. As we ascended the mountains it seemed to be less common and above 1500 feet was not even recorded.

Specimens Collected

C. M. N. H. Number	*Sex*	*Locality*	*Elevation*	*Date*
22152	♀	Paracoté	Sea Level	February 7, 1932
22153*	♂	Mariato River Camp	250 Feet	February 23, 1932
22154	♀	Mariato River Camp	250 Feet	February 23, 1932
22155*	♀	Altos Cacao	1500 Feet	March 5, 1932
22156	♂	Paracoté	Sea Level	March 19, 1932
22157	♀	Paracoté	Sea Level	March 19, 1932

*Iris red.

Notharchus hyperrhynchus dysoni (Sclater). DYSON PUFFBIRD.

Our specimens of this species are not different from Honduras examples and so belong to the race *Notharchus hyperrhynchus dysoni* rather than to *N. h. hyperrhynchus*, which according to Griscom[74] extends into Panama from South America as far as the Canal Zone.

One specimen was collected from its perch on an exposed dead branch of a large tree overlooking the mangrove-covered edge of the estero at Paracoté. The other was taken from a similar perch in a large tree on the precipitous ridge at Altos Cacao. In both cases the birds sat as motionless as statues while being approached sufficiently close for a shot.

Specimens Collected

C. M. N. H. Number	*Sex*	*Locality*	*Elevation*	*Date*
22170	♀	Paracoté	Sea Level	February 17, 1932
22171*	♀	Altos Cacao	1500 Feet	March 1, 1932

*Iris red.

[74]Bull. Mus. Comp. Zoöl., Vol. LXXVIII, No. 3, April, 1935, p. 328.

Malacoptila panamensis panamensis Lafresnaye. PANAMA MALACOPTILA.

This sluggish species was apparently fairly common in the forested regions visited. When encountered it was always sitting quietly on some low branch, usually not more than 6 to 10 feet above the ground. It could be approached rather closely before taking wing, when it would fly for a few yards only and take up another perch always at approximately the same height above the ground.

Specimens Collected

C. M. N. H. Number	*Sex*	*Locality*	*Elevation*	*Date*
22172	♂	Mariato River Camp	250 Feet	February 21, 1932
22173*	♀	Mariato River Camp	250 Feet	February 24, 1932
22174*	♀	Mariato River Camp	250 Feet	February 26, 1932
22175	♂	Cerro Viejo Camp	2000 Feet	March 7, 1932
22176	♀	Cerro Viejo Camp	2000 Feet	March 9, 1932
22177	♀	Paracoté	Sea Level	March 29, 1932
22178	♂	Paracoté	Sea Level	April 1, 1932

*Iris red.

Rhamphastos sulphuratus brevicarinatus Gould. SHORT-KEELED TOUCAN.

The specimens that we obtained are indistinguishable from an eastern Panama (Port Obaldia) example.

The short-keeled toucan, called "joralico" and "pico feo" by the natives, was a rather common species in the forested areas at all altitudes visited. At Cavulla, altitude 3000 feet, one was seen to leave a tongue of forest and fly, with its curious looping flight, to another about a quarter of a mile across a grassy llano.

Specimens Collected

C. M. N. H. Number	*Sex*	*Locality*	*Elevation*	*Date*
22166*	♂	Paracoté	Sea Level	February 10, 1932
22167	♀	Paracoté	Sea Level	February 11, 1932
22168	♂	Cerro Viejo Camp	2000 Feet	March 7, 1932
22169	♀	Paracoté	Sea Level	March 19, 1932

*Feet light blue. Iris and skin around eye greenish yellow. Bare skin behind eye yellow.

Centurus rubricapillus wagleri (Salvin and Godman). WAGLER WOODPECKER.

As Todd and Carriker[75] have pointed out, there is considerable individual as well as seasonal color variation in this species. These authors have mentioned the fact that Costa Rica examples seem to show a restriction of the red color of the abdomen and more white on the lateral rectrices, but they have not recognized these differences in nomenclature. However, with a series of 59 specimens of this species at hand including 3 topotypes of *Centurus rubricapillus wagleri*, and representing localities in the Pearl Islands, Canal Zone, Veraguas, Chiriqui, and southwestern Costa Rica, it is apparent, after separating the birds into groups according to season and sex, that there is a very definite difference in size and color between groups from Costa Rica and seasonally as well as sexually comparable groups from the Canal Zone (typical *wagleri*). Todd and Carriker[75] have noted part of the color difference, and Ridgway,[76] without commenting, showed, in his table of measurements, the smaller size of Costa Rica birds.

In the series now examined, 14 birds from Costa Rica average distinctly of a paler and more olive, less ochraceous gray below; have the red of the abdomen more restricted; and average smaller, particularly in the wing, than specimens of typical *C. r. wagleri* from the Canal Zone. I am, however, unable to verify the character of more white in the lateral rectrices mentioned by Todd and Carriker. The Azuero Peninsula specimens, although they are slightly paler and more yellowish below, particularly about the border of the red abdominal patch, than Canal Zone birds, do not seem to be different enough to warrant separation. Oddly enough birds from Chiriqui, which region is geographically intermediate between the Azuero Peninsula and Costa Rica, are as dark and as ochraceous below as Canal Zone birds, and one specimen from Boquete comes very close in color of under parts to Pearl Islands birds, (*Centurus rubricapillus seductus*). It seems very strange that Chiriqui examples should differ so markedly from those from western Costa Rica since the two regions are in general faunally alike. Nevertheless, it appears that a sufficient series is at hand to show this to be the case, and on the

[75]Ann. Carnegie Mus., Vol. XIV, October, 1922, p. 240.
[76]Bull. U. S. Nat. Mus. No. 50, Part VI, April 8, 1914, p. 74.

basis of the facts presented, the Costa Rica bird should be considered a distinct subspecies which I propose to call:

Centurus rubricapillus costaricensis, subsp. nov.Costa Rica Woodpecker.

Subspecific Characters.—Similar to *Centurus rubricapillus wagleri* from the Canal Zone, Veraguas, and Chiriqui, Panama, but smaller; under parts paler and of a more olive, less ochraceous gray; red abdominal patch more restricted.

Measurements.—*Adult male* (11 specimens from southwestern Costa Rica): wing, 105-113. (average, 109.7) mm.; exposed culmen, 21-24 (22.1); tail, 51-55 (52.4); tarsus, 18.5-19 (18.9). *Adult female* (4 specimens from southwestern Costa Rica): wing, 104.5-113 (average, 107.5) mm.; tail, 52.5; exposed culmen, 18-21 (19.5); tarsus, 17.5.

Type.—Adult male, No. 22572, Cleveland Museum of Natural History; El Pozo, altitude 25 feet, Rio Terraba, Puntarenas, Costa Rica; May 13, 1930; Austin Smith, original number 8577; "tarsi olive, irids dark brown."

Geographic Distribution.—As far as known, confined to southwestern Costa Rica. Specimens have been seen from El Pozo, Boruca, Puerto Uvita, and Buenos Aires, Costa Rica.

The wagler woodpecker (*Centurus rubricapillus wagleri*) was very common in the more open country at Paracoté. A pair insisted on digging a nesting cavity in the flag-pole at the plantation headquarters despite all attempts to discourage them, until they were added to the collection. The species was absent from the more heavily forested regions, but a single specimen was taken from second-growth jungle on the site of an old abandoned rubber operations headquarters near our Mariato River camp.

Specimens Collected

C. M. N. H. Number	*Sex*	*Locality*	*Elevation*	*Date*
22182	♀	Paracoté	Sea Level	February 9, 1932
22183	♂	Paracoté	Sea Level	February 12, 1932
22184	♂	Paracoté	Sea Level	February 14, 1932
22185	♂	Paracoté	50 Feet	February 14, 1932
22186	♀	Paracoté	50 Feet	February 14, 1932
22187	♀	Mariato River Camp	250 Feet	February 26, 1932

Phloeoceastes melanoleucus malherbii (Gray). MALHERBE WOODPECKER.

The specimen collected is not distinguishable from Canal Zone and eastern Panama examples.

Two of these big woodpeckers were seen together in a large tree at the edge of the forest at Paracoté. From the courtship behavior it was apparent that this was a mated pair. The female was collected, and neither the mate, which escaped, nor any other bird of this species was ever seen again during our trip.

Specimens Collected

C. M. N. H. Number	*Sex*	*Locality*	*Elevation*	*Date*
22181	♀	Paracoté	Sea Level	February 17, 1932

Ceophloeus lineatus mesorhynchus Cabanis and Heine. PANAMA PILEATED WOODPECKER.

Compared with a series of 16 specimens of *C. l. mesorhynchus* from western Panama and Costa Rica, ours are slightly more buffy on the light-colored areas. One of the 2 individuals from the Azuero Peninsula is much more extensively black on the under parts, particularly in respect to the size of the spots on the abdomen, than any other bird in the series. Since, however, the other of our specimens is not more blackish than the average of the series and differs only in being more buffy, it is probably better to refer the Azuero birds to *P. l. mesorhynchus* until such time as a larger series from that region is available to show whether or not the above-mentioned characters are constant.

The 2 specimens collected are from the same general region in the forested bottomlands at Paracoté. The bird obtained on March 24 was busy excavating a nesting cavity when collected.

Specimens Collected

C. M. N. H. Number	*Sex*	*Locality*	*Elevation*	*Date*
22179*	♀	Paracoté	Sea Level	February 6, 1932
22180	♀	Paracoté	Sea Level	March 24, 1932

*Ovary well developed.

Xiphorhynchus guttatus marginatus Griscom. GRISCOM WOODHEWER.

Our series bears out very well the distinctive characters used by Griscom[77] to differentiate this race from *Xiphorhynchus guttatus costaricensis*, particularly the darker chestnut of the wings, the darker sooty tips of the primaries, and the brighter buff of the throat. A character not mentioned as diagnostic in the original description, which is shown clearly in our specimens, is the more blackish edging of the crown and nape feathers. This is a feature which seems to present more of a contrast to the condition found in X. *g. costaricensis* than do the markings of the under parts. The latter character, however, is noticable on close scrutiny.

This woodhewer was a common bird both in the deeper forests of the interior of the Azuero Peninsula and in the second growth jungle in the vicinity of the plantation.

Specimens Collected

C. M. N. H. Number	*Sex*	*Locality*	*Elevation*	*Date*
22223	♂	Paracoté	Sea Level	February 10, 1932
22224	♀	Mariato River Camp	250 Feet	February 22, 1932
22225	♀	Mariato River Camp	250 Feet	February 23, 1932
22226	♂	Altos CaCao	1500 Feet	March 1, 1932
22227	♀	Altos CaCao	1500 Feet	March 6, 1932
22228	♀	Cerro Viejo Camp	2000 Feet	March 9, 1932
22229	♀	Paracoté	50 Feet	March 22, 1932
22230	♂	Paracoté	Sea Level	March 25, 1932
22231	♀	Paracoté	Sea Level	March 28, 1932

There are in the American Museum of Natural History 1 male and 5 female specimens collected by Rex Benson[78] on the Cape Mala [=Azuero] Peninsula.

Sittasomus griseicapillus veraguensis, subsp. nov. VERAGAUS WOOD-CREEPER.

Subspecific Characters—Similar to *Sittasomus griseicapillus levis* but smaller; more greenish olive gray on the head, neck and under parts; slightly more tawny on posterior abdominal region.

Measurements.—Adult male (1 specimen from the Azuero Peninsula); wing, 78 mm.; tail, 73.5; exposed culmen, 13.5; tarsus, 17.5. *Adult female* (3 specimens from the Azuero Peninsula): wing, 68-73 (aver-

[77]Amer. Mus. Novit., No. 280, September 10, 1927, pp. 7-8.
[78]Griscom, Amer. Mus. Novit., No. 280, September 10, 1927, p. 7.

age, 70) mm.; tail, 51-70.5 (61.7); exposed culmen, 13.5-14.5 (14); tarsus, 17-18 (17.5).

Type.—Adult male, No. 22232, Cleveland Museum of Natural History; Mariato River, elevation 250 feet, 10 miles east of Montijo Bay, Veraguas, Panama; February 24, 1932; John W. Aldrich, original number, 1821.

Geographic Distribution.—Forested areas of the Pacific slopes of the main cordillera of Veraguas and the Azuero Peninsula.

Remarks.—The birds from the Azuero Peninsula are distincly different from a topotypical series of 11 specimens of *Sittasomus griseicapillus levis* from Boquete, particularly in the more greenish cast of the olive gray of the head, neck, and under surface. Four individuals examined from Chitra on the Pacific slope of the main Cordillera of Veraguas in the collection of the American Museum of Natural History are apparently referable to *S. g. veraguensis* also, being, like the Azuero Peninsula specimens, more greenish than the Boquete series of *S. g. levis*. They are, however, intermediate in size, and somewhat darker below than typical *S. g. veraguensis*. A single male from Cascajal, Coclé, is distinctly different in color from either Boquete, Azuero Peninsula, or Chitra birds, being more brownish below with a more pronounced rufescent wash on the abdomen, and a richer, more rufescent brown back. If these characters were found to hold in series, this would be a very distinct geographic race, and in this event it would be necessary to recognize 3 different subspecies of *Sittasomus griseicapillus* on the Pacific slope of Panama west of the Canal Zone. Two specimens from Cana in eastern Panama do not seem to present any noticeable color differences from Boquete examples of *S. g. levis*, although one of the birds, a female, is even smaller than the average of *S. g. veraguensis* from the Azuero Peninsula. If these Cana specimens were to be referred to *S. g. levis*, this form would present a discontinuous range with the western part separated from the eastern by the range of *S. g. veraguensis*. No examples of *Sittasomus griseicapillus griseus* of the Caribbean coast of Venesuela have been seen so it cannot be said what relation the eastern Panama bird may bear to that form.

It is obvious that we are here dealing with one of the morphologically most plastic of neotropical birds, which is separable into a great many local geographic races. The feasibility of recognizing all of these in nomenclature is of course open to question. However, in the above described form, *S. g. veraguensis*. it seems to me that the difference between the Azuero Peninsula and Boquete birds is pronounced enough and constant enough to warrant considering the birds from the 2 regions as belonging to separate subspecies.

The Veraguas wood-creeper was not a common species but was fairly evenly distributed throughout the more heavily forested area visited from at least 250 feet to 3000 feet above sea level.

Specimens Collected

C. M. N. H. Number	*Sex*	*Locality*	*Elevation*	*Date*
22232	♂	Mariato River Camp	250 Feet	February 24, 1932
22233	♀	Altos Cacao	1500 Feet	February 28, 1932
22234	♀	Cerro Viejo, Cavulla	3000 Feet	March 13, 1932
22235	♀	Cerro Viejo, Cavulla	3000 Feet	March 13, 1932

Xenops minutus ridgwayi Hartert and Goodson. RIDGEWAY XENOPS.

The writer follows Griscom[79] in referring our specimens to *Xenops minutus ridgwayi*. Two individuals from the Azuero Peninsula are almost indistinguishable from 2 others from Divala, western Panama, which should be typical *X. m. ridgwayi*, but the other 2 Azuero birds are closer in color to 2 from El Tigre and Permé, eastern Panama, which Griscom[79] referred to *X. m. littoralis*. However, as no typical Ecuador specimens of the latter form are at hand for comparison it seems better to refer our specimens to *X. m. ridgwayi*, from which the difference is, at best, extremely slight, and can probably be best explained as a tendency toward intergradation with *X. m. littoralis*, a condition found by Zimmer[80] to exist also among Canal Zone specimens.

Three of the specimens were taken from a single flock of these birds which was encountered in the deep forest on the banks of the Mariato River. The birds were flitting about in the manner of some of the North American warblers, high up in the trees. The fourth specimen was found alone in the forest at Paracoté.

[79]Bull. Mus. Comp. Zoöl., Vol. LXIX, No. 8, April 29, 1929, p. 171.
[80]Amer. Mus. Novit., No. 862, June 23, 1936, pp. 23-25.

Specimens Collected

C. M. N. H. Number	*Sex*	*Locality*	*Elevation*	*Date*
22219	♂	Mariato River Camp	250 Feet	February 24, 1932
22220	♀	Mariato River Camp	250 Feet	February 24, 1932
22221	♀	Mariato River Camp	250 Feet	February 24, 1932
22222	♂	Paracoté	50 Feet	April 1, 1932

Thamnophilus doliatus nigricristatus Lawrence. BLACK-CRESTED ANTSHRIKE.

The male specimens obtained on the Azuero Peninsula differ from a single topotypical specimen of *Thamnophilus doliatus nigricristatus* from Lion Hill, Panama, in having no white in the center of the crown when the feathers are parted and in being more extensively black, having broader black bars on the bersat and smaller white spots on the back, in the last character resembling an example of *T. d. intermedius* from Costa Rica and one from Honduras. Our Azuero Peninsula female is of a darker rufous on the back than a Canal Zone specimen of *T. d. nigricristatus*, but slightly paler than the females of *T. d. intermedius*. These characteristics of the Azuero Peninsula bird, although possibly showing some intergradation between *T. d. nigricristatus* and *T. d. intermedius* in body color, are for the most part an intensification of the characters that separate *T. d. nigricristatus* from *T. d. albicans* of Colombia, while the unbroken black crown separates the former race very distinctly from *T. d. intermedius* of Costa Rica and northward. These findings further substantiate the statement of Cory and Hellmayr[81] that "the black-crested antshrike is the only form occuring in Veragua."

This species was rather common in the more open brushy country about the plantation and even in the shrubbery about the houses. It was the only member of the family found away from the forest, in fact it was confined to open shrubby country. Only a single specimen was found away from the plantation proper, and that was taken in the small area of formerly cultivated land at Altos Cacao, altitude 1500 feet, which, not having been planted for a few years, had grown up to a dense tangle of sprouts and vines.

[81]Zoöl. Ser. Field Mus. Nat. Hist., Vol. XIII, Part III, November 20, 1924, p. 71.

Specimens Collected

C. M. N. H. Number	*Sex*	*Locality*	*Elevation*	*Date*
22188	♂	Paracoté	50 Feet	February 5, 1932
22189	♂	Paracoté	50 Feet	February 12, 1932
22190	♂	Paracoté	50 Feet	February 12, 1932
22191	♂	Paracoté	50 Feet	February 18, 1932
22192	♂	Paracoté	50 Feet	March 21, 1932
22193	♂	Paracoté	50 Feet	March 21, 1932
22194*	♀	Altos CaCao	1500 Feet	March 2, 1932

*Feet bluish gray. Iris white.

Thamnophilus bridgesi Sclater. BRIDGES ANTSHRIKE.

The only detectable color difference between our Azuero Peninsula specimens and a large series from Costa Rica and extreme western Panama (Divala) was a slightly more whitish appearance of the top of the head of the Azuero females due to the broader white streaks of the crown. However, since this character is subject to some individual variation, and the difference slight at best, it does not seem desirable to attempt the separation of the Azuero Peninsula birds on the basis of that alone.

This was one of the commonest birds of the forest, where it kept to the low dense undergrowth, being frequently seen flitting about close to the ground. The species seemed to be comparatively unwary. On one occasion I found myself within 6 feet of a male which sat calmly watching me from a shrub at the edge of our camp clearing on the Mariato River.

Specimens Collected

C. M. N. H. Number	*Sex*	*Locality*	*Elevation*	*Date*
22195	♂	Paracoté	50 Feet	February 9, 1932
22196	♀	Paracoté	50 Feet	February 9, 1932
22197	♂	Mariato River Camp	250 Feet	February 24, 1932
22198	♂	Altos Cacao	1500 Feet	March 3, 1932
22199	♂	Mariato River Camp	250 Feet	March 17, 1932
22200	♀	Paracoté	50 Feet	March 25, 1932
22201	♀	Paracoté	50 Feet	March 25, 1932
22202	♂	Paracoté	50 Feet	March 29, 1932
22203	♀	Paracoté	50 Feet	March 29, 1932

Myrmotherula fulviventris Lawrence. LAWRENCE ANTWREN.

The 2 immature males of this species collected, although still olive tawny on the breast are beginning to acquire on the throat the black

coloration of the adult male plumage. These 2 specimens, taken in the forest at two different localities, represent all of the knowledge we possess concerning the distribution of this humid tropical zone species on the Azuero Peninsula.

Specimens Collected

C. M. N. H. Number	*Sex*	*Locality*	*Elevation*	*Date*
22204	♂ im.	Mariato River Camp	250 Feet	February 24, 1932
22205	♂ im.	Cerro Viejo Camp	2000 Feet	March 6, 1932

Cercomacra tyrannina rufiventris (Lawrence). WESTERN TYRANNINE ANTBIRD.

There is considerable discussion in ornithological literature concerning the distribution of the various forms of *Cercomacra tyrannina* in southern Central America. Bangs, in 1901[82], initiated the discussion when he described *Cercomacra tyrannina crepera* from Divala, Chiriqui, as distinct from *C. t. tyrannina* on the basis of its much darker coloration throughout in both sexes. Carriker, in 1908[83], called attention to the fact that, although the specimens of the Caribbean coast of Costa Rica fit the description of *C.t.crepera*, those from the southwestern part of that country are paler and agree with the description of the type of *C. t. tyrannina*. He came to the conclusion that *C. t. crepera* is confined almost entirely to the Caribbean slope of Costa Rica and western Panama, but extends over the divide in western Chiriqui to Divala (the type locality) on the Pacific coast. Thus it interrupts at that point the range of *C. t. tyrannina* which extends otherwise unbroken from Colombia along the Pacific slope of Panama to southwestern Costa Rica. Ridgway in 1911[84], was evidently somewhat confused by the apparent individual variation of the Central American examples of this race, but recognized two forms in Panama, *C. t. tyrannina* from Cascajal, Coclé, eastward, and *C. t. crepera* from Santa Fé de Veragua westward. Hellmayr, in 1911[85], drew the line of separation between the dark and light forms in a different place. He considered that birds from Guatemala, Costa Rica, Chiriqui, western Colombia, and northwestern Equador are "not withstanding some individual variation" much darker than specimens from Bogota (topotypes of *tyrannina*), the upper Orinoco, British Guiana, and northern Brazil. In view of this similarity be-

[82]The Auk, Vol. XVIII, No. 4, October, 1901, pp. 365-366.
[83]Ann. Carnegie Mus., Vol. VI, Nos. 2, 3, and 4, August, 1910, p. 613.
[84]Bull. U. S. Nat. Mus., No. 50, Part V, November 29, 1911, pp. 93-97.
[85]Proc. Zoöl. Soc. London, 1911, Part IV, December 15, 1911, pp. 1165-1166.

tween all the birds of southern Central America, Hellmayr considered that Lawrence's name *Disythamnus rufiventris*[86], based on a bird from Lion Hill, Panama, must take precedence over *C. t. crepera*. Chapman, in 1917[87], although noting in central and eastern Panama, southwestern Colombia, and western Ecuador, specimens of darker coloration than true *C. t. tyrannina*, considered them nearer to that race than to *C. t. crepera*. Cory and Hellmayr, in 1924[88], recognized *C. t. rufiventris* as distinct from both *C. t. tyrannina* and *C. t. crepera*, and as occupying a range extending from the Isthmus of Panama through western Colombia south to Chimbo, western Ecuador. Griscom, in 1935[89], apparently agrees with these views, as he refers all Panama birds from the Canal Zone eastward, to *C. t. rufiventris*, and those of the western half of that country to *C. t. crepera*.

With these views the writer also heartily agrees, except that he would extend the range of *C. t. rufiventris* westward along the Pacific slope to include Coclé, whence came the specimen referred to *C. t. tyrannina* by Ridgway, and the Azuero Peninsula. The 2 specimens obtained by us in the latter region are apparently typical *C. t. rufiventris*, as they are indistinguishable from specimens from Cana, eastern Panama, and nothing like examples of *C. t. crepera* from Almiranti, Bocas del Toro, and Chiriqui, Panama; and from Boruca, southwestern Costa Rica, being much paler both in the male and the female. It is interesting to note that specimens from Santa Fé, Veraguas, were refered to *C. t. crepera* by Ridgway, which indicates that this form may range farther east in the mountain forests north of the Azuero Peninsula.

Nothing further than the record of the 2 specimens captured at 2 different forest localities can be offered by way of information concerning the abundance and distribution of the western tyrannine antbird on the Azuero Peninsula.

Specimens Collected

C. M. N. H. Number	*Sex*	*Locality*	*Elevation*	*Date*
22206	♂	Mariato River Camp	250 Feet	February 21, 1932
22207	♀	Altos Cacao	1500 Feet	March 5, 1932

[86]Lawrence, Ann. Lyc. Nat. Hist. N. Y., Vol. VIII, 1867, p. 131.
[87]Bull. Amer. Mus. Nat. Hist., Vol. XXXVI, 1917, p. 380.
[88]Zoöl. Ser. Field Mus. Nat. Hist., Vol. XIII, Part 3, November 20, 1924, pp. 216-217.
[89]Bull. Mus. Comp. Zoöl., Vol. LXXVIII, No. 3, April, 1935, p. 335.

Myrmeciza exul occidentalis Cherrie. CHERRIE ANTBIRD.

The specimens collected agree perfectly with a series of typical *Myrmeciza exul occidentalis* from southwestern Costa Rica.

This species rivaled the Bridges antishrike as the most abundant formicarian species in the forest regions of the Azuero Peninsula, and like that form was characteristic of the dense undergrowth, keeping near the floor of the forest.

Specimens Collected

C. M. N. H. Number	*Sex*	*Locality*	*Elevation*	*Date*
22208*	♂	Paracoté	Sea Level	February 6, 1932
22209†	♂	Paracoté	Sea Level	February 9, 1932
22210†	♀	Paracoté	Sea Level	February 9, 1932
22211†	♂	Mariato River Camp	250 Feet	February 21, 1932
22212†	♀	Altos CaCao	1500 Feet	February 28, 1932
22213	♂	Cerro Viejo Camp	2000 Feet	March 8, 1932
22214	♂	Cerro Viejo Camp	2000 Feet	March 9, 1932
22215	♂	Paracoté	Sea Level	April 1, 1932

*Skin of head bright blue.
†Skin around eye blue.

Attila spadiceus citreopygus (Bonaparte). CITRON-RUMPED ATTILA.

The single specimen obtained is very similar to specimens of *Attila spadiceus citreopygus* examined from extreme western Panama and is therefore appreciably different from examples of *Attila spadiceus sclateri* from eastern Panama.

The individual collected was obtained in the heavy forest along the river at Mariato River camp and was the only one of the species seen on the entire trip.

Specimens Collected

C. M. N. H. Number	*Sex*	*Locality*	*Elevation*	*Date*
22239	♂	Mariato River Camp	250 Feet	February 23, 1932

Pachyrhamphus polychropterus cinereiventris Sclater. GRAY-BELLIED BECARD.

An insufficient series has been seen to warrant any opinion as to the status of the geographic variation of this form in southern

Central America. Recent opinions seem to concur in considering *Pachyrhamphus polychropterus tantalus* [= *costaricensis*] as unrecognizable. Hellmayr[90] considers the birds of southern Central America from Guatemala to the Canal Zone as referable to *Pachyrhamphus polychropterus similis* and confines *Pachyrhamphus polychropterus cinereiventris* to northern Colombia and extreme eastern Panama. Griscom[91] refers all birds from Guatemala to Colombia to *P. p. cinereiventris*. Our specimens do vary distinctly from supposedly typical specimens of *P. p. similis* from Nicaragua in being of a distinctly paler gray below and less extensively black on the back, also in the female, more brightly and more extensively yellow below. Not having seen any typical specimens of *P. p. cinereiventris*, I cannot say how our specimens vary, if they do, from that form. According to Ridgway's diagnosis,[92] our specimens come closer to *P. p. cinereiventris* than to *P. p. similis*. Bangs and Penard[93] say that the species attains the palest coloration in Costa Rica in which region they recognized a distinct form *P. p. costaricensis*. Our specimens apparently tend to bear out the validity of a different race in western Panama and western Costa Rica, but a much larger series from that region as well as from the ranges of *P. p. similis* and *P. p. cinereiventris* than I have seen is needed before definitely stating this to be the case. Until the writer has had such opportunity he is inclined to follow Griscom[94] in uniting all the birds from these regions under the oldest name available, which is *P. p. cinereiventris*.

The gray-bellied becard was evidently rather evenly distributed although not very common throughout the forested areas visited, since a specimen was taken at each of the 3 camps at varying altitudes of from 50 to 1500 feet.

Specimens Collected

C. M. N. H. Number	*Sex*	*Locality*	*Elevation*	*Date*
22240	♂im.	Mariato River Camp	250 Feet	February 23, 1932
22241	♀	Altos CaCao	1500 Feet	February 28, 1932
22242	♂	Paracoté	50 Feet	April 1, 1923

[90]Zool. Ser., Field Mus. Nat. Hist., Vol. XIII, November 14, 1929, pp. 184-185.
[91]Bull. Mus. Comp. Zoöl., Vol. LXXVIII, No. 3, April, 1935, p. 345.
[92]Bull. U. S. Nat. Mus., No. 50, Part IV, July 1, 1907, pp. 829-832.
[93]Bull. Mus. Comp. Zoöl., Vol. LXIV, No 4, January, 1921, p. 383
[94]Bull Mus Comp Zoöl , Vol LXXVIII, No 3, April, 1935, p 345

Tityra semifasciata costaricensis Ridgway. COSTA RICAN TITYRA.

A pair of these birds had evidently become established for the purpose of nesting near our camp at Altos Cacao. The male of this pair was collected on February 28. On March 1 another male appeared and proceeded to attempt to win the female, which had remained in the vicinity. At intervals the male pursued the female in a large circle around and around among the trees surrounding our camp clearing. After several circuits had been made the birds would stop and rest and then resume the performance. This was continued for several hours until this second male was collected. The following day another male appeared on the scene and took up the circular chase where it had been left off by his predecessor the day before. This time the new male was not molested, but left to carry on the nesting activities with the female. The pair was seen together just before we left that camp on March 6.

Only one other Costa Rican tityra was seen. That was the one collected at Paracoté while it was feeding on small berry-like fruit in a large tree at the edge of the forest.

Specimens Collected

C. M. N. H. Number	*Sex*	*Locality*	*Elevation*	*Date*
22237	♂	Paracoté	Sea Level	February 8, 1932
22236	♂	Altos Cacao	1500 Feet	February 28, 1932
22238	♂	Altos Cacao	1500 Feet	March 1, 1932

Pipra mentalis ignifera Bangs. SOUTHERN YELLOW-THIGHED MANAKIN.

Our series of this species more nearly resembles specimens of *Pipra mentalis ignifera* from Divala than examples of *Pipra mentalis minor* from the Canal Zone and Colombia.

Yellow-thighed manakins were found only in the bottomland forests at or near sea level at Paracoté where they were fairly common. One of the specimens collected had a bot fly larva embedded under the skin at the corner of the mouth. This was the only case

of infestation of birds by this group of parasites which were so commonly found in mammals, particularly the howler monkey *Alouatta* and which even found the writer to its liking.

Specimens Collected

C. M. N. H. Number	*Sex*	*Locality*	*Elevation*	*Date*
22270	♂	Paracoté	Sea Level	February 6, 1932
22271	♂	Paracoté	Sea Level	February 6, 1932
22272*	♂	Paracoté	Sea Level	February 9, 1932
22273	♂	Paracoté	Sea Level	March 24, 1932
22274*	♂	Paracoté	Sea Level	March 25, 1923
22275	♂	Paracoté	Sea Level	March 25, 1932
22276	♂	Paracoté	Sea Level	April 1, 1932
22277	♂	Paracoté	Sea Level	April 1, 1932

*Iris white.

Chiroxiphia lanceolata (Wagler). SHARP-TAILED MANAKIN.

In all, 44 specimens of this species from localities ranging from Chiriqui to Venezuela have been examined. The only variation in any way correlated with geographic distribution noted in this series is a tendency toward duller, less blackish and more greenish under parts of the males from Margarita Island, Venezuela, and slightly purer, less yellowish green upper parts of the females from western Panama (Azuero Peninsula and Boquete). The former difference in the birds from Venezuela has been noted by Hellmayr,[95] and the latter by Miller[96] in females from Coiba Island, western Panama. These variations, however, seem too slight and individually variable to warrant subspecific separation at the present time.

The sharp-tailed manakin was the commonest bird in the forests at all elevations, at least up to 2000 feet. Its pleasing bell-like call remains in my mind as the most characteristic sound of the Azuero Peninsula forests. One could not walk far through the woods without encountering at least one of these interesting little birds, and on several occasions we witnessed the curious dance of this species. Two males would fly from their perches and meet in mid-air, whereupon they would proceed to move up and down in the air in rythmic alternation as if suspended, like puppets, by concealed threads. These manoeuvers were accompanied by curious scraping sounds the source of which was undetermined. After a few seconds the

[95]Zoöl. Ser. Field Mus. Nat. Hist., Vol. XIII, Part VI, November 14, 1929, p. 54.
[96]Bull. Amer. Mus. Nat. Hist., Vol XXIV, 1908, p. 335.

two birds would resume their perches, and possibly, after a short rest, repeat the performance. The clear bell-like "tow, tow" call was given only when the bird was at rest, and apparently was not connected with the dance.

Specimens Collected

C. M. N. H. Number	*Sex*	*Locality*	*Elevation*	*Date*
22250*	♂	Paracoté	Sea Level	February 6, 1932
22251*	♂ im.	Paracoté	Sea Level	February 6, 1932
22252*	♂	Paracoté	50 Feet	February 9, 1932
22253	♂	Paracoté	50 Feet	February 14, 1932
22254	♂	Paracoté	Sea Level	February 14, 1932
22255	♀	Paracoté	Sea Level	February 17, 1932
22256	♀	Mariato River Camp	250 Feet	February 22, 1932
22257	♂	Mariato River Camp	250 Feet	February 23, 1932
22258	♂ im.	Altos Cacao	1500 Feet	March 3, 1932
22259	♂	Altos Cacao	1500 Feet	March 4, 1932
22260	♀	Cerro Viejo Camp	2000 Feet	March 6, 1932
22261	♀	Cerro Viejo Camp	2000 Feet	March 8, 1932

*Feet orange.

Corapipo altera altera Hellmayr. COSTA RICAN WHITE-THROATED MANAKIN.

Compared with 25 specimens of *Corapipo altera altera* and 10 of *Corapipo altera heteroleuca*, including 2 topotypes of the latter, our specimens were found to be typical of the former subspecies.

This interesting little manakin was first encountered in the mountain forests when we had reached an elevation of 1500 feet at Altos Cacao. It was fairly common there, and even more so around Cerro Viejo camp at 2000 feet. It was also found at 3000 feet near our camp at Cavulla.

The curious "dance" of the males of this species was observed on several occasions. Attention was usually first called to the presence of the bird by a muffled, explosive "puff," like a miniature blast of dynamite going off underground. The bird was never observed while making this sound for the first time, so whether it was made while the bird was perching or while on the wing, cannot be said, but on two occasions the manakin was seen in flight directly after the sound was heard, moving very slowly and evenly through the air on rapidly vibrating wings which produced a dis-

tinct humming sound, and with white throat-patch puffed out, so that at first glance it appeared as if the bird were carrying a white chicken feather in its beak. During the course of this peculiar slow progress from one perch to another, on one occasion for a distance of some fifty feet, the tiny explosions were repeated 2 or 3 times. It seems that the sounds must have been made with the wings in the same manner that hummingbirds frequently cause a sudden explosive increase in the volume of the humming sound of their wings. As far as could be determined these display antics were solo affairs. At neither time the dance was observed, was the presence of another bird of the same species detected, and certainly if others were present they did not join in the dance as is the case with the sharp-tailed manakin.

It seems evident that males of this species breed while still in the immature plumage, since one was captured in immature garb on March 1, which had much enlarged gonads.

Specimens Collected

C. M. N. H. Number	*Sex*	*Locality*	*Elevation*	*Date*
22278	♂	Altos Cacao	1500 Feet	February 28, 1932
22279	♂	Altos Cacao	1500 Feet	February 28, 1932
22285*	♂ im.	Altos Cacao	1500 Feet	March 1, 1932
22286	♀	Altos Cacao	1500 Feet	March 3, 1932
22280	♂	Altos Cacao	1500 Feet	March 5, 1932
22281	♂	Cerro Viejo Camp	2000 Feet	March 7, 1932
22282	♂	Cerro Viejo Camp	2000 Feet	March 7, 1932
22283	♂	Cerro Viejo Camp	2000 Feet	March 9, 1932
22287	♂ im.	Cerro Viejo, Cavulla	3000 Feet	March 13, 1932
22284	♂	Cerro Viejo, Cavulla	3000 Feet	March 14, 1932

*Testes well developed.

Manacus aurantiacus flaviventris, subsp. nov. YELLOW-BELLIED MANAKIN.

Subspecific Characters.—Similar to *Manacus aurantiacus aurantiacus*, but more brightly colored; male with throat, sides of head, and hind-neck, deeper and more extensively orange; posterior under parts of a brighter yellow (less washed with olive green); female, with yellow on the abdomen brighter and more extensive; throat more yellowish olive green; a more distinct band of darker olive green on the chest; upper parts slightly more yellowish olive green.

Measurements.—Adult male (5 specimens from the Azuero Peninsula): wing, 48-49 (average, 48.7) mm.; tail, 30-31 (30.6); exposed culmen, 10-11 (10.7); tarsus, 19-21 (20.3). *Adult female* (5 specimens from the Azuero Peninsula): wing, 48-51.5 (50.5); tail, 30-33.5 (32.5); exposed culmen, 9-11 (10.2); tarsus, 18-19.5 (19.2).

Type.—Adult female, No. 22264, Cleveland Museum of Natural History; Mariato River, elevation 250 feet; 10 miles east of Montijo Bay, Veraguas, Panama; February 22, 1932; John W. Aldrich, original number 1792.

Geographic Distribution.—As far as is known at present, confined to the Azuero Peninsula, southern Veraguas, Panama.

Remarks.—Compared to 20 specimens of *Manacus aurantiacus aurantiacus* from Chiriqui, western Panama, and southwestern Costa Rica, including 10 specimens from Divala which is very near the type locality (Bugaba), the Azuero Peninsula series is very distinct. The females of this species show greater geographic variation than the males, and for this reason a female was chosen as the type of *Manacus aurantiacus flaviventris*. The females of the new form are very distinctly brighter and more extensively yellow on the abdomen, this color extending anteriorly on to the breast. The throat of *M. a. flaviventris* is much paler and more yellowish olive green than in typical *M. a. aurantiacus*, in which the throat is more nearly the same color as the breast. For this reason the former subspecies seems to have a distinct dark band across the chest. In the male the most noticeable difference is the brighter more yellowish color of the posterior under parts of the new subspecies.

Since no Veraguas birds have been seen other than those from the Azuero Peninsula, it is impossible to say, at the present time, how extensive is the range of *M. a. flaviventris*. All Chiriqui and Costa Rica examples seen are referable to *M. a. aurantiacus*.

The writer agrees with Hellmayr[97] that *Manacus aurantiacus* is probably conspecific with *Manacus vitellinus*, but the characters of *M. a. flaviventris*, instead of giving any further indication of intergradation between the 2 forms, vary from the characters of *M. a. aurantiacus* in the opposite direction from those of *M. v. vitellinus* of the Canal Zone. Therefore, if the intergradation does occur it

[97]Zoöl. Ser., Field Mus. Nat. Hist., Vol. XIII, Part VI, November 14, 1929, p. 73.

would seem that it must be in the interior of Panama north of the Azuero Peninsula, in Veraguas or Coclé. The possibility of this is indicated by the specimen of *M. v. vitellinus* from Chorera in the western part of the Province of Panama a short distance west of the Canal Zone, noted by Chapman.[98] This was a male in which the orange areas were more deeply colored.

The yellow-bellied manakin was a common bird in the dense undergrowth of the bottomland forest at Paracoté, and the forest borders at Mariato River camp and Altos Cacao. It seems to be absent from the deeper forest areas and from the higher altitudes.

The curious snapping sounds produced by this species are evidently similar to those described for the Gould manakin (*Manacus vitellinus vittellinus*) by Chapman[99] and might be considered another indication of the close relationship between these two forms.

On one occasion a very brief glimpse was obtained of the dance of this species. Attention was attracted to the presence of a male yellow-bellied manakin by the familiar snapping sounds issuing from an extremely dense thicket into which the writer was able to see with great difficulty. Through the dense maze of vines and twigs I caught sight of one of the brilliant little orange and black fellows hopping around and around a triangular course on the floor of the thicket. Each hop carried the bird over one side of an equilateral triangle, approximately two feet on a side. Each hop occurred at rhythmic intervals of about one second each and was accompanied by a flit of the wings and a loud snap. The sound was presumably caused by the wings in the same manner as that described by Chapman[99] for the Gould manakin.

Specimens Collected

C. M. N. H. Number	*Sex*	*Locality*	*Elevation*	*Date*
22262*	♀	Paracoté	Sea Level	February 5, 1932
22263*	♂	Paracoté	Sea Level	February 6, 1932
22264	♀	Mariato River Camp	250 Feet	February 22, 1932
22265	♂	Altos Cacao	1500 Feet	March 3, 1932
22266	♀	Altos Cacao	1500 Feet	March 4, 1932
22267	♂	Altos Cacao	1500 Feet	March 5, 1932
22268	♂	Altos Cacao	1500 Feet	March 5, 1932
22269	♀	Paracoté	1500 Feet	March 25, 1932

*Feet bright orange.

[98]Bull. Amer. Mus. Nat. Hist., Vol. XXXVI, 1917, p. 487.
[99]Bull. Amer. Mus. Nat. Hist., Vol. LXVIII, September 30, 1935, p. 491.

Schiffornis turdinus verae-pacis (Sclater and Salvin). BROWN MANAKIN.

This series averages somewhat more greenish both above and below than specimens from Guatemala and Costa Rica, thus seeming to substantiate the validity of *Schiffornis turdinus dumicola* Bangs. However, since Hellmayr[100] states that he has seen 6 birds from the coastal forests of the Pacific side of Veraguas, including 3 from Cerro Montuosa on the Azuero Peninsula, which approach *S. t. furvus* (a more brownish form than *S. t. verae-pacis*), I am inclined to follow the example of several other authors and tentatively consider *S. t. dumicola* a synonym of *S. t. verae-pacis*. On the other hand, there does not at present seem to be a large enough series in existence from western Panama, to make possible a definite statement that *S. t. dumicola* is unrecognizable on the basis of average differences.

This species was rather common in the undergrowth of the more heavily forested regions at all elevations visited, but because of tis secretive habits would usually have been overlooked had it not been for its rather musical calls.

Specimens Collected

C. M. N. H. Number	*Sex*	*Locality*	*Elevation*	*Date*
22243	♀	Mariato River Camp	250 Feet	February 21, 1932
22244	♀	Mariato River Camp	250 Feet	February 23, 1932
22245	♂	Altos Cacao	1500 Feet	February 28, 1932
22246	♂	Altos Cacao	1500 Feet	February 28, 1932
22247	♂	Altos Cacao	1500 Feet	March 5, 1932
22248	♂	Cerro Viejo, Cavulla	3000 Feet	March 14, 1932
22249	♂	Paracoté	Sea Level	April 1, 1932

Muscivora tyrannus (Linnaeus). FORK-TAILED FLYCATCHER.

A single individual of this species was observed to alight on the ground in the open yard beside our house on the plantation at Paracoté. Before the bird could be collected, however, it took wing and flew straight away toward the northwest and did not stop until completely out of sight in the distance. The fork-tailed flycatcher was found to be a very common species on the dry, grassy plains of Coclé Province through which we traveled to reach the

[100]Zoöl. Ser., Field Mus. Nat. Hist., Vol. XIII, Part VI, November 14, 1929, p. 86.

Azuero Peninsula. It is believed, however, that the single bird seen at Paracoté, was not a resident there, but probably a straggler from the more characteristic habitat offered by the savannahs of Panama, north of the Azuero Peninsula.

Tyrannus melancholicus chloronotus Berlepsch. BERLEPSCH KINGBIRD.

The Azuero Peninsula specimens collected are indistinguishable from Costa Rican individuals.

This kingbird was one of the commonest and most conspicuous birds in the more open, scrubby country in the vicinity of the cocoanut plantation, and in the cultivated lands about the houses. It was absent, however, from habitat of similar appearance in the mountains.

Specimens Collected

C. M. N. H. Number	*Sex*	*Locality*	*Elevation*	*Date*
22309	♂	Paracoté	50 Feet	February 7, 1932
22310	♀	Paracoté	50 Feet	February 7, 1932
22311	♂	Paracoté	50 Feet	February 9, 1932
22312	♂	Paracoté	50 Feet	March 25, 1932
22313	♂	Paracote	50 Feet	April 1, 1932

Legatus leucophaius leucophaius (Vieillot). STRIPED FLYCATCHER.

Not having seen any topotypical specimens of this form from Cayenne the writer cannot say whether our 2 specimens are typical of *Legatus leucophaius leucophaius* or not. They differ markedly from a single example from western Costa Rica in being distinctly more yellowish and less heavily streaked below; also in being more greenish, less brownish on the back. However, in a species known to exhibit so much individual variation as does *Legatus leucophaius* our series is far too small to permit any definite conclusions.

The striped flycatcher was encountered only twice on our trip and was evidently not common.

Specimens Collected

C. M. N. H. Number	*Sex*	*Locality*	*Elevation*	*Date*
22340	♀	Mariato River Camp	250 Feet	February 23, 1932
22241	♂	Paracoté	Sea Level	March 22, 1932

Myiodynastes maculatus nobilis Sclater. NOBLE FLYCATCHER.

Despite the opinions of several other authors[101] to the contrary, the writer, after having examined 55 specimens of *Myiodynastes maculatus* from Brazil, Trinidad, Colombia, Panama, and Costa Rica, is of the opinion that *M. m. nobilis* is easily separable from *M. m. maculatus* on the basis of size, and of the color of either the upper or under parts, in most cases both. Santa Marta, Colombia the type locality of *M. m. nobilis*, is unfortunately in an intermediate area as far as color variation is concerned, the most marked and constant color differences from those of typical *M. m. maculatus* being found in examples from Panama and Costa Rica, including our Azuero Peninsula specimens, which exhibit extreme *nobilis* characters both in size and color.

There seem to be 2 color phases in *Myiodynastes maculatus* irrespective of sex. In one the buffy edges of the back feathers are cinnamon buff, while in the other they are yellowish buff occasionally tinged with green. There seems to be no racial significance to these differences, as both phases, with all kinds of intergradation exhibited, are found throughout the range of the species. The character of the color of the upperparts which distinguishes *M. m. nobilis* from *M. m. maculatus* is not the color of the edges of the feathers, but the relative amount of dark brown center and paler buff edging. The darker appearance of *M. m. maculatus* is due to the greater size of the dark brown centers of the dorsal feathers. The yellowish cast of the under parts is subject to a great deal of individual variation in this species, but *M. m. nobilis* averages a little more yellowish than *M. m. maculatus*. Two eastern Panama (Port Obaldia and Mt. Sapo) birds are the most yellowish below. The amount of streaking on the under surface is subject to considerable individual variation, but apparently has very little value for racial discrimination.

Myiodynastes maculatus nobilis, judging from the specimens at hand, reaches its maximum size in western Panama, and averages distinctly larger than *M. m. maculatus*, as may be seen from the following measurements:

[101]Todd and Carriker, Ann. Carnegie Mus., Vol. XIV, October, 1922, pp.344-345.
Chapman, Bull. Amer. Mus. Nat. Hist., Vol LV, October 1, 1926, p. 512.
Griscom, Bull. Mus. Comp. Zoöl., Vol. LXIX, No. 8, April, 1929, p. 176.
Griscom, Bull. Mus. Comp. Zoöl., Vol. LXXII, No. 9, January, 1932, p. 350.

Myiodynastes maculatus maculatus.—Adult male (4 specimens from Para and Amazonas, Brazil): wing, 102-105 (average, 103) mm.; tail, 75-81 (78.5); exposed culmen, 19-21 (20.3); tarsus, 18-20 (19). *Adult female* (2 specimens from Para and Serra da Lua, Brazil): wing, 96-106 (average, 101) mm.; tail, 75-82 (78.5); exposed culmen, 20-23 (21.5); tarsus, 18-21 (19.5).

Myiodynastes maculatus nobilis.—Adult male (26 specimens from Santa Marta, Colombia; central and western Panama; and southwestern Costa Rica): wing, 104-116 (average, 108.5) mm; tail, 81-90 (84.9) exposed culmen, 20-25 (22.8); tarsus, 18-22 (19.7). *Adult female* (19 specimens from Santa Marta, Colombia; eastern, central, and western Panama; and southwestern Costa Rica): wing, 98-111 (average, 105.8) mm.; tail, 76-88 (83.4); exposed culmen, 19-25 (22.2); tarsus, 18-21 (19.9).

The noble flycatcher was a very common species in the more open scrubby country of the Azuero Peninsula lowlands in the vicinity of the cocoanut plantation. A pair was observed nesting in an abandoned woodpecker nesting cavity in a small dead tree at the edge of our camp clearing at Altos Cacao.

Specimens Collected

C. M. N. H. Number	*Sex*	*Locality*	*Elevation*	*Date*
22288	♀	Paracoté	50 Feet	February 5, 1932
22289	♀	Paracoté	50 Feet	February 7, 1932
22290	♂	Paracoté	50 Feet	February 8, 1932
22291	♂	Paracoté	50 Feet	February 14, 1932
22292	♀	Altos Cacao	1500 Feet	February 28, 1932

Megarhynchus pitangua mexicanus (Lafresnaye). MEXICAN BOAT-BILLED FLYCATCHER.

The 2 specimens collected were the only individuals of this big flycatcher seen on the entire trip. They were found in the scrubby savannah country at Paracoté.

Specimens Collected

C. M. N. H. Number	*Sex*	*Locality*	*Elevation*	*Date*
22293	♂	Paracoté	50 Feet	February 18, 1932
22294	♂	Paracoté	50 Feet	March 29, 1932

Myiozetetes cayanensis harterti Bangs and Penard. HARTERT FLYCATCHER.

Our 2 specimens collected on the Azuero Peninsula, Panama, extend the known range of this species westward to that point from the Panama Canal Zone. Compared with a male and a female from Loma del Leon, Panama, including the type of *Myiozetetes cayanensis harterti*, our Azuero Peninsula specimens seem to be perfectly typical of that subspecies.

The collected specimens were the only individuals of this species seen. These were evidently a pair as they were taken together in rather open scrubby country near the shore of Montijo Bay.

Specimens Collected

C. M. N. H. Number	*Sex*	*Locality*	*Elevation*	*Date*
22318	♂	Paracoté	Sea Level	February 15, 1932
22319	♀	Paracoté	Sea Level	February 15, 1932

Myiozetetes similis columbianus Cabanis and Heine. COLOMBIAN FLYCATCHER.

A single specimen was taken at Mariato River camp in a region at that time entirely devoid of clearings, and not the type of country where one would expect to find this species. It was not encountered in the lowland savannahs which seemed to offer a more characteristic habitat for this species.

Specimens Collected

C. M. N. H. Number	*Sex*	*Locality*	*Elevation*	*Date*
22320	♂	Mariato River Camp	250 Feet	February 24, 1932

Myiarchus crinitus boreus Bangs. NORTHERN CRESTED FLYCATCHER.

Crested flycatchers were seen on several occasions both in the woodlands bordering the plantation and in the forested region of the interior of the Azuero Peninsula. The 2 specimens collected were molting the feathers of the throat, and the bird taken on February 8 was molting the tail also.

Specimens Collected

C. M. N. H. Number	*Sex*	*Locality*	*Elevation*	*Date*
22303	♀	Paracoté	50 Feet	February 8, 1932
22304	♀	Altos Cacao	1500 Feet	February 28, 1932

Myiarchus ferox panamensis Lawrence. PANAMA FLYCATCHER.

Our series from the Azuero Peninsula is indistinguishable from a series of typical *Myiarchus ferox panamensis* from the Canal Zone.

The Panama flycatcher was a common bird in the more open scrubby country at Paracoté. It was found also in the openings in the highlands up to 3000 feet.

Specimens Collected

C. M. N. H. Number	*Sex*	*Locality*	*Elevation*	*Date*
22305	♀	Cerro Viejo, Cavulla	3000 Feet	March 14, 1932
22306	♀	Paracoté	50 Feet	March 27, 1932
22307	♂	Paracoté	50 Feet	February 9, 1932
22308	♂	Paracoté	50 Feet	February 13, 1932

Myiarchus tuberculifer brunneiceps Lawrence. BROWN-CAPPED FLYCATCHER.

Compared with a series of *Myiarchus tuberculifer bangsi* from southwestern Costa Rica and Chiriqui, Panama, and a series of *M. t. brunneiceps* from the Canal Zone, Panama, our specimens, although intermediate, appear closer to the latter. The color of the back is slightly more brownish than in typical *M. t. brunneiceps*, but closer to that form in this character than to *M. t. bangsi*. With respect to the amount of rufous edgings on the secondaries and wing coverts the Azuero Peninsula birds are almost exactly intermediate between *M. t. brunneiceps*, and *M. t. bangsi;* in the amount of rufous edgings on the tail, however, they are much nearer to *M. t. brunneiceps*. With respect to the color of the head the Azuero Peninsula series is also nearer to *M. t. brunneiceps* than to *M. t. bangsi*, although not much credit is given to this character since it is found to vary greatly with the age of the skins.

The brown-capped flycatcher was rather common and evenly distributed throughout the forest from sea level to an altitude of 3000 feet.

Specimens Collected

C. M. N. H. Number	*Sex*	*Locality*	*Elevation*	*Date*
22295	♂	Paracoté	50 Feet	February 5, 1932
22296	♂	Paracoté	50 Feet	February 12, 1932
22297	♀	Paracoté	50 Feet	February 12, 1932
22298	♂	Altos Cacao	1500 Feet	February 28, 1932
22299	♂	Altos Cacao	1500 Feet	March 1, 1932
22300	..	Altos Cacao	1500 Feet	March 1, 1932
22301	♀	Cerro Viejo Camp	2000 Feet	March 6, 1932
22302	♀	Cerro Viejo, Cavulla	3000 Feet	March 13, 1932

Empidonax flaviventris (Baird). YELLOW-BELLIED FLYCATCHER.

The single specimen of this North American migrant collected in the forest at Paracoté was molting both wing and head feathers.

Specimens Collected

C. M. N. H. Number	*Sex*	*Locality*	*Elevation*	*Date*
22354	♂	Paracoté	50 Feet	March 25, 1932

Terenotriccus erythrurus fulvigularis (Salvin and Godman). FULVOUS-THROATED FLYCATCHER.

The 2 males collected on the same day in the forest along the Mariato River represent our total experience with this species on the Azuero Peninsula.

Specimens Collected

C. M. N. H. Number	*Sex*	*Locality*	*Elevation*	*Date*
22350	♂	Mariato River Camp	250 Feet	February 25, 1932
22351	♂	Mariato River Camp	250 Feet	February 25, 1932

Myiobius atricaudus atricaudus Lawrence. BLACK-TAILED MYIOBIUS.

The 4 specimens of this species collected on the Azuero Peninsula differed very slightly from 12 topotypical and nearly topotypical specimens of *Myiobius atricaudus atricaudus* from the Canal Zone, in being paler and more yellowish olive green on the back and pileum; in having the chest more tawny, less grayish; and the abdomen of a brighter yellow. However, at the present time it is thought that the differences are too slight to warrant subspecific separation.

Peters[102] has called attention to a skeletal peculiarity of *Myiobius sulphureipygius aureatus* in that the adult has a non-ossified skull. This same characteristic was found in all of our specimens of *Myiobius atricaudus atricaudus*.

The black-tailed myiobius was apparently of rather localized distribution on the Azuero Peninsula, since 4 specimens were taken at Mariato River camp and the species was not encountered at any other forest locality.

Because of its habit of flitting about among the lower branches of the trees with tail spread, this little flycatcher reminded the writer of the more familiar North American redstart (*Setophaga ruticilla*).

Specimens Collected

C. M. N. H. Number	*Sex*	*Locality*	*Elevation*	*Date*
22356*†	♀	Mariato River Camp	250 Feet	February 21, 1932
22357*	♂	Mariato River Camp	250 Feet	February 22, 1932
22358*	♀	Mariato River Camp	250 Feet	February 24, 1932
22359	♂	Mariato River Camp	250 Feet	February 26, 1932

*Skull very soft.
†Ovary developed.

Tolmomyias sulphurescens flavo-olivaceus (Lawrence). YELLOW-OLIVE FLYCATCHER.

The capture of a single female of this species in the heavy forest bordering the Mariato River is all the knowledge that can be contributed concerning the distribution of the yellow-olive flycatcher on the Azuero Peninsula.

Specimens Collected

C. M. N. H. Number	*Sex*	*Locality*	*Elevation*	*Date*
22353	♀	Mariato River Camp	250 Feet	February 25, 1932

Rhynchocyclus brevirostris brevirostris (Cabanis). SHORT-BILLED FLYCATCHER.

The four specimens of this species collected on the Azuero Peninsula are identical with a series from Boquete and Volcan de Chiriqui, western Panama which have been referred by various

[102]Bull. Mus. Comp. Zoöl., Vol. LXIX, No. 12, October, 1929, p. 449.

authors to *Rhnchocyclus brevirostris brevirostris*. The Azuero Peninsula birds show no tendency toward intergradation with specimens of *Rhynchocyclus brevirostris hellmayri* from eastern Panama.

The short-billed flycatcher like the black-tailed myiobius (*Myiobius atricaudus atricaudus*) was apparently of rather localized distribution on the Azuero Peninsula since 4 specimens were taken in the heavy forest at Mariato River Camp and the species was not encountered at any other collecting station.

Specimens Collected

C. M. N. H. Number	*Sex*	*Locality*	*Elevation*	*Date*
22314	♀	Mariato River Camp	250 Feet	February 22, 1923
22315	..	Mariato River Camp	250 Feet	February 23, 1932
22316	..	Mariato River Camp	250 Feet	February 24, 1932
22317	♂	Mariato River Camp	250 Feet	February 26, 1932

Atalotriccus pilaris wilcoxi Griscom. WILCOX PIGMY TYRANT.

The single specimen taken at the edge of the forest at Paracoté represents the extent of our knowledge of the distribution of this species on the Azuero Peninsula.

Specimens Collected

C. M. N. H. Number	*Sex*	*Locality*	*Elevation*	*Date*
22352*	..	Paracoté	Sea Level	February 17, 1932

*Iris yellowish white.

Elaenia flavogastra pallididorsalis subsp. nov. PANAMA ELAENIA.

Subspecific Characters.—Similar to *Elaenia flavogastra flavogastra*, but averaging slightly paler above; much more yellowish below. Similar also to *Elaenia flavogastra subpagana*, but slightly less yellowish on posterior under parts and paler grayish on the chest; upper parts averaging very much paler and less brownish (more grayish or greenish) olive green.

Measurements.—Adult male (27 specimens from the Azuero Peninsula, Pearl Islands, and Pacific side of the Isthmus of Panama): wing, 75-84.5 (average 79.9) mm.; tail, 68-79 (73.5); exposed cul-

men, 10-12.5 (11.3); tarsus, 18.5-21 (19.9). *Adult female* (16 specimens from the Pearl Islands and the Pacific side of the Isthmus of Panama): wing, 70-80 (average, 76.9) mm.; tail, 66-76 (71.7); exposed culmen, 10-12 (10.8); tarsus, 18-21 (19.5).

Type.—Adult male, No. 22322, Cleveland Museum of Natural History; Paracoté, altitude 50 feet, east shore of Montijo Bay, 1 mile south of the mouth of the Angulo River, Veraguas, Panama; February 8, 1932; John W. Aldrich, original number, 1660.

Geographic Distribution.—Savannahs and clearings on the Pacific slope of Panama, including the Azuero Peninsula and the Pearl Islands.

Remarks.—With a series of 86 specimens of *Elaenia flavogastra*, containing birds from regions ranging from Mexico to Brazil available for comparison it is perfectly obvious that, despite considerable individual variation, the birds from the Pacific side of Panama and from the Pearl Islands average paler and less brownish above than the examples from Costa Rica northward. Birds from the Pearl Islands and near Panama City are paler and more grayish, while specimens from the Azuero Peninsula are paler and more greenish than those from Costa Rica northward in Central America which are assumed to be typical *Elaenia flavogastra subpagana*. Ridgway[103] noted the pallor of the upper parts of specimens of this species from Saboga Island and the vicinity of Panama City and suggested that they might possibly represent a new form. He did not, however, suggest a new name for them.

Specimens from the Atlantic side of the Canal Zone and those from the Pacific side of extreme western Panama are somewhat intermediate between *E. f. subpagana* and *E. f. pallididorsalis*. The former, however, seem nearer *E. f. subpagana*, while the latter average closer to *E. f. pallididorsalis*. A single specimen from Cana, eastern Panama is, as Griscom[104] says intermediate between Central American birds of this species and *E. f. flavogastra*. However, in view of the above proposed separation of a new form from the Pacific slope of Panama, it is the writer's opinion that this specimen should be referred to *E. f. pallididorsalis*, although somewhat darker on the upper parts and paler below than the average of that sub-species.

[103]Bull. U. S. Nat. Mus., No. 50, Part IV, July 1, 1907, p. 430.
[104]Bull. Mus. Comp. Zoöl., Vol. LXIX, No. 8, April, 1929, p. 175.

While *E. f. pallididorsalis* appears somewhat intermediate between *E. f. subpagana* and *E. f. flavogastra* in respect to the color of the under surface, it is not intermediate in the color of the upper parts, which are paler in *E. f. pallididorsalis* than in either of the two other forms.

The Panama elaenia was in the field, not distinguished from the Lawrence elaenia (*Elaenia chiriquensis*) with which it associated in the open scrubby land on the plantation, so on that basis, it is impossible to say what was the relative abundance of the former species on the Azuero Peninsula. It can be said only that out of 13 specimens of both species collected at random on the plantation, but 2 turned out to be the Panama elaenia. A single specimen of this species was seen and collected on the mountain savannahs at Cavulla, near the top of Cerro Viejo.

Specimens Collected

C. M. N. H. Number	*Sex*	*Locality*	*Elevation*	*Date*
22321	♂	Paracoté	50 Feet	February 5, 1932
22322	♂	Paracoté	50 Feet	February 8, 1932
22323	♂	Cerro Viejo, Cavulla	3000 Feet	March 12, 1932

Elaenia chiriquensis chiriquensis Lawrence. LAWRENCE ELAENIA.

No difference can be detected between the series of *Elaenia chiriquensis* from the Azuero Peninsula and specimens from El General, Costa Rica, indicating that birds of this species from the former region are probably fairly typical *E. c. chiriquensis*.

The Lawrence elaenia was a very common bird in the open scrubby country adjoining the cocoanut plantation at Paracoté, apparently considerably outnumbering the Panama elaenia (*Elaenia flavogastra pallididorsalis*) with which it associated (see preceding species). Two specimens were taken in the mountains in brush grown areas which had formerly been under cultivation.

Specimens Collected

C. M. N. H. Number	*Sex*	*Locality*	*Elevation*	*Date*
22324	♂	Paracoté	50 Feet	February 5, 1932
22325	♂	Paracoté	50 Feet	February 6, 1932
22326	♂	Paracoté	50 Feet	February 7, 1932
22327	♀	Paracoté	50 Feet	February 7, 1932
22328	♂	Paracoté	50 Feet	February 8, 1932
22329	♂	Paracoté	50 Feet	February 8, 1932
22330	♀	Paracoté	50 Feet	February 12, 1932
22331	♂	Paracoté	50 Feet	February 18, 1932
22332	♀	Paracoté	50 Feet	February 18, 1932
22333	..	Paracoté	50 Feet	February 18, 1932
22334	♂	Altos Cacao	1500 Feet	March 5, 1932
22335	..	Cerro Viejo, Cavulla	3000 Feet	March 11, 1932
22336	♀	Paracoté	50 Feet	March 22, 1932

Elaenia viridicata accola (Bangs). PANAMA PLACID ELAENIA.

Although our 3 specimens of this species seem darker than the average of 26 topotypical examples of *F. v. accola*, the difference seems too slight to differentiate them subspecifically, particularly in view of the fact that only 2 of the specimens from the Azuero Peninsula are adults.

A report of the 3 specimens collected in the forest at three widely separated collecting stations is the only information that can be contributed concerning the distribution of the Panama placid elaenia on the Azuero Peninsula.

Specimens Collected

C. M. N. H. Number	*Sex*	*Locality*	*Elevation*	*Date*
22337	♀	Mariato River Camp	250 Feet	February 21, 1932
22338	..juv.	Cerro Viejo, Cavulla	3000 Feet	March 13, 1932
22339	♂	Paracoté	Sea Level	March 29, 1932

Tyranniscus vilissimus parvus Lawrence. LESSER PALTRY FLYCATCHER.

Our single specimen from the Azuero Peninsula is slightly paler and more yellowish olive green on the upper parts, also brighter and more extensively yellow on the posterior under surface than 3 typical specimens of *Tyranniscus vilissimus parvus* from the Canal Zone, as well as 1 specimen from Cana, eastern Panama, and 2 from El General, Costa Rica. A larger series from the Azuero Peninsula might show the birds from that region worthy of separation.

Our entire knowledge of the distribution of the lesser paltry flycatcher in the regions visited is represented by the single specimen collected in the lowland forest at Paracoté.

Specimens Collected

C. M. N. H. Number	*Sex*	*Locality*	*Elevation*	*Date*
22355	♂	Paracoté	Sea Level	February 7, 1932

Pipromorpha oleaginea lutescens Griscom. VERAGUAS PIPROMORPHA.

Our Azuero Peninsula series is slightly duller on the under parts, being less greenish anteriorly, and less yellowish, more tawny posteriorly, than 4 topotypical specimens of *Pipromorpha oleaginea lutescens* from Santa Fé, Veraguas. This condition was noted also by Griscom[105] in specimens from the coastal forests of Veraguas. However, the writer agrees with Griscom that these southern Veraguas birds, which include those from the Azuero Peninsula are, despite a slight average difference, best referable to *P. o. lutescens*.

The Veraguas pipromorpha was a rather common species in the forests at the higher altitudes on the Azuero Peninsula. We encountered these birds frequently in the undergrowth of the forests about 1500 feet. It was most abundant at 3000 feet, the highest of our collecting stations.

Specimens Collected

C. M. N. H. Number	*Sex*	*Locality*	*Elevation*	*Date*
22342	♀	Mariato River Camp	250 Feet	February 23, 1932
22343	♂	Altos Cacao	1500 Feet	February 28, 1932
22344	♀	Altos Cacao	1500 Feet	February 28, 1932
22345	♂	Altos Cacao	1500 Feet	March 3, 1932
22346	♂	Cerro Viejo Camp	2000 Feet	March 6, 1932
22347	♂	Cerro Viejo Cavulla	3000 Feet	March 13, 1932
22348	♂	Cerro Viejo, Cavulla	3000 Feet	March 13, 1932
22349	..	Cerro Viejo, Cavulla	3000 Feet	March 13, 1932

There are in the American Museum of Natural History 2 male specimens[106] collected by Rex Benson in the interior of the Cape Mala [=Azuero] Peninsula.

Iridoprocne albilinea (Lawrence). MANGROVE SWALLOW.

The mangrove swallow was a common bird along the shore of Montijo Bay. Several individuals were always to be seen coursing back and forth either along the beach, or over the water of the

[105]Amer. Mus. Novit., No. 280, September 10, 1927, p. 10.
[106]Griscom, Amer. Mus. Novit., No. 280, September 10, 1927, p. 10.

estero, or of a partially dried up lagoon where the 2 specimens were taken at Paracoté.

Specimens Collected

C. M. N. H. Number	*Sex*	*Locality*	*Elevation*	*Date*
22360	♂	Paracoté	Sea Level	February 15, 1932
22361	♀	Paracoté	Sea Level	February 15, 1932

Cyanocorax affinis zeledoni Ridgway. TALAMANCA JAY.

Three roving bands of these jays were encountered in the forests of the Azuero Peninsula. Two of them were at Paracoté and one at Mariato River camp. The bands consisted of from 6 to 10 birds each.

The Talamanca jay is apparently endowed with considerable curiosity. On each occasion the birds hovered all about in the trees giving voice to a great variety of squeaks and rattling sounds as they eyed me curiosly.

Specimens Collected

C. M. N. H. Number	*Sex*	*Locality*	*Elevation*	*Date*
22362*	♂	Paracoté	50 Feet	February 5, 1932
22363*	♀	Paracoté	50 Feet	February 5, 1932

*Iris straw yellow.

Thryothorus rufalbus castanonotus (Ridgway). CHESTNUT-BACKED WREN.

No difference can be detected between our two specimens and a series of 6 supposedly typical examples of *Thryothorus rufalbus castanonotus* from Costa Rica.

The specimens were taken in the dense forest undergrowth, one in the heavy timber along the Mariato River, 10 miles from the coast, and the other in the woods adjoining the cocoanut plantation at Paracoté.

Specimens Collected

C. M. N. H. Number	*Sex*	*Locality*	*Elevation*	*Date*
22373	♂	Mariato River Camp	150 Feet	February 24, 1932
22374	♀	Paracoté	50 Feet	April 2, 1932

Thryothorus modestus elutus (Bangs). PANAMA WREN.

There has been available for the present study a large series of specimens of *Thryothorus modestus* from the Canal Zone, Panama and Costa Rica including topotypes of both *T. m. modestus* and *T. m. elutus*. This seems to be a species subject to great variation in color due to abrasion of the plumage. Worn plumaged Costa Rican specimens of *T. m. modestus* can scarcely be distinguished from equally abraded Canal Zone specimens of *T. m. elutus*. Unabraded Costa Rican specimens are distinctly darker and more reddish brown on the back than fresh plumaged Canal Zone birds. Our specimen from the Azuero Peninsula which is in good condition is fairly typical *T. m. elutus*, although somewhat darker and more reddish on the back than the average of Canal Zone specimens.

The single specimen of the Panama wren obtained was discovered in the rank growth of sprouts growing up in a small patch of fallow cultivated land at Altos Cacao.

Specimens Collected

C. M. N. H. Number	*Sex*	*Locality*	*Elevation*	*Date*
22375	♀	Altos Cacao	1500 Feet	March 2, 1932

Thryothorus rutilus hyperythrus Salvin and Godman. TAWNY-BELLIED WREN.

Our Azuero Peninsula series was found to differ from a series of 7 typical specimens of *Thryothorus rutilus hyperythrus* from the Canal Zone in having a considerably more brownish, less grayish back; larger white spots on sides of head and throat; under parts of a brighter rufous, and in entirely lacking white on the center of the abdomen. Since, however, the two series are not comparable in respect to season, the Azuero Peninsula birds having been taken in the winter, and the Canal Zone specimens in the summer, the writer does not place a great deal of confidence in the significance of the differences noted. Mr. B. P. Bole, Jr., took our Azuero Peninsula specimens to the Museum of Comparative Zoölogy where he and Mr. James L. Peters very kindly compared them with much larger series from the Canal Zone as well as other parts of the range of *T. r. hyperythrus*. He discovered that, although there is a

slight tendency for Costa Rican and western Panama (including Azuero Peninsula) birds to have darker under parts than seasonally comparable Canal Zone specimens, all of the other characters mentioned above are subject to marked seasonal change due to abrasion and are therefore of very little value as racial distinctions.

The tawny-bellied wren was a rather common species in the heavily forested regions of the Azuero Peninsula, particularly along the banks of the Mariato River. Its long rich song frequently called attention to its presence.

Specimens Collected

C. M. N. H. Number	*Sex*	*Locality*	*Elevation*	*Date*
22364	♂	Mariato River Camp	250 Feet	February 21, 1932
22365	♂	Mariato River Camp	250 Feet	February 21, 1932
22366	♂	Mariato River Camp	250 Feet	February 23, 1932
22367	♂	Altos Cacao	1500 Feet	February 28, 1932
22368	♀	Altos Cacao	1500 Feet	February 29, 1932
22369	♂	Cerro Viejo Camp	2000 Feet	March 7, 1932

Troglodytes musculus inquietus Baird. PANAMA HOUSE WREN.

Our 3 Azuero Peninsula specimens have not been compared with topotypical *Troglodytes musculus inquietus* from the Canal Zone. They are, however, not different from 2 specimens from Divala, western Panama, from which region birds have been referred by several authors to *T. m. inquietus*.

The Panama house wren was a common bird about the cocoanut plantation, particularly in the vicinity of the buildings. Its song and habits were extremely like the more familiar North American house wrens (*Troglodytes domesticus*). On two occasions a bird of this species was trapped in our screened porch, coming in through a knot hole under the eaves and being unable to find its way out again.

Specimens Collected

C. M. N. H. Number	*Sex*	*Locality*	*Elevation*	*Date*
22370	♂	Paracoté	Sea Level	February 12, 1932
22371	♂	Paracoté	Sea Level	March 23, 1932
22372	♀	Paracoté	Sea Level	March 23, 1932

Dumetella carolinensis (Linnaeus). CATBIRD.

The well known mewing note of this species, issuing from a dense tangle of bushes and vines at the edge of the road at Paracoté, first called attention to the presence of this familiar North American migrant.

By reason of the paucity of Panama records for the catbird, except in the Almirante region, indicated by Griscom,[107] the capture of an additional specimen seems to be of considerable interest. The species was not met with on the Azuero Peninsula except as mentioned above; and Paracoté apparently constitutes the farthest south locality at which the catbird has ever been taken.

Specimens Collected

C. M. N. H. Number	*Sex*	*Locality*	*Elevation*	*Date*
22376	..	Paracoté	50 Feet	March 22, 1932

Turdus assimilis cnephosus (Bangs). SALVIN THRUSH.

Our series of this species collected on the Azuero Peninsula was compared with 33 specimens of *Turdus assimilis cnephosus* from western Panama and Costa Rica, including 4 topotypical specimens of this race from Boquete. Only 1 out of 7 of the Azuero Peninsula birds differs appreciable from typical *T. a. cnephosus*. This individual is more brownish (less olivaceous) above, more brownish (less grayish) below, and apparently shows a tendency toward intergradation with *Turdus assimilis daguae* of Colombia and eastern Panama.

Salvin thrushes were in full song and much in evidence during our trip into the mountains in late February and March. The species was first encountered at Mariato River camp at 250 feet elevation, but became more abundant as we ascended the mountains. It reached its peak of abundance at our highest camp, Cavulla, near the top of Cerro Viejo at 3000 feet elevation. There, these thrushes were very common and their loud caroling songs, very similar to those of the familiar North American robin (*Turdus migratorius*), were the most characteristic sounds of the misty, moss-festooned, subtropical forest.

[107]Bull. Mus. Comp. Zoöl., Vol. LXXVIII, No. 3, April, 1935, p. 360.

Specimens Collected

C. M. N. H. Number	*Sex*	*Locality*	*Elevation*	*Date*
22384*	♂	Mariato River Camp	250 Feet	February 22, 1932
22385*	♂	Mariato River Camp	250 Feet	February 22, 1932
22386*	♂	Cerro Viejo Camp	2000 Feet	March 6, 1932
22387*	♂	Cerro Viejo Camp	2000 Feet	March 7, 1932
22388	♂	Cerro Viejo Cavulla	3000 Feet	March 13, 1932
22389	♂	Cerro Viejo Cavulla	3000 Feet	March 14, 1932
22390	♂	Cerro Viejo Cavulla	3000 Feet	March 14, 1932

*Eyelids yellow.

Turdus grayi casius (Bonaparte). BONAPARTE THRUSH.

Our specimens from the Azuero Peninsula are very close in color to those from David, Chiriqui, also to those from near Panama City.

The Bonaparte thrush was a very common bird along the forest margins at Paracoté. In the deep forests, however, and even in the openings at the higher elevations, it was absent. A single specimen only was obtained away from the vicinity of the plantation and that was in a second growth jungle on the site of the old rubber operations headquarters near our Mariato River camp.

Since this species was in full song and a female collected on March 22 contained well-developed eggs, it is assumed that our collecting fell within the breeding season. The song is similar to that of the preceding species (*Turdus assimilis*) and to the American Robin (*Turdus migratorius*), but somewhat weaker then either.

Specimens Collected

C. M. N. H. Number	*Sex*	*Locality*	*Elevation*	*Date*
22377	♂	Paracoté	Sea Level	February 9, 1932
22378	♂	Paracoté	Sea Level	February 9, 1932
22379	♂	Paracoté	50 Feet	February 14, 1932
22380	♂	Paracoté	Sea Level	February 17, 1932
22382	♂	Paracoté	50 Feet	March 21, 1932
22383*	♀	Paracoté	50 Feet	March 22, 1932
22381	♂	Mariato River Camp	250 Feet	February 21, 1932

*Eggs well developed in ovary.

Polioptila plumbea bilineata (Bonaparte). WHITE-BROWED GNATCATCHER.

The writer here accepts the views of Hellmayr[108] in considering this form of subspecies of *Polioptila plumbea*, from which it differs

[108]Zoöl. Ser. Field Mus. Nat. Hist., Vol. XIII, Part VII, November 15, 1934, p. 501.

chiefly in the possession of white superciliary stripes. Since Griscom[109] has found that the character of the white superciliary tends to break down in Central American birds of the *bilineata* group "wherever it encounters a dry or arid climate, and disappears almost completely in western and northwestern Mexico", it would seem that intergradation is shown between *P. plumbea* and *P. bilineata* in this respect, although not necessarily over geographically continuous areas.

Our Azuero Peninsula specimens have complete white lores and superciliary stripes and are apparently typical of *P. p. bilineata*. At least they are indistinguishable from Boruca, Costa Rica, specimens, which have been referred to that form by several authors.

The white-browed gnatcatcher was not uncommon in the vicinity of the cocoanut plantation at Paracoté, 4 specimens having been collected. These birds were taken in the second growth trees at the forest margins. The species was not found away from the plantation.

Specimens Collected

C. M. N. H. Number	*Sex*	*Locality*	*Elevation*	*Date*
22391	♂	Paracoté	50 Feet	February 5, 1932
22392	♀	Paracoté	50 Feet	February 5, 1932
22393	♂	Paracoté	50 Feet	February 10, 1932
22394	♀	Paracoté	50 Feet	March 29, 1932

Ramphocaenus rufiventris sanctae-marthae Sclater. SANTA MARTA LONG-BILLED ANT-WREN.

Our 3 Azuero Peninsula specimens were compared with 4 typical examples of *Ramphocaenus rufiventris rufiventris* from Guatemala and a topotype of *Ramphocaenus rufiventris sanctae-marthae* from Santa Marta, Colombia. Our specimens are perfectly typical of the latter subspecies in size, and in degree of pallor of head and lower surface. In the degree of the brownish cast of the back they are somewhat intermediate, but nearer to *R. r. sanctae-marthae*.

This curious little long-billed ant-wren was found in the forest at 2 different camps, but was apparently not common anywhere. It recalls some species of the *Sylviidae* by its gnatcatcher-like habit of dancing stiff-legged about on its perch with tail held aloft.

[109]Amer. Mus. Novit., No. 414, March 24, 1930, pp. 6-7.

Specimens Collected

C. M. N. H. Number	*Sex*	*Locality*	*Elevation*	*Date*
22216	♂	Mariato River Camp	250 Feet	February 21, 1932
22217	..	Cerro Viejo Camp	2000 Feet	March 7, 1932
22218	♀	Cerro Viejo Camp	2000 Feet	March 8, 1932

Vireosylva flavoviridis flavoviridis (Cassin). NORTHERN YELLOW-GREEN VIREO.

A single female of this migrant form was taken at Altos Cacao, March 4, and 2 males were taken at Paracoté, March 27, 1932. All 3 of these birds are perfectly typical of *V. f. flavoviridis* in color, having well defined dusky lateral borders to the pileum, and corresponding in size to that race, as may be seen from the following measurements: (2 males) wing, 76.5, 79; tail, 53, 55; exposed culmen, 14.5,15; tarsus, 18,18; (1 female) wing, 74.5; tail, 51; exposed culmen, 13.5; tarsus, 18 mm.

This form may be conspecific with *Vireosylva olivacea* [=*virescens*] of North America as believed by Van Rossem[110] and Hellmayr[111] although the writer does not consider that this has as yet been satisfactorily established in any published work. The songs of the 2 forms are certainly strikingly similar.

Specimens Collected

C. M. N. H. Number	*Sex*	*Locality*	*Elevation*	*Date*
22395*	♀	Altos Cacao	1500 Feet	March 4, 1932
22397	♂	Paracoté	50 Feet	March 27, 1932
22398	♂	Paracoté	50 Feet	March 27, 1932

*Iris reddish brown.

Vireosylva flavoviridis insulana Bangs. SOUTHERN YELLOW-GREEN VIREO.

A single male of *Vireosylva flavoviridis insulana*, which has been shown by Peters[112] to be the breeding form of this species in Panama, was taken at Altos Cacao on March 5, 1932. This specimen has been compared with 10 individuals, including several summer examples of *V. f. insulana* from the Pearl Islands, Panama, and found to be typical in color, having the dusky lateral borders to the pileum

[110]Bull. Mus. Comp. Zoöl., Vol. LXXVII, No. 7, December, 1934, p. 467.
[111]Zoöl. Ser. Field Mus. Nat. Hist., Vol. XIII, Part VIII, September 16, 1935, p. 132.
[112]The Auk, Vol. XLVIII, No. 4, October 18, 1931, p. 583.

scarcely discernible. In size, also, the Azuero Peninsula specimen agrees with *V. f. insulana*, as may be seen from the following measurements: wing, 75; tail, 51; exposed culmen, 14.5; tarsus, 17 mm.

When collected this specimen was in full song which was almost exactly like that of the red-eyed vireo (*Vireosylva olivacea*) of North America.

Specimens Collected

C. M. N. H. Number	*Sex*	*Locality*	*Elevation*	*Date*
22396	♂	Altos Cacao	1500 Feet	March 5, 1932

Vireosylva philadelphica (Cassin). PHILADELPHIA VIERO.

The Philadelphia vireo was rather common in mixed flocks of arboreal North American migrants which were frequently encountered in the forests both at Paracoté and at Altos Cacao.

Specimens Collected

C. M. N. H. Number	*Sex*	*Locality*	*Elevation*	*Date*
22399	..	Altos Cacao	1500 Feet	March 1, 1932
22400	♀	Altos Cacao	1500 Feet	March 1, 1932
22401	♂	Altos Cacao	1500 Feet	March 5, 1932

Hylophilus decurtatus decurtatus (Bonaparte). GRAY-HEADED HYLOPHILUS.

Azuero Peninsula specimens of this species seem to be indistinguishable from a large series of typical *Hylophilus decurtatus decurtatus*.

This little vireo was not uncommon in the lowland forests, where it frequented the higher leafy portions of the trees. It was not observed in any of the forests at the higher elevations, but might easily have been missed due to its inconspicuousness in the high tree tops.

Specimens Collected

C. M. N. H. Number	*Sex*	*Locality*	*Elevation*	*Date*
22402	♂	Mariato River Camp	250 Feet	February 21, 1932
22403	♂	Paracoté	50 Feet	March 25, 1932
22404	♂	Paracoté	50 Feet	March 27, 1932
22405	♂	Paracoté	50 Feet	April 1, 1932

Coereba flaveola columbiana (Cabanis). COLOMBIAN BANANAQUIT.

As Hellmayr[113] has pointed out, Canal Zone specimens of this species are referable to *Coereba flaveola columbiana*. The writer has compared 9 adult specimens from that region with 10 examples of *Coereba flaveola mexicana* from Vera Cruz and Chiapas, Mexico, from Vera Paz, Guatemala, and from Honduras; also with 9 specimens of *Coereba flaveola columbiana* from Antioquia and Heula, Colombia, and Cana and Obaldia, eastern Panama, and finds that, particularly in the size and brightness of the yellow rump patch, the Canal Zone birds are fairly typical of the latter subspecies. At the same time our 4 adult specimens from the Azuero Peninsula were compared in the same series, and, as in the case of the Canal Zone birds, were found to be definitely referable to *Coereba flaveola columbiana*.

The Colombian bananaquit was rather common on the plantation among the cocoanut palms and in the brush at the edge of the forest.

Specimens Collected

C. M. N. H. Number	*Sex*	*Locality*	*Elevation*	*Date*
22406	♂	Paracoté	Sea Level	February 6, 1932
22407	♀	Paracoté	Sea Level	February 8, 1932
22408	♂ im.	Paracoté	Sea Level	February 14, 1932
22409	♀ im.	Paracoté	Sea Level	February 17, 1932
22410	♀	Paracoté	Sea Level	March 23, 1932
22411	♂	Paracoté	Sea Level	April 2, 1932

Cyanerpes cyaneus carneipes (Sclater). CENTRAL AMERICAN HONEY CREEPER.

Compared to 15 specimens of typical *Cyanerpes cyaneus cyaneus* from French Guiana and Brazil, our Azuero Peninsula series, together with 4 specimens from Costa Rica, bear out perfectly the subspecific characters of *C. c. carneipes* as mentioned by Oberholser[114] and Hellmayr.[115] The broader purplish blue nuchal band of the males as well as the more yellowish under parts of the females are exceptionally well marked and constant distinguishing characters. Furthermore, the Costa Rica and Panama females are very different from the Brazil and French Guiana birds, of the same sex, in the

[113]Zoöl. Ser. Field Mus. Nat. Hist., Vol. XIII, Part VIII, September 16, 1935, p. 294.
[114]The Auk, Vol. XVI, No. 1, January, 1899, p. 33.
[115]Zoöl. Ser., Field Mus. Nat. Hist., Vol. XIII, Part VIII, September 16, 1935, p. 256.

color of the upper parts, being much more yellowish green on the crown, back, and rump. It appears to the writer that, on the basis of specimens examined, the Central American bird is a good subspecies, and it is therefore hard to understand why several recent authors have failed to recognize it as distinct.

The Central American honey creepers apparently become concentrated in certain trees during the blooming period since all of the 10 specimens collected were taken from two adjacent trees of the same species which were, at that time, in full bloom in the forest at Altos Cacao. The birds worked about among the blossoms in the very tops of the trees and although frightened away several times by the discharge of my gun repeatedly returning to the same trees until several had been taken. This performance was repeated on 3 different days. The species was not encountered by us elsewhere.

Specimens Collected

C. M. N. H. Number	*Sex*	*Locality*	*Elevation*	*Date*
22412*	♂	Altos Cacao	1500 Feet	March 1, 1932
22413*	♂	Altos Cacao	1500 Feet	March 1, 1932
22414†	♀	Altos Cacao	1500 Feet	March 1, 1932
22415*	♂	Altos Cacao	1500 Feet	March 3, 1932
22416*	♂	Altos Cacao	1500 Feet	March 3, 1932
22417†	♀	Altos Cacao	1500 Feet	March 3, 1932
22418*	♂	Altos Cacao	1500 Feet	March 5, 1932
22419†	♀	Altos Cacao	1500 Feet	March 5, 1932
22420†	♀	Altos Cacao	1500 Feet	March 5, 1932
22421†	♀	Altos Cacao	1500 Feet	March 5, 1932

*Feet coral red.
†Feet purplish red.

Cyanerpes lucidus isthmicus Bangs. ISTHMIAN HONEY CREEPER.

Our single specimen of this species from the Azuero Peninsula corresponds in size to *Cyanerpes lucidus isthmicus*, but is paler than the average of this form, being more like the average of *C. l. lucidus* in this respect. However, with only a single specimen at hand from the Azuero Peninsula, the writer feels that it is best to refer the birds of that region, for the present at least, to *Cyanerpes lucidus isthmicus* which is the name currently applied to Panama birds. The writer is inclined to agree with Hellmayr[116] that *Cyanerpes*

[116]Zoöl. Ser., Field Mus. Nat. Hist., Vol. XIII, Part VIII, September 16, 1935, p. 264.

lucidus is probably a subspecies of *Cyanerpes caeruleus*, but awaits definite evidence of intergradation before recognizing this as a fact in nomenclature.

A lone male Isthmian honey creeper was taken with the 10 specimens of the Central American honey creeper in the blossoming trees at Altos Cacao, discussed under the last species. No further evidence of the occurrence of *C. l. isthmicus* on the Azuero Peninsula was found.

Specimens Collected

C. M. N. H. Number	*Sex*	*Locality*	*Elevation*	*Date*
22422*	♂	Altos Cacao	1500 Feet	March 3, 1932

*Feet pure yellow.

Chlorophanes spiza arguta Bangs and Barbour. COSTA RICAN GREEN HONEY CREEPER.

After examination of a large series of specimens from various parts of Panama and southwestern Costa Rica, it is apparent that there is considerable variation in size and color in both males and females of the green honey creepers currently included under the name *Chlorophanes spiza arguta* Bangs and Barbour.[117] I am able to detect some slight average differences in size and color of birds from those regions which seem to be correlated with geographic distribution. However, these differences are so slight compared with the great individual variation in the birds from any one locality, that it does not seem advisable at the present time to recognize them in nomenclature. The color differences are dependent on the amount of greenish sheen of the blue plumage of the males and the degree of yellowish of the green plumage of the females. The size and color differences seem to divide the Panama and southwestern Costa Rica birds as follows:

Males

Larger and more bluish—Azuero Peninsula and (?) Pacific coast of Chiriqui.

Larger and more greenish—Southwestern Costa Rica, Atlantic slope of Chiriqui, and Canal Zone.

Smaller and more greenish—Eastern Panama.

[117]Bull. Mus. Comp. Zoöl., Vol. LXV, No. 6, September, 1922, p. 225.

Females

Larger and more pure green—Azuero Peninsula.

Larger and more yellowish green—Southwestern Costa Rica, Chiriqui, and Canal Zone.

Smaller and more yellowish green—Eastern Panama.

On the basis of these differences it would seem off-hand that 3 subspecies might be recognized in Panama. However, it does not seem advisable to recommend such a procedure at the present time, since I have been unable to see more than one topotypical specimen of *C. s. arguta*, the type itself, which is a male. A good series of both males and females from the type locality, Divala, on the Pacific coast of Chiriqui, should be studied before attempting any division of such an individually variable form. It might be stated here that the type is a very bluish individual, and could be matched in this respect, among the Panama specimens, only by males from the Azuero Peninsula. The bill is rather large (15 mm.), a character also like Azuero Peninsula specimens. The wing, on the other hand, is small (67 mm.) which equals the minimum size found among eastern Panama birds. Thus in the type, the extremes of color and size found in males are more or less bridged, which fact alone tends to preclude any subspecific differentiation until an adequate topotypical series of *C. s. arguta* can be obtained.

It might be added that the eastern Panama birds do not even vaguely suggest *C. s. subtropicalis*, the nearest form to the south, either in bluishness of males or yellowishness of females, being closer in these respects to both *C. s. exul* and *C. s. spiza*. The smaller size of the eastern Panama bird might be explained as a tendency to intergrade with the South American forms while the larger size of the western Panama specimens shows a tendency toward intergradation with *C. s. guatemalensis*.

This species seemed to be more generally distributed in the regions visited than the other species of forest-inhabiting honey creepers. Two male specimens of the Costa Rican green honey

creeper were taken with individuals of the Central American honey creeper from the same flowering trees at Altos Cacao described under the latter species.

Specimens Collected

C. M. N. H. Number	*Sex*	*Locality*	*Elevation*	*Date*
22423*	♀	Mariato River Camp	250 Fet	February 24, 1932
22424*	♀	Mariato River Camp	250 Feet	February 26, 1932
22425*	♂	Altos Cacao	1500 Feet	February 28, 1932
22426*†	♂	Altos Cacao	1500 Feet	March 5, 1932
22427	♀	Altos Cacao	1500 Feet	March 5, 1932
22428	♀	Cerro Viejo Camp	2000 Feet	March 8, 1932
22429	♂	Paracoté	50 Feet	March 25, 1932
22430	♂	Paracoté	50 Feet	April 1, 1932

*Iris red.
†Lower part of upper mandible and whole of lower mandible yellow.

Mniotilta varia (Linnaeus). BLACK AND WHITE WARBLER.

The single specimen taken was the only individual of this North American migrant encountered.

Specimens Collected

C. M. N. H. Number	*Sex*	*Locality*	*Elevation*	*Date*
22434	♂	Paracoté	50 Feet	February 5, 1932

Protonotaria citrea (Boddaert). PROTHONOTARY WARBLER.

Several individuals of this North American migrant species were seen in a small patch of mangroves at Paracoté.

Specimens Collected

C. M. N. H. Number	*Sex*	*Locality*	*Elevation*	*Date*
22435	♂	Paracoté	Sea Level	February 6, 1932

Vermivora peregrina (Wilson). TENNESSEE WARBLER.

The Tennessee warbler seemed to be the most abundant of all of the North American migrants, wintering on the Azuero Peninsula. At least the greater part of the roving flocks of warblers frequently encountered in the forest tree tops proved to be of this species.

Specimens Collected

C. M. N. H. Number	*Sex*	*Locality*	*Elevation*	*Date*
22431	..	Paracoté	50 Feet	February 8, 1932

Dendroica erithachorides aequatorialis Sundevall. PANAMA GOLDEN WARBLER.

Hellmayr[118] believes that intergradation of *Dendroica petechia* and *Dendroica erithachorides* takes place through *Dendroica ruficapilla* and considers them conspecific, with the former name taking preference due to priority. The writer does not consider that this condition has been sufficiently well established to accept in the present instance, however.

The single Azuero Peninsula specimen is indistinguishable from a large series of *D. erithachorides aequatorialis* from the Pearl Islands. It is very different from specimens of *Dendroica erithachorides erithachorides* from the Atlantic coast of Panama and *Dendroica erithachorides xanthotera* from Honduras. This extends the range of *D. e. aequatorialis* slightly westward from Agua Dulce, Coclé along the Pacific coast of Panama.

The single specimen collected and one other individual seen, both in the mangroves fringing the estero at Paracoté, represent the only records for this species on the Azuero Peninsula. Apparently the species is not common there, although it must be admitted that comparatively little time was spent collecting in the mangroves.

Specimens Collected

C. M. N. H. Number	*Sex*	*Locality*	*Elevation*	*Date*
22436	♂	Paracoté	Sea Level	April 2, 1932

Dendroica pensylvanica (Linnaeus). CHESTNUT-SIDED WARBLER.

Although not preserved, a single specimen of the chestnut-sided warbler was taken on February 12, 1932, from one of the several roving flocks of North American migrants met with in the high tree-tops of the forest at Paracoté.

Oporornis formosus (Wilson). KENTUCKY WARBLER.

The Kentucky warbler was observed on several occasions on the Azuero Peninsula, on or near the floor of the forest. Unlike the other North American warblers, this species was represented by solitary

[118]Zoöl. Ser., Field Mus. Nat. Hist., Vol. XIII, Part VIII, September 16, 1935, p. 374.

individuals apparently not associating either with others of its own kind or individuals of different migrant species.

Specimens Collected

C. M. N. H. Number	*Sex*	*Locality*	*Elevation*	*Date*
22432	♂	Paracoté	50 Feet	February 17, 1932
22433	♀	Altos Cacao	1500 Feet	February 28, 1932

Setophaga ruticilla (Linnaeus). AMERICAN REDSTART.

Although no specimens were collected, individuals of the American redstart were seen on several occasions in the forests in mixed flocks of migrant North American warblers.

Basileuterus culicivorus godmani Berlepsch. GODMAN WARBLER.

Our specimens from the Azuero Peninsula are indistinguishable from a series of *Basileuterus culicivorus godmani* from Boquete and Volcan de Chiriqui, western Panama.

This mountain species was first found at an altitude of 1500 feet on the forested ridge at Altos Cacao, where 3 specimens were collected. It was not met with again until we reached the higher country near the top of Cerro Viejo, at 3000 feet, where a single specimen was secured.

Specimens Collected

C. M. N. H. Number	*Sex*	*Locality*	*Elevation*	*Date*
22438	♂	Altos Cacao	1500 Feet	February 28, 1932
22439	♀	Altos Cacao	1500 Feet	February 29, 1932
22440	♀	Altos Cacao	1500 Feet	February 29, 1932
22441	..	Cerro Viejo, Cavulla	3000 Feet	March 13, 1932

Basileuterus delattrii mesochrysus Sclater. SCLATER WARBLER.

Although no topotypical specimens of *Basileuterus delattrii mesochrysus* have been seen, the single specimen collected is referred to it since specimens collected at various other points along the Pacific slopes of Panama from Chiriqui to Darien have been shown to belong to that subspecies.

The lone specimen taken on a rather scrubby ridge leading up to Cerro Viejo at 2000 feet elevation, represents our entire knowledge of the distribution of this species on the Azuero Peninsula.

Specimens Collected

C. M. N. H. Number	*Sex*	*Locality*	*Elevation*	*Date*
22437	♂	Cerro Viejo Camp	2000 Fet	March 6, 1932

Phaeothlypis fulvicauda veraguensis (Sharpe). VERAGUAN BUFF-RUMPED WARBLER.

From examination of a series of 19 specimens of this species including birds from Boruca and El General, Costa Rica; and Boquete, Azuero Peninsula, Cascajal, Canal Zone, Cerro Azul, Cana, and Obaldia, Panama, the following facts are evident. This series, small as it is, shows a surprisingly gradual and complete intergradation between Costa Rican and eastern Panama birds. In every one of the 10 characters used by Griscom[119] to separate specifically *Phaeothlypis leucopygia* from *Phaeothlypis semicervina*, complete intergradation is shown. The character that changes most abruptly is the marbling of the under parts. The Cana and Obaldia (extreme eastern Panama) specimens show scarcely a trace of this character, but Cerro Azul (40 miles east of Canal Zone) birds are noticeably mardled, and the Canal Zone specimens are heavily marked in this way. In the color of the upper parts and feet, in the buffiness of the under parts and inner portion of the tail, and in the width of the dark terminal tail-band there is gradual and complete intergradation. There is a rather distinct and constant difference between specimens representing the area from Costa Rica to Veraguas and those of the Canal Zone in respect to degree of the buffiness of under parts, sides of head, rump, and inner portion of tail, which might, in a large series, warrant the recognition of *Phaeothlypis fulvicauda toddi* Griscom.[119] However, since the difference merely marks a transition between the characters of *Phaeothlypis fulvicauda semicervina* and *Phaeothlypis leucopygia*, it seems better to give only one name, *veraguensis* to the transitional form.

The 3 Canal Zone specimens examined are fairly uniform in color, yet considerable individual variation is said, by Hellmayr,[120]

[119]Amer. Mus. Novit., No. 280, September 10, 1927, pp. 14-16.
[120]Zoöl. Ser., Field Mus. Nat. Hist., Vol. XIII, Part VIII, September 16, 1935, p. 524.

to occur there. The existence of extremely great individual variation in the Canal Zone would not be surprising after having found this to be true in Costa Rica and Veraguas examples. In fact, one Azuero Peninsula bird is more greenish on the back and more grayish on the head than the Obaldia specimen examined. Birds from Cerro Azul, only 40 miles east of Gatum, although intermediate, are definitely referable to *P. f. semicervina*, as has also been pointed out by Todd.[121] On this basis it would be expected that somewhere between Gatun and Cerro Azul a region would be found where the average characters would be exactly intermediate between those of *P. f. veraguensis* and *P. f. semicervina*. Therefore it is not surprising that specimens have been found in the Canal Zone which are closer to eastern Panama birds than to those of western Panama. I am inclined to agree with Hellmayr[120] that such specimens were probably seen by Griscom[122] and Todd[121] and are responsible for the opinion of these authors that *P. semicervina* and *P. veraguensis* are specifically distinct. The writer prefers to consider them as the same species until further field work on the habits and life history of the Canal Zone birds has shown the opposite to be the case.

The Veraguan buff-rumped warbler was encountered twice on our trip. On both occasions a mated pair was found, and in each case the birds were observed low down in the brush by the side of a forest stream. Because of their habitat and habit of wagging the tail up and down, these birds reminded me very much of the Louisiana water-thrush (*Seiurus motacilla*).

Specimens Collected

C. M. N. H. Number	*Sex*	*Locality*	*Elevation*	*Date*
22443	♀	Cerro Viejo, Cavulla	3000 Feet	March 13, 1932
22442	♀	Mariato River Camp	250 Feet	March 18, 1932
22444	♂	Mariato River Camp	250 Feet	March 18, 1932

There are in The American Museum of Natural History 2 specimens, 1 male and 1 female collected by Rex Benson in the interior of the Cape Mala [=Azuero] Peninsula and listed by Griscom[123] under *Basileuterus fulvicauda toddi*.

Cacicus vitellinus Lawrence. LAWRENCE CACIQUE.

No difference could be detected between our specimens and a series of typical *Cacicus vitellinus* from near Panama City.

[120]Zoöl. Ser., Field Mus. Nat. Hist. Vol. XIII, Part VIII, September 16, 1935, p. 524.
[121]Proc. U. S. Nat. Mus., Vol. 74, Art. 7, April 26, 1929, pp. 11-15.
[122]Amer. Mus. Novit., No. 280, September 10, 1927, p. 15.
[123]Amer. Mus. Novit., No. 280, September 10, 1927, p. 14.

A single colony of these interesting birds had established itself in a very tall tree in a small patch of mangrove at Paracoté. The 15 long pendant nests were hung from the lower branches of this tree some 50 feet above the ground.

Specimens Collected

C. M. N. H. Number	*Sex*	*Locality*	*Elevation*	*Date*
22445*†	♂	Paracoté	Sea Level	February 14, 1932
22446*	♀	Paracoté	Sea Level	February 14, 1932

*Bill straw color.
†Iris pale blue.

Amblycercus holosericeus centralis Todd. CENTRAL AMERICAN CACIQUE.

Our 4 specimens bear out the characters of *Amblycercus holosericeus centralis* Todd[124] in having wings longer than tail. Peters[125] has shown this character to be inconstant in a very large series of birds from widely distributed points in Central America. However, it is the writer's opinion that the difference in relative length of wing and tail is a good average character which necessitates the recognition of *A. h. centralis*.

The Central American cacique seemed to be fairly common and evenly distributed throughout the forest areas visited.

Specimens Collected

C. M. N. H. Number	*Sex*	*Locality*	*Elevation*	*Date*
22447*	♂	Paracoté	Sea Level	February 17, 1932
22448	♂	Mariato River Camp	250 Feet	February 21, 1932
22449	♀	Mariato River Camp	250 Feet	February 21, 1932
22450*	♀	Altos Cacao	1500 Feet	March 3, 1932

*Iris and bill pale straw color; feet bluish gray.

Icterus galbula (Linnaeus). BALTIMORE ORIOLE.

A single male was collected in a small area of mangrove swamp at Paracoté.

Specimens Collected

C. M. N. H. Number	*Sex*	*Locality*	*Elevation*	*Date*
22451	♂	Paracoté	Sea Level	April 1, 1932

[124]Proc. Biol. Soc. Washington, Vol. XXXVII, July 8, 1924, pp. 115-116.
[125]Bull. Mus. Comp. Zoöl., Vol. LXIX, No. 12, October, 1929, pp. 474-475.

Tanagra laniirostris crassirostris (Sclater). THICK-BILLED EUPHONIA.

Our Azuero Peninsula specimens of this species seem indistinguishable from 4 topotypical examples of *Tanagra laniirostris crassirostris* from Santa Marta, Colombia.

This handsome little euphonia was fairly evenly distributed, although not very common throughout the forested area visited. The male and female taken at Cerro Viejo Camp on March 16 were apparently mated.

Specimens Collected

C. M. N. H. Number	*Sex*	*Locality*	*Elevation*	*Date*
22461	♂	Cerro Viejo Camp	2000 Feet	March 16, 1932
22462	♀	Cerro Viejo Camp	2000 Feet	March 16, 1932
22463	♂	Paracoté	50 Feet	March 25, 1932
22464	♂	Paracoté	50 Feet	March 28, 1932
22465	♀	Paracoté	50 Feet	March 29, 1932

Tangara gyrola bangsi (Hellmayr). BANGS GREEN TANAGER.

The single female secured in the mountains of the Azuero Peninsula has been compared with series of typical *Tangara gyrola bangsi* from Boruca, Costa Rica, and Boquete, Chiriqui, and found to differ from them in being of a slightly deeper (less yellowish) green on the back, and of a deeper blue on the rump and breast. It is, however, matched in the bluishness of the breast by Ecuador specimens which Hellmayr[126] was unable to distinguish from typical *T. g. bangsi*, and which Bangs[127] subsequently described as *Tangara gyrola nupera*. A larger series of this species from the isolated mountains of the Azuero Peninsula might show that the birds from that region represent a distinct subspecies. However, nothing further can be done with a single female specimen than to refer it to *T. g. bangsi*, which form the Azuero Peninsula birds geographically most closely approach.

The single specimen taken at 3000 feet on Cerro Viejo is the only individual of this subtropical zone species recorded.

Specimens Collected

C. M. N. H. Number	*Sex*	*Locality*	*Elevation*	*Date*
22468	♀	Cerro Viejo, Cavulla	3000 Feet	March 14, 1932

[126]Proc. Zoöl. Soc. London, 1911, Part IV, December 15, 1911, p. 1106.
[127]Proc. New England Zoöl. Club, Vol. VI, December 21, 1917, p. 76.

Tangara larvata franciscae (Sclater). FRANCISCA TANAGER.

An adult female and an immature male of this gaudy little tanager collected at Paracoté are all the records obtained by us for its occurence on the Azuero Peninsula.

Specimens Collected

C. M. N. H. Number	*Sex*	*Locality*	*Elevation*	*Date*
22466	♀	Paracoté	50 Feet	February 9, 1932
22467	♂ im.	Paracoté	Sea Level	March 27, 1932

Thraupis episcopus diaconus (Lesson). NORTHERN BLUE TANAGER.

It seems to the writer that the Colombian and Central American blue tanagers are subspecies of *Thraupis episcopus*.

With a series of 100 specimens of this species for examination from localities ranging from southern Mexico to Colombia, it is obvious, as has also been noted by Griscom,[128] that Panama birds are intermediate between *Thraupis episcopus cana* and *Thraupis episcopus diaconus*. Griscom[129] has referred specimens from extreme eastern Panama to *T. e. cana*, and those from "at least the Canal Zone westward" to *T. e. diaconus*. With the first of these allocations the writer cannot agree. Compared with 15 specimens of *T. e. cana* from Santa Marta, Jiminez, Cali and Atuncela, Colombia, and 22 specimens of *T. e. diaconus* from Nicaragua, Honduras, Salvador, and Guatemala, the 7 available specimens from Cana, Permé, and Obaldia, eastern Panama, seem definitely nearer the latter. It must be admitted, however, that no topotypical specimens of *T. e. cana* have been available to me for comparison, which may account for the discrepency of opinions. Specimens from the Canal Zone westward in Panama, including the present Azuero Peninsula birds, are definitely the darker northern form *T. e. diaconus*, and if any Panama birds are referable to *T. e. cana* it seems that it should be those from the Pearl Islands which have been named *T. e. dilucida* by Thayer and Bangs.[130] The series of 20 specimens that the writer has examined from the Pearl Islands seems almost exactly intermediate between typical *T. c. cana* and *T. e. diaconus*, but possible slightly favoring the later race. To my mind the specimens from the entire

[128]Bull. Amer. Mus. Nat. Hist., Vol. LXIV, May 7, 1932, p. 376.
[129]Bull. Mus. Comp. Zoöl., Vol. LXIX, No. 8, April, 1929, p. 189.
[130]Bull. Mus. Comp. Zoöl., Vol. XLVI, No. 8, September, 1905, pp. 157-158.

mainland of Panama are more typical of *T. e. diaconus* than are those from the Pearl Islands. In view of its intermediate position and the slightness of its difference from either *T. e. cana* or *T. e. diaconus* it does not seem to the writer advisable to recognize *T. e. dilucida* as a distinct subspecies. If, however, this intermediate form be ever considered separable, then, as pointed out by Griscom[131] the birds of the mainland of Panama must be referred here.

The northern blue tanager was an abundant bird on the cocoanut plantation at Paracoté, frequenting the cocoanut palms and shade trees about the houses and the edges of the second-growth forest. Away from the plantation, however, not a single individual was found.

Specimens Collected

C. M. N. H. Number	*Sex*	*Locality*	*Elevation*	*Date*
22454	♂	Paracoté	50 Feet	February 5, 1932
22455	♀	Paracoté	Sea Level	February 5, 1932
22456	♂	Paracoté	50 Feet	February 11, 1932
22457	♂	Paracoté	50 Feet	February 12, 1932

Thraupis palmarum atripennis Todd. BLACK-WINGED PALM TANAGER.

The 2 Azuero Peninsula specimens of this species were matched by specimens of typical *Thraupis palmarum atripennis* from Costa Rica.

The black-winged palm tanager was not observed on the Azuero Peninsula on any other occasion than those of the capture of 2 specimens in the lowland forest at Paracoté.

Specimens Collected

C. M. N. H. Number	*Sex*	*Locality*	*Elevation*	*Date*
22452	♂	Paracoté	50 Feet	February 8, 1932
22453	♀	Paracoté	50 Feet	February 12, 1932

Ramphocelus dimidiatus isthmicus Ridgway. PANAMA CRIMSON-BACKED TANAGER.

Comparison of larger series of typical *Ramphocelus dimidiatus dimidiatus* from Colombia, *R. d. isthmicus* from the Canal Zone,

[131]Bull. Amer. Mus. Nat. Hist., Vol. LXIV, May 7, 1932, p. 376.

R. d. pallidirostris [=*albirostris*][132] from western Chiriqui, and *R. d. limatus* from the Pearl Islands show the 2 Azuero Peninsula specimens to be typical *R. d. isthmicus*, thus extending the range of this subspecies from the Canal Zone westward along the Pacific coast of Panama about half way to Divala, the type locality of *R. d. pallidirostris*. Strangely enough the Azuero Peninsula birds do not seem to show any tendency toward intergradation between *R. d. isthmicus* and *R. d. pallidirostris*.

The Panama crimson-backed tanager, called "sangre del toro" by the natives, was a very common bird at the forest margin, in the shade trees and in the cultivated areas about the plantation, where brilliant flashes of red caused by the flight of these birds from one tree to another were a familiar sight.

Specimens Collected

C. M. N. H. Number	*Sex*	*Locality*	*Elevation*	*Date*
22473	♀	Paracoté	50 Feet	February 8, 1932
22474	♂ im.	Paracoté	50 Feet	February 14, 1932

Piranga rubra rubra (Linnaeus). SUMMER TANAGER.

The single female specimen collected in the forest along the Mariato River was all that was seen of this North American migrant on the Azuero Peninsula.

Specimens Collected

C. M. N. H. Number	*Sex*	*Locality*	*Elevation*	*Date*
22472	♀	Mariato River Camp	250 Feet	February 24, 1932

Habia rubica aurantiicapilla, subsp. nov. ORANGE-CROWNED ANT TANAGER

Subspecific Characters.—Similar to *Habia rubica vinacea* from the Canal Zone and eastern Panama, but larger and paler; the male slightly paler and brighter (more reddish) above and below; the female much paler and more yellowish olive green above, crown patch more orange, (less yellowish), under parts paler and more brownish and yellowish.

[132]Hellmayr, Zoöl. Ser., Field Mus. Nat. Hist., Vol. XIII, Part 9, October 6, 1936, p. 256.

Measurements.—*Adult male* (6 specimens from western Costa Rica): wing, 90.5-94.5 (average, 93) mm.; tail, 78.5-83 (81.4); exposed culmen, 16.5-18.5 (17.6); tarsus, 23.5-25 (24.3). *Adult female* (9 specimens from western Panama and western Costa Rica): wing, 83-89.5 (average, 86) mm.; tail, 69.5-79 (75.7); exposed culmen, 16.5-18 (17.4); tarsus, 23-24.5 (23.8).

Type.—Adult female, No. 22460, Cleveland Museum of Natural History; Cerro Viejo, altitude 3000 feet, between the headwaters of the Negro and Mariato Rivers, 18 miles east of Montijo Bay, Veraguas, Panama, March 11, 1932; John W. Aldrich, original number 1942.

Geographic Distribution.—Pacific slopes of western Panama to the Pacific slopes of western Costa Rica (Azuero Peninsula, Panama, to Nicoya Peninsula, Costa Rica).

Remarks.—As Griscom[133] has pointed out, the birds of this species from eastern Panama (Cana) are inseparable from typical *Habia rubica vinacea* from the Canal Zone. It is rather strange, however, that birds from western Panama and western Costa Rica have been considered by so many authors the same as the Canal Zone form, from which they differ so markedly, particularly in the case of the females. Fifteen specimens of *Habia rubica aurantiicapilla* from the Azuero Peninsula and western Costa Rica are separable from 9 specimens of *H. r. vinacea* from the Canal Zone and eastern Panama, chiefly on the basis of larger size of the males and the paler coloration and orange instead of yellow crown patch, as well as the larger size of the females. The under parts of the females of *H. r. aurantiicapilla* are subject to great individual variation in hue, varying from a yellowish olive green to a brownish olive green, this possibly due to age. Despite this individual difference in color, however, the under parts of *H. r. aurantiicapilla* are distinctly and constantly paler than the equally variable under parts of Canal Zone and eastern Panama examples of *H. r. vinacea*. A female has been chosen for the type of *H. r. aurantiicapilla* since the subspecific characters are more pronounced in this sex than in the male.

On the Azuero Peninsula the orange-crowned ant tanager was apparently confined to the forests of the higher altitudes, as it was

[133]Bull. Mus. Comp. Zoöl., Vol. LXIX, No. 8, April, 1929, p. 189.

not encountered below 2000 feet. Even at the higher elevations, however, it was not a common bird, the 3 females collected being the only individuals seen.

Specimens Collected

C. M. N. H. Number	*Sex*	*Locality*	*Elevation*	*Date*
22458	♀	Cerro Viejo, Camp	2000 Feet	March 6, 1932
22459	♀	Cerro Viejo, Camp	2000 Feet	March 7, 1932
22460	♀	Cerro Viejo, Cavulla	3000 Feet	March 11, 1932

Eucometis penicillata stictothorax (Berlepsch). STREAKED-CHESTED TANAGER.

Our Azuero Peninsula specimens, compared with a large series of *Eucometis penicillata stictothorax*, proved to be typical.

The streak-chested tanager was found to occur, but rather uncommonly, in the forests at Paracoté and along the Mariato River.

Specimens Collected

C. M. N. H. Number	*Sex*	*Locality*	*Elevation*	*Date*
22469	♀	Mariato River Camp	250 Feet	February 26, 1932
22470	♂	Paracoté	50 Feet	March 25, 1932
22471	♀	Paracoté	50 Feet	March 29, 1932

Oryzoborus funereus Sclater. LESSER RICE GROSBEAK.

The lesser rice grosbeak occurred together with the Hicks seedeater (*Sporophila aurita aurita*) and northern grassquit (*Volatinia jacarini atronitens*) on the grassy lowland llanos and open grassy patches among the cocoanut trees at Paracoté, but in smaller numbers than either of these 2 other species.

Specimens Collected

C. M. N. H. Number	*Sex*	*Locality*	*Elevation*	*Date*
22485	♂	Paracoté	Sea Level	February 13, 1932
22486	♀	Paracoté	Sea Level	March 23, 1932

Sporophila aurita aurita (Bonaparte). HICKS SEEDEATER.

The Hicks seedeater was a very common species in open grassy areas on the cocoanut plantation and on the small llanos at Paracoté where it moved in small flocks, associating with the northern

grassquit (*Volatinia jacarini atronitens*) and an occasional lesser rice grosbeak (*Oryzoborus funereus*.) These tiny finches would sway up and down on the slender grass stalks while feeding on the seeds in the heads of these cereals.

Specimens Collected

C. M. N. H. Number	*Sex*	*Locality*	*Elevation*	*Date*
22491	♂	Paracoté	50 Feet	February 7, 1932
22492	♂	Paracoté	50 Feet	February 9, 1932
22493	♀	Paracoté	50 Feet	February 13, 1932
22494	♀	Paracoté	50 Feet	February 14, 1932
22495	♂ im.	Paracoté	50 Feet	March 25, 1932

Volatinia jacarini atronitens Todd. NORTHERN GRASSQUIT.

The single fully adult male taken on the Azuero Peninsula is more purely black (less purplish) than 5 adult males from southern Mexico, including 2 topotypes of *Volatinia jacarini atronitens*. It, however, has the under wing-coverts and axillars entirely black, the character which was used by Todd[134] to distinguish *V. j. atronitens* from *Volatinia jacarini splendens*. The single adult female from the Azuero Peninsula is darker throughout than 4 adult females from southern Mexico. A larger series from the Azuero Peninsula might prove to be separable.

The grassquit was a common species in the lowlands of the Azuero Peninsula, occurring in little groups of a dozen or so birds, frequently associating with the Hicks seedeater (*Sporophila aurita aurita*) in grassy areas about the plantation and the small llanos at Paracoté.

Specimens Collected

C. M. N. H. Number	*Sex*	*Locality*	*Elevation*	*Date*
22487	♂	Paracoté	Sea Level	March 23, 1932
22488	♂ im.	Paracoté	Sea Level	March 23, 1932
22489	♂ im.	Paracoté	Sea Level	March 23, 1932
22490	♀	Paracoté	Sea Level	March 23, 1932

Saltator maximus intermedius (Lawrence). PANAMA BUFF-THROATED SALTATOR.

Compared with a large series of all the southern Central American races of this species our Azuero Peninsula birds prove to be referable to *Saltator maximus intermedius*.

[134]Proc. Biol. Soc. Washington, Vol. XXXIII, December 30, 1920, p. 72.

The Panama buff-throated saltator was a very common bird in the second growth forest edges at Paracoté. It was also found at Mariato River camp and at Altos Cacao in second growth areas which had formerly been cut off for cultivation.

Specimens Collected

C. M. N. H. Number	*Sex*	*Locality*	*Elevation*	*Date*
22476	♂	Paracoté	50 Feet	February 5, 1932
22477	..	Paracoté	50 Feet	February 8, 1932
22478	♀	Paracoté	50 Feet	February 10, 1932
22479	♂	Paracoté	50 Feet	February 17, 1932
22484	♂	Paracoté	50 Feet	March 29, 1932
22480	♀	Mariato River Camp	250 Feet	February 21, 1932
22481	♂	Mariato River Camp	250 Feet	February 23, 1932
22482	♀	Altos Cacao	1500 Feet	February 28, 1932
22483	♀	Altos Cacao	1500 Feet	March 3, 1932

Saltator striatipictus isthmicus Sclater. PANAMA STREAKED SALTATOR.

Our single Azuero Peninsula specimen of this species has been compared with good series of *Saltator striatipictus isthmicus*, *Saltator striatipictus furax*, and *Saltator striatipictus speratus*, including the types of the last 2 forms, and found to be fairly typical of *Saltator striatipictus isthmicus*.

Our knowledge of the occurrence of the Panama streaked saltator on the Azuero Peninsula is confined to the record of the single specimen captured at Altos Cacao in a clearing in the forest made some years previous for purposes of cultivation, but which had grown up to a dense tangle of brush.

Specimens Collected

C. M. N. H. Number	*Sex*	*Locality*	*Elevation*	*Date*
22475	♂	Altos Cacao	1500 Feet	March 3, 1932

Arremonops striaticeps striaticeps Lafresnaye. LAFRESNAYE SPARROW.

Our Azuero Peninsula specimens, when compared with large series of both *Arremonops striaticeps richmondi* and *Arremonops striaticeps striaticeps*, prove to be nearer the latter subspecies in size and in

shade of gray on the head. This discovery extends the known range of the *A. s. striaticeps* some 120 miles westward on the Pacific coast of Panama from the Canal Zone, which was previously considered the approximate dividing line between the ranges of *A. s. striaticeps* and *A. s. richmondi*.

The Lafresnaye sparrow was a common species in the more open brushy country in the vicinity of the plantation at Paracoté and was fairly common at the border line between forest and savannah on the crests of the mountain ridges leading up to Cerro Viejo in the vicinity of 3000 feet elevation. As we stood on the summit of Cerro Viejo, its pleasing song could be heard repeatedly coming from the spurs of stunted forest that reach up along the draws on the mountain side from the vast areas of verdant unbroken rain forest in the valleys below.

Specimens Collected

C. M. N. H. Number	*Sex*	*Locality*	*Elevation*	*Date*
22502	♀	Cerro Viejo, Cavulla	3000 Feet	March 11, 1932
22503	♂	Cerro Viejo, Cavulla	3000 Feet	March 12, 1932
22500	♂	Paracoté	Sea Level	February 13, 1932
22501	♂	Paracoté	Sea Level	February 13, 1932
22504	♂	Paracoté	Sea Level	March 23, 1932
22505	♂	Paracoté	Sea Level	March 27, 1932
22506	♂	Paracoté	Sea Level	April 2, 1932
22507	♂	Paracoté	Sea Level	April 2, 1932
22508	♂	Paracoté	Sea Level	April 2, 1932

Arremon aurantiirostris aurantiirostris Lafresnaye.
ORANGE-BILLED SPARROW.

One of the Azuero Peninsula specimens of this species is paler and more greenish on the back and has the gray areas of the head paler than any individual of a series of 9 typical specimens from the Canal Zone. The other Azuero Peninsula specimen, however, seems to agree fairly well with the Canal Zone series.

The 2 individuals collected at 2 different forest camps were all that were seen of this handsome sparrow.

Specimens Collected

C. M. N. H. Number	*Sex*	*Locality*	*Elevation*	*Date*
22509	♂	Mariato River Camp	250 Feet	February 25, 1932
22510*	..	Altos Cacao	1500 Feet	March 3, 1932

*Bill orange.

Atlapetes gutturalis azuerensis, subsp. nov. AZUERO YELLOW-THROATED SPARROW.

Subspecific Characters.—Similar to *Atlapetes gutturalis fuscipygius* of Nicaragua and Honduras, but slightly more brownish on back and flanks; and white crown stripe broader.

Measurements.—Adult male (4 specimens from the Azuero Peninsula): wing, 71-77.5 (average, 74.9) mm.; tail 74.5-80 (78); exposed culmen, 13-14.5 (13.9); tarsus, 26.5-27.5 (27.1).

Type.—Adult male, No. 22496, Cleveland Museum of Natural History; Cerro Viejo, elevation 3000 feet, between headwaters of the Negro and Mariato Rivers, 18 miles east of Montijo Bay, Province of Veraguas, Panama, March 11, 1932; B. P. Bole, Jr. and John W. Aldrich, original number, 1938.

Geographic Distribution.—Probably confined to the subtropical zone of the isolated mountains of the Azuero Peninsula.

Remarks.—Atlapetes gutturalis azuerensis is extremely different in color from the 2 geographically closest races, *A. g. brunnescens*, of western Chiriqui and *A. g. coloratus* of the main cordillera of Veraguas. The Azuero Peninsula form is closer to *A. g. brunnescens* than to *A. g. coloratus*, but is much more brownish on the back, rump, wings, flanks, and under tail coverts, has a narrower white crown stripe and slightly paler yellow throat-patch than the former subspecies. *A. g. azuerensis* differs from *A. g. coloratus*, *A. g. parvirostris* and *A. g. gutturalis* mainly in having brown, rather than gray, back, flanks, and under tail-coverts. Its size is apparently the same as that of other Central American subspecies.

The remarkable difference between *A. g. azuerensis* and its geographically nearest relative, *A. g. coloratus* of the main cordillera in Veraguas and eastern Chiriqui, is hard to explain. Although the writer has seen no specimens of *A. g. coloratus*, it is apparent from the description of that form that the birds of the mountains of the Azuero Peninsula are about as dissimilar as they are unlike any other known race of this species. The bird that most nearly approximates the above-mentioned new subspecies is *A. g. fuscipygius* of

Nicaragua and Honduras, which is also a bird with brown back, flanks, and under tail-coverts. Oddly enough, however, the ranges of these 2 forms are separated by the ranges of at least 3 other well-marked and very different subspecies, *A. g. coloratus*, *A. g. brunnescens* and *A. g. parvirostris*. This characteristic of discontinuous geographic variation seems well developed in *Atlapetes gutturalis* and has been commented upon by Dwight and Griscom.[135] Cases like this afford perplexing problems with respect to the relationships of the various forms. Obviously there is no progressive intergradation existing here at the present time, nor is there any certainty that it ever existed. As is true in the case of geographic races of many other species of birds, *Atlapetes gutturalis azuerensis* and *A. g. coloratus* intergrade through forms which are not geographically intervening and which indeed may even be the result of parallel evolution. Nevertheless, an individual form similar enough to two other forms to be considered morphologically intermediate between the two, whether geographically intermediate or not, indicates rather strongly that many of the same hereditary factors are present in all these forms. This would seem to indicate a not too far distant common ancestor. For the present at least, the writer will continue to accept as best indicating true genetic relationship the criterion elucidated by Oberholser,[136] by which forms are recognized as subspecifically related if they intergrade, even though the intergrading forms are not geographically intermediate.

The Azuero yellow-throated sparrow occurred in small flocks among the dwarfed trees of the forest margin in two different places near our camp at Cavulla.

Specimens Collected

C. M. N. H. Number	*Sex*	*Locality*	*Elevation*	*Date*
22496	♂	Cerro Viejo, Cavulla	3000 Feet	March 11, 1932
22497	♂	Cerro Viejo, Cavulla	3000 Feet	March 11, 1932
22498	♂	Cerro Viejo, Cavulla	3000 Feet	March 12, 1932
22499	♂	Cerro Viejo, Cavulla	3000 Feet	March 12, 1932

[135]Amer. Mus. Novit., No. 16, September 9, 1921, p. 1.
[136]Science, N. S., Vol. XLVIII, August 16, 1918, pp. 165-167.

ANNOTATED LIST OF MAMMALS OF THE MARIATO RIVER DISTRICT OF THE AZUERO PENINSULA

By B. P. Bole, Jr.

Two months of intensive field endeavor by the junior author, assisted at times by Mr. Aldrich and Mr. Davies, resulted in a collection of one hundred forty-one preserved mammal specimens, all originally deposited in The Cleveland Museum of Natural History. About fifty others were not saved, having been mutilated almost beyond recognition in the field. Practically all of these discarded individuals were of the two commonest forms to be found on the Mariato River drainage—*Zygodontomys cherriei ventriosus* and *Sigmodon hispidus borucae*, species which comprise the bulk of the existing collection. Besides these two, specimens are on hand of twenty other forms, and photographic evidence of one more, the deer of the region. As in the case of the birds, the Cleveland Museum's collections were unable to supply more than a meagre fraction of the requisite comparative material, and I borrowed from three sources: the United States Biological Survey, the Museum of Comparative Zoölogy at Harvard, and the Field Museum of Natural History. To Major E. A. Goldman and Dr. H. H. T. Jackson of the Biological Survey I am greatly indebted for the loan of specimens and invaluable critical comments in the regard to the manuscript of this paper. To Dr. Thomas Barbour and Dr. Glover M. Allen of the Museum of Comparative Zoölogy I am indebted not only for the loan of specimens but also for the priceless opportunity of working on my collection in their laboratories, with their extensive material at my disposal. I am further indebted to Dr. Allen for assistance and advice given during the course of certain identifications. To Dr. S. C. Simms of the Field Museum I owe thanks for the loan of their specimens of the spiny pocket rat, *Liomys adspersus*.

The mammal population of the Mariato region is as remarkable for what it does not contain as for what it does. As in most isolated areas, the species present seem to be few in number and the forms tend to differ from those of nearby faunae. Many genera character-

istics of other parts of Panama are missing here; among the monkeys, *Saimiri* and *Leontocebus; Microsciurus* among the squirrels; the tapir is unknown; there are no brockets, no great anteaters, and a deficient representation of many genera of smaller mammals. Had our trip been of longer duration this deficiency list might well have been reduced but considerable effort was made to enlarge our lists from the much wider experience of Mr. Davies, Mr. Richards, our head porter Ignacio Alvarado, and others. Doubtless a number of arboreal forms eluded us as we were unequipped with live traps, while the short time we had at any one camp precluded any detailed study of the nocturnal tree-living species. It seems likely that there is an important bat fauna that would have been obtained, had we known where to find their caves or other roosting places. In view of all this, this report on mammals is to be regarded as provisional and for one small area only, the Mariato River drainage basin. Some of the species that we did not find may well be there; others are undoubtedly absent from the region, for various reasons enumerated elsewhere in this joint report.

Trapping conditions, as in most tropical regions, we found atrocious. Warm, humid nights, legions of ants, and a general scarcity of mammal populations all militated against the field collector. These discomforts experienced from insect pests and the protective measures they necessitated diminished our efficiency and energy in the field. Our rate of travel was not conducive to thorough trapping of any area but there was little incentive to stay at stations where two or three mammals a day would be yielded from a trapline two or three miles in length and numbering two or three hundred sets. The primary reason for the smallness of our yield—141 specimens in two and a half months was that the mammals were not there.

The climate of the region is no doubt partially responsible for this. For nine months of the year field and forest and mountainside are flooded with a downpour that even at Paracoté on the coastal plain amounts to over 130 inches annually. For the rest of the year, searing drought is the rule on the coastal plain; many of the trees lose their leaves; the forest floor becomes hard and unfriable, and nearly all ground-cover vegetation vanishes. No fallen logs survive in the forest away from soggy ravine-bottoms and flood-plains;

termites take care of them. In short, most of the woodland of the Mariato region is nearly devoid of cover for small animals. The obvious places for large populations are the flood plain woods and the crown of all the forests including the mangrove jungles. The last of these areas was not investigated by us at all with regard to mammals. As other writers[137] have pointed out, however, the dry season inhabitants of wet woodlands in Panama may sometimes be the wet season inhabitants of the uplands or vice versa, as the case may be; so the meagre list I obtained from ravine bottoms may have been of species generally distributed through the woods in June, when, according to our hosts and guides, tabanid flies render Mariato's woods all but impenetrable.

Not only, therefore, is the semi-arid savannah belt at the head of the peninsula, a type of habitat found by other collectors[138] very deficient in mammal life, a barrier for many species, but so also is the forest fringing the base of the Azuero ranges. Perhaps this double barrier—accentuated if the peninsula has recently been an island—accounts for the mammalogical desolation of the highlands—the upper tropical zone, to the lower edge of which we penetrated. Not one species characteristic of this zone in other parts of Panama did we secure. Perhaps they occur at a higher level than we attained and it is our hope to be able to return to this higher country at some later date.

Besides the species listed on the following pages, we obtained records of one sort or another of a few species the genera of which could not be determined from the descriptions given. Wherever there is no question concerning the genus to which the record should be referred, it is included under the annotated list.

A native laborer was sure that he had seen an oppossum of a species different from the three here listed, but could give no salient features of it.

Mr. Richards reported that a dog he once owned had killed a sloth on the port road as the ungainly creature was trying to creep across it. He was quite unable to remember the anatomy of its feet.

[137]Enders, Bull. Mus. Comp. Zoöl., Vol. LXXVIII, No. 4, October, 1935, pp. 390, 451.
[138]Bangs, Bull. Mus. Comp. Zoöl., Vol. XLVI, No. 12, January, 1906, p. 212.

Vampire bats, alone among the Chiroptera, can figure in this report, as evidences of their presence were noted on a few occasions. At Paracoté several of our horses were bitten by these creatures before the beginning of our pack trip. A trapped *Proechimys* was also the victim of vampire attack at this station. The natives are thoroughly acquainted with them, but did not seem to fear them greatly, and our porters were not very determined about keeping themselves covered at night in the course of our pack-trip.

At the Mariato Rubber Camp, several bats were flying close to the ground around our camp, with rather slow, hesitating flight. Our men suspected that these were vampires. They rarely came within range of the Coleman lantern's rays and may well have been of a harmless species in quest, perhaps, of insects. I flushed one from the ground, which may be evidence of sorts, as the animal seemed to "spring" into the air.

Bats were an uncommonly inconspicuous part of the Mariato fauna. In all, I saw not over two dozen in the entire course of the expedition. At Paracoté, where I spent considerable time outdoors in the evenings, I saw just one bat, perhaps the same individual, in the same place on several successive evenings. It was a very small animal of *Myotis*-like flight, perhaps *Myotis nigricans*, which should occur there.[139] At the Mariato Rubber Camp a few other bats, larger than the alleged "vampires," were flying to and fro overhead under the leafy crown of the forest. We shot at them but obtained no specimens. We dared not shoot at the low-flying "vampires" for fear of collecting samples of mankind or his works. It seems a possibility that some of the bites suffered by our horses may have been the work of *Diphylla centralis*, but as no specimens were collected we could not determine which species was present. So far as is known at present, *Diphylla* is always much rarer than *Desmodus* in Panama[140].

Didelphis marsupialis *ssp.* GRAY OPOSSUM.

One evening, when we were encamped on the top of the sharp wooded ridge separating the deep valleys of the Negro and Mariato rivers, a muffled shuffling in dry leaves attracted our attention to

For an account of the bats of the Panama region, see
[139]Goldman, Smithsonian Misc. Coll. Vol. 69, No. 5, 1920, pp. 172-222, and Allen, G. M. Jour. Mamm., Vol. 16, No. 3, August, 1935, pp. 226-228.
[140]Goldman, loc. cit., p 208

a patch of brush near our tent. Shortly an opposum, that might as well have appeared from an Ohio hedgerow, stepped into view and nosed about the pathway in front of the tent, dimly illuminated by the Coleman lantern within. It was quite active and amazingly tame. I turned a flashlight full on it at a distance of fifteen or twenty feet, to its great unconcern. It apparently captured several insects that were attracted to the beam of light, and made one abortive rush at a large insect that landed at the edge of the brushy patch. At this point, I remembered that I was observing a species unlisted in our collection, and returned to the tent for my gun. My opposum had assumed its original status, however, when I returned—a muffled shuffling in the leaves under the blackness of the Panamanian night.

Splay-footed tracks of this species were seen subsequently at sea level, in the dust of the "port" road leading from the Paracoté settlement to the mangrove-bordered estero that served as a harbor. No specimens were taken, but the form occurring in the district was probably *etensis*, the one that ranges from one end of Panama to the other along the main cordillera to the north.

Metachirops opossum fuscogriseus (Allen). ALLEN'S OPOSSUM; ZORRO.

These small active opossums were, to judge from the tracks seen in the roadways of the Paracoté plantation, very abundant in that region. The three specimens taken were all caught in steel traps placed in runways among weeds and small brush.

Several writers have commented on the aggressive disposition of this species, comments well merited, to judge from the behavior of my specimens. Two were weasel-like in their eagerness to bite. They made no sound until I approached within reach, whereupon their slashing bites were accompanied by hisses and shrill, growling snarls. One specimen was killed in the trap by native plantation laborers before I got to that part of my trapline; they strongly and commendably disapproved of the brutality of steel traps.

The stomach contents of one male animal consisted of insects of various sorts, carapaces of crabs, a few partly broken seeds, and the remains of a two-thirds grown *Sigmodon*. This item had apparently been eaten in its entirety, as fragments of skin, hair, cranial elements, caudal vertebrae, and three feet were noticed. It appeared to have been the most recent meal of the opossum.

A female, taken February 18, 1932, at sea level contained five embryos about 10 mm. in length. These were active and stayed alive for twenty-four hours after the skin was made up, wrapped in a piece of moist paper. They were only loosely attached to the teats of the mother.

The altitudinal range of this species is extensive, as one specimen was taken at Cavulla, well over 3000 feet in elevation. In that region of timbered hollows and llano-topped ridges, little game trails pass from point-of-woods to point-of-woods over the intervening grassy saddles for distances of only a few hundred feet or half a mile. In one of these paths the *Metachirops* was taken.

Specimens: Paracoté, 2; Cavulla, 1.

Marmosa mexicana mexicana Merriam. MEXICAN MARMOSA.

According to the specimens listed on the distribution map given by Tate,[141] the occurrence of this marmosa at Mariato extends the known range of the form southwards about a hundred miles. Only three specimens were taken, of which only two were savable. Both of these were found alive in rat traps set beside rotting logs in a dank ravine-bottom forest. Both specimens had been attacked by ants, the entire terminal two-thirds of the tail of one had been removed, and the animals were covered with wounds. Despite this, they were still willing to fight when removed from the traps. Live-trapping is certainly a more humane and profitable way of obtaining specimens of this species.

Apparently marmosas are not abundant at Mariato, as the natives seemed unfamiliar with them, while the other two opossums here listed were well known.

[141]Tate, Bull. Amer. Mus. Nat. Hist., Vol. LXVI, Art 1, August 10, 1933, p. 129.

Measurements:

C. M. N. H. No.	Length	Tail	Hindfoot	Greatest Length of Skull	Zygomatic Breadth	Palatal Length	Least Width Across Pterygoid	Greatest Breadth of Palate across outer borders of M.	Greatest Length of Nasals	Postorbital Constriction	Greatest Breadth of Brain Case	Greatest Length of Mandibl
1141♂			21	34.1	18.6	18.9	4.0	11.0	15.5	6.2	13.1	25.2
1150♀	267	146	20			18.7	3.8	11.5	15.2	6.1		24.5

Alouatta palliata trabeata Lawrence. HERRERA HOWLER MONKEY.

Howler monkeys are more often heard than seen at Mariato. Their deep-throated voices once scared a German visitor at Paracoté into refusing to go into the woods without armed assistance, on the grounds that lions abounded in the vicinity. Great was his amazement when monkeys proved to be the source of his terror! Our own astonishment was no less great when we first heard them, fortified as we were with considerable howler lore.

The monkeys were both heard and seen regularly at all our camps except the highest, the Cavulla stations, where they evidently found an uncongenial environment in the cold, fog-soaked, mossy woods. Their serenades were as often heard at night as at day. Like the voices of the huge toads that sang by the Mariato River in the evenings, howler howlings decrease in volume as one approaches the source; an animal only a few feet away seems to have nothing uncommonly big about his voice, except as it is compared to the bird-like notes of the white-faced species.

Unlike the whitefaces, I found a troop of these monkeys very menacing when I shot one of their number. The adults of the troop came down to within ten feet of me, hair on end, teeth bared. At each retreat by me they would make short explosive charges, and

gave ground very slowly, roaring and snarling. When I left my victim to see what they would do, three of the largest descended at once to the fallen animal's side, from which I could not drive them even by advancing. I finally discharged my gun in the air which drove them back overhead to a height of about 20 feet. I did not care to shoot any more as I already had other animals to be carried and skinned, and it was getting late. They followed me up the side of the nearly vertical ridge and only left when the timber degenerated into heavy brush farther along the ridge-top trail.

While the larger members of the troop were "hazing" me near the ground, several others, from an elevation of 30 feet or more made what I can only interpret as a deliberate attempt to defecate on me. Their indeterminate aim was the only factor that leads to any hesitation on my part in making this interpretation of their behavior.

Both of the specimens we obtained were badly infested in the neck and breasts with the larvae of some species of *Cuterebra*, pests which subsequently caused a member of our expedition considerable annoyment. This seems to be a general observation on the subject of howlers, witness the comments of Goldman.[142] Perhaps it is a reason for the fact that this species is looked upon with revulsion by most Mariato natives who rarely, if ever, eat it. For an exhaustive account of the habits of the related form, *aequatorialis* from the main cordillera of Panama, see Carpenter.[143]

Species Number	Sex	Total Length	Tail	Hindfoot	Greatest Length of Skull (Exclusive of Incisors)	Basilar Length	Palatal Length (From most anterior point on posterior border)	Length of Rostrum (From right orbital border)	Zygomatic Width	Width of Brain Case	Greatest Width—Upper Molar Series	Maxillary Toothrow	Lower Cheek Teeth	Width of Pm. 1
1172 Adult	♂	1167	647	150	112.0	91.8	39.3	34.5	83.5	53.0	8.6	43.4	46.4	6.7
1185 Adult	♀	1111	593	146	100.5	82.7	35.3	29.6	72.3	48.7	8.6	39.9	44.5	6.8

[142]Smithsonian Misc Coll , Vol 69, No 5, 1920, p. 229
[143]Comp Psych Mon., Vol 10, No 2, 1934, pp 1-168

Cebus capucinus imitator Thomas. PANAMA WHITE-FACED MONKEY.

White-faced monkeys—los monos cariblancos—are undoubtedly the most frequently seen mammal of the Mariato woodlands. This may seem very curious to northern naturalists, but in a land where there is no chipmunk, and where rabbits and squirrels are relatively uncommon and secretive, the field of diurnal species is much reduced.

Capuchins travel in large bands and are noisy, alert, and full of curiosity. I have little in my notes about their habits that has not already been stated by Enders[144] about the capuchins of Barro Colorado. In connection with their stick-breaking habit, however, it seems that this is deliberately purposeful, as I watched one young monkey take a short fall when he trusted his weight to a dead branchlet that broke off half-way to its end under him. He at once climbed back to the spot and broke off the remainder of the branch. It is apparently "road repair," perhaps grown into a persistent habit with the passing of time. Occasionally these monkeys went to seemingly excessive effort to remove dead branches. I saw one pull at a stout branch, first with his forefeet, then with his forefeet and hindfeet, his only support being his tail. The branch broke off, and he spun halfway around his support on that member.

One female monkey that I shot had a quarter-grown young clinging to her. As the mother fell, he quickly left her, sitting on the branch crying pitifully with his hands over both eyes! The troop immediately stopped its flight, and one adult rushed down, seized the young one and carried it off to safety.

It was frequently noticed that a troop of white-faces caused the withdrawal of most of the bird life from its immediate vicinity, and those birds that dared stay close were invariably in high alarm and rage, particularly the chachalacas (*Ortalis*). At Cavulla I watched a flock of jays (*Cyanocorax*) annoying a solitary pair of monkeys by making dashes at them as they fled through the trees from me. Several writers have mentioned the fondness of capuchins for eggs and young birds, and their unpopularity in avian circles is no doubt stimulated by that. Those that I saw feeding were invari-

[144]Bull Mus Comp. Zoöl., Vol. LXXVIII, No. 4, October, 1935, p. 445.

bly eating either fruits, flower-petals, or insects. They seemed particularly fond of the blossoms of a liana with showy pink flowers that grew abundantly on the ridges about Altos Cacao.

These monkeys are considered rather poor food by the natives and are infrequently killed for this purpose. We saw troops of them at all elevations visited, from sea level to 3000 feet.

Specimens obtained: Total number 8, as follows: Paracoté, 1; Mariato Rubber Camp, 1; Altos Cacao, 4; Cerro Viejo, 2.

C. M. N. H. No.	Sex	Total Length	Tail	Hindfoot	Greatest Length of Skull (Exclusive of incisors)	Basilar Length	Palatal Length (From most anterior part of posterior border)	Length of Rostrum (From Lacrimal border of orbit)	Upper Maxillary Toothrow (crowns)	Zygomatic Breadth	Lower Maxillary Toothrow (Alveolar Borders)	Greatest Length of Lower Jaw (Coronoid to Angular Process)	Greatest Width of M_3 (Upper jaw, crown)	Greatest Width of Pm_3 (Upper jaw, crown)
1183 Adult	♂	922	523	143	102.1	67.7	33.4	27.0	29.5	67.5	32.6	42.6	5.8	6.6
1186 Subadult	♂	855	439	137	97.7	64.2	32.4	23.7	28.4	62.7	31.6	32.0	6.0	6.7
1189 Adult	♂	877	505	131	98.5	67.0	33.7	25.8	27.2	65.3	31.3	36.3	5.7	6.1
1187 M_3 emerging	♀	841	445	127	94.1	58.2	66.9	21.3		56.3		30.3	5.9	6.6
1194 Adult	♀	871	490	127	91.0	61.6	31.1	22.7	27.6	60.0	30.3	31.7	5.8	6.2
1195 Adult	♀	904	497	130	98.5	62.7	30.8	24.9	27.4	61.2	30.1	34.3	5.7	6.2

Ateles azuerensis sp. nov. AZUERO SPIDER MONKEY.

Type Locality.—Altos Negritos, 10 miles east of Montijo Bay (part of the spur forming south drainage divide of Rio Negro, altitude 1500 feet), Mariato Suay Lands, Veraguas Province, Panama.

Type.—Specimen No. 1235, adult female, Cleveland Museum of Natural History; collected by Ignacio Alvarado, March 23, 1932. Field number, B-A 115.

Geographic Distribution.—Azuero Peninsula of Panama, probably on both slopes of the mountains in deeper forests, but known only from the western (Veraguas) side, from the vicinity of Ponuga southwards.

General Characters.—A small form with contrasting colors and greatly elevated anterior portion of the rostrum.

Color.—Type: Black from shoulders to base of tail, bright ochraceous-tawny, heavily mixed with dusky; sides, thighs and under parts paler, heavily washed with golden, and lacking the dusky suffusion; shoulders and nape of the neck black, with faint suggestion of russet; head black, occasionally washed with very dark brownish; face black; sides of neck and inner surfaces of upper forearms cream-colored, this color also occurring as a faint wash on the sides of the lower jaws; tail sharply bicolored, upper parts black for the entire length, sides and under parts bright ochraceous-tawny above the "palm;" feet black. The dusky suffusion of the back and the russet cast of the shoulders is more pronounced in some individuals, less so in others; this also is the case for the cream-colored wash on the sides of the lower jaw.

Skull.—The skull of the present form is so peculiar that on this basis alone it merits recognition as a distinct species. The nasal region of both males and females is greatly sunken with the result that the premaxilla has been thrown forward and upward, and the main axis of the first upper incisors is inclined 45^0 or more from the vertical, giving the skull a peculiarly prognathus appearance in lateral view, the toothrow being seen to curve very abruptly upwards anteriorly. The surface of the palate is deeply trough-shaped as compared to *geoffroyi;* the nasal bridge is narrower; the external nares smaller, and the distance between the lower border of the nares and the upper bases of the first incisors correspondingly greater. The orbits are laterally expanded so that they appear more oval and less round than in *geoffroyi.* Finally, the braincase is narrower and considerably higher, although the uplifted premaxillary region

tends to give the impression of a low forehead which the animal does not really have.

The present form differs externally from *geoffroyi* in its smaller size, blacker head and shoulders, and much paler sides, flanks, and sides of tail. The reddish cast of *geoffroyi* is almost entirely lost on the shoulders of *azuerensis* and is replaced by ochraceous heavily mixed with dusky. The skull characteristics ennumerated above further differentiate the animal. The specimens at hand vary considerably among themselves, some tending in certain characters towards *geoffroyi*. This form is given full specific instead of subspecific ranking, owing to the shortage of comparative material available from Panama and the unrevised condition of the group. Furthermore, the Azuero colony is in all probability fully isolated.

The type locality of *Ateles geoffroyi* is unknown. The present series was compared to specimens from the Canal Zone and the nearby mountains.

Considering the insular nature of the Azuero fauna, it is not surprising that the present form should differ from its mainland relative. The race is probably sharply limited by the savannah belt and "bush" lands at the head of the peninsula, since it is entirely dependent on a continuous forest of tall trees for overland travel. To be sure, the coastal "gallery" forest around Montijo Bay was once continuous[145] as far as western Chiriqui, but even when this was the case, that forest was interrupted by several deep and fairly wide tidal rivers (the San Pedro and the San Pablo) that served as effective barriers. If, as seems likely, the peninsula has been an island in the recent past, the differences in the two races are further explained.

Spider monkeys are far less often seen around Mariato than either howlers or white-faces; in fact, I myself never saw any close enough to be positively sure of their identity. Their apparent scarcity may in part be due to persecution by the natives as "los monos colorados" are considered excellent provender. According to Mr. Davies, who secured our four specimens, they travel habitually at higher levels in the trees than do the white-faces and are capable of much greater speed.

[145]Griscom, Bull. Mus. Comp. Zoöl., Vol. LXXVIII, No. 3, April 1935, p. 270.

Measurements:

C. M. N. H. Number	Sex	Total Length	Tail	Hindfoot	Greatest Length of Skull (Exclusive of incisors)	Basilar Length	Palatal Length (From most anterior point on posterior border)	Length of Rostrum (From lower border of orbit)	Zygomatic Breadth	Width of Braincase	Upper Maxillary Toothrow (Alveolar borders)	Lower Maxillary Toothrow (Alveolar borders)	Greatest Width of Upper Molars	Nasal Bridge (Width at upper end of nasals)	Greatest Breadth of Left Orbit	Greatest Height of Left Orbit
1234	♀	1166	701	168	109.3	76.2	30.5	27.2	65.4	58.0	27.2	30.7	6.1	10.3	25.4	23.2
1235 Type	♀	1173	717	178	110.8	73.6	29.0	27.9	65.1	56.8	27.7	31.2	6.0	8.1	26.1	23.3
1236	♂	1153	720	170												
1237	♂	1170	720	177	109.5	76.6	31.0	29.9	66.9	54.5	29.5	33.1	6.1	8.4	23.6	20.2

Aotus bipunctatus sp. nov. AZUERO NIGHT MONKEY.

Type Locality.—Paracoté, three miles east of Montijo Bay, Mariato-Suay Lands, Veraguas Province, Panama.

Type.—Spec. No. 1204, adult female, Cleveland Museum of Natural History; collected by Pinkney Davies, March 19, 1932. Field Number: B-A 84.

Geographic Distribution.—Known only from the type locality,but probably distributed throughout the forested parts of the Azuero Peninsula, Panama.

General Characters.—A large, pale race with black markings reduced and heavy, massive rostrum and dentition; similar in external coloring to *A. griseimembra* of Colombia, but widely different cranially; close to *A. zonalis* of Panama.

Color.—Type: Back and sides pale wood-brown[146] lightly overlain with ochraceous-tawny along mid-line of back; the general

[146]Ridgway, Color Standards and Color Nomenclature. 1912.

color slightly darkened by scattered dark-tipped hairs; many of the hairs of the back and sides brightly burnished with pale golden straw-color; sides slightly paler than back; back of neck and shoulders grayer than rest of upper parts; underparts from light to pale ochraceous buff, slightly darker around groin and arm-pits; hind-limbs and upperparts of fore-limbs the same color as sides; underside of fore-limbs paler, suffused with color of underparts; feet slightly darkened by black-tipped hairs; tail suffused with russet, more and more heavily overlain with black from base to tip; terminal half of tail black; sides of head same as sides; top of head paler, but with narrow median line of black running between eyes over forehead; crown of head slightly darkened; two spots of clear white above eyes, many of their hairs white to their roots, others lightly tipped with black; a white ring surrounding the mouth, broken only by the nose; two grayish patches at bases of jaws, separated medially by a narrow line of ochraceous buff that is continuous with color of under parts.

Skull.—Similar to that of *Aotus zonalis* Goldman, but the facial angle more abrupt; the interorbital breadth (nasal bridge) greater; the rostrum much more massive; the braincase narrower and shorter, the distance from the foramen magnum to the rearmost point of the skull being less; inter-pterygoid fossa much narrower, especially anteriorly; molariform teeth larger.

Remarks.—*Aotus bipunctatus* is closely related to *A. zonalis* of the Panamanian cordillera and foothills. It is apparently a larger animal, however, and differes in a number of cranial characters, as set forth above. In coloring it is noticeably paler than *zonalis* everywhere, but it is in the coloring of the head that the two forms differ most markedly, the black markings of the crown of the present race being greatly reduced, the lateral ones being almost obsolete and the median one greatly narrowed. The blackened throat-patches of *zonalis* are pale grayish-buff in *bipunctatus;* and the two white spots below the eye in *zonalis* have become, in *bipunctatus*, a white ring encircling the mouth. Although this ring is clear white in the type, it is lightly overlain throughout its extent with dusky blackish in the one existing topotype, a male animal.

Aotus was the fourth species of monkey encountered by us in the Mariato River district. We were entirely unconscious of the presence of this animal until Mr. Davies succeeded in shooting two as they stuck their heads out of a hole in a hollow tree about fifteen feet above ground. They were, however, well known to the natives, who knew the species simply as "mono del noche." Because of their nocturnal habits they are never as familiar as the diurnal howlers and capuchins, and any estimate of the abundance in the region would be pure guess work, although the animal was not considered rare by our native porters. A strange wailing cry that we frequently heard in the night at the Mariato Rubber Camp, Altos Cacao and Cerro Viejo was ascribed to this species by them.

Measurements:

C. M. N. H. Number	Sex	Total Length	Tail	Hindfoot	Greatest Length of Skull	Basilar Length	Palatal Length (From anterior point of posterior border)	Length of Rostrum (From lacrimal border)	Zygomatic Breadth	Greatest Width of Braincase across Anterior Expansion of Temporals	Upper Maxillary Toothrow (crowns)	Lower Maxillary Toothrow (Alveolar borders)	Greatest Width of M. (Upper jaw)	Nasal Bridge (Width at narrowest)	Greatest Depth of Lower Jaw (Coronoid to angular)
1203	♂	839	430	101			19.8	13.8			18.4	19.5	3.4		29.5
1204 Type	♀	806	413	95	61.5	44.0	19.7	13.6	38.3	32.8	17.6	19.2	3.3	5.8	29.6

Procyon sp. RACCOON.

According to Goldman's account of the raccoons of Panama[147] *Procyon lotor pumilus* should be the commonest form to be found along the Mariato. No specimens were taken, but small coon-tracks were frequently seen in the mud of the mangrove-bottoms at low tide. From native descriptions we gathered that this was the animal usually known in the region as "gato de manglé," mangrove cat,

[147]Smithsonian Misc. Coll., Vol. 69, No. 5, 1920, p. 151.

although that name was indescriminately applied to any animal vaguely resembling a cat that lived or was seen in mangroves. The animals ate crabs and various species of small snails, to judge from the remains seen about the mud-flats near the "port."

Another species of raccoon, *Procyon cancrivorus panamensis*, might possibly occur on the Mariato-Suay lands, although the species is unreported west of the Canal Zone.

Nasua narica panamaensis Allen. COATI-MUNDI.

Despite the extensiveness of the literature on the coati, both popular and scientific, no account of Panama mammals would be complete without some mention of this animal mountebank. As elsewhere in Panama, coatis swarm in the forests of the Mariato-Suay lands and are frequently seen in the course of daily wanderings through timbered country. They customarily travel in small bands of from five to twenty individuals that forage through all strata of the forests in quest of insect food. A company of coatis on foray is most amusing to watch as each mobile snout and absurdly long tail is gyrated in some new antic. The tails are as often carried straight up as not and seem to be of use in balancing the animals, to judge from the tame individual at large in the Paracoté plantation compound.

The particular specimen, a young male almost full-grown, was a constant source of interest and merriment. In a barnyard that teemed with chickens he had learned that game cocks had bad tempers and were dangerous; also that pursuing baby chicks, his favorite sport, was fraught with peril if those chicks were accompanied by their mothers. He was terrified of the mother cats of the premises, but enjoyed roughing up their kittens, which he did whenever the opportunity presented itself. When the chickens went to roost in a mango tree, he would, if the spirit moved him, rush out each limb knocking them off. He eventually learned to shake them off by leaping from branch to branch, thus setting the branches in such a commotion that the birds, in obedience to Newton's first law, parted company with their perches.

We tried to get this individual to eat meat, but he would have none of it. Insects he eagerly accepted, however, and was an inveterate robber of hens' nests and the laborers' pigeon-lofts, which ultimately led to his undoing. In the yard grew a tree dignified, according to Mr. Richards, by the name of soursop. The new-fallen fruit had all the tastiness of milk of magnesia and was shunned by all living things. As the fruit fermented in the tropical sunshine, a small species of wasp began to attend in numbers; and it was then that soursops became of interest to our coati. He would sit down in front of one, his head cocked to one side, his little ears forward and his mobile nose in ecstasies. When a wasp lit on the edge of the sticky mess he would slowly raise one paw, then swat the insect and rub it vigorously into the ground with the thick palm of his paw, keeping his "forefingers" raised up out of harm's way. This was terminated by a leap away from the scene of the death and was followed by long-range study of his victim's kind on the fruit. After apparent satisfaction that the wasp was safely disabled, and that no reprisals were forthcoming from the kin of the deceased, he would cautiously return, bare all his teeth by the most consummate withdrawal of his lips and nip off the offending end of the insect. This accomplished, he would eat the remainder, and immediately begin observations on a new wasp.

Interestingly enough, large iguanas that also inhabited the compound were terrified of this coati. Several times we saw them abruptly halted in the midst of a meal of hibiscus blossoms by the sight of him. They would immediately dash for the palm trees and disappear in their "collars" of dead leaves. Since the coati sometimes saw and sometimes failed to see them, but never showed more than a passing interest in any but one small one, it seems as though it was a normal carnivore reflex for the lizards. They paid no attention to the deer that lived in the compound, but were afraid of cats.

In the forests of the region, I met several lone coatis, presumably old males. One in particular resented my close approach and made several abortive charges, ending about fifty feet from me. When I again moved toward him he fled precipitately, tail erect. As other writers have noted, bands of coatis, when startled suddenly, rush to trees, climb up a few feet or to the lower branches to reconnoitre.

If then pressed, they rush headlong to earth to escape. During all this they utter a grunting alarm note.

Only three specimens were taken, although the opportunity to take many more was provided. All are from Paracote.

There seems to be some doubt as to the validity of the form *panamensis*, as distinguished from *bullata* of Costa Rica. Whatever the status of the Panama animal, the Azuero specimens at hand are perfectly typical of it.

Measurements:

C. M. N. H. Number	Sex	Total Length	Tail	Hindfoot	Greatest Length of Skull	Palatal Length	Zygomatic Breadth	Postorbital Constriction	Width of Braincase	Breadth across Bullae	Width of Left Bulla	Length of Left Bulla	Width of Upper M^3
1201 2nd P_3's erupting 2nd C's erupted	♀	938	463	101	116.5	72.4	52.2	31.0	42.5	31.7	10.2	13.5	7.7
1202 Old Adult	♀	1186	494	106	129.4	81.2	64.7	32.2	44.2	35.6	11.0	14.3	8.0
1260 2nd P_3's erupted 2nd C's erupting	♂	1017	483	105	121.1	75.5	58.0	31.2	43.2	33.9	9.8	14.0	7.5

Potos flavus ssp. KINKAJOU.

On the second evening after our arrival at Paracoté, while I was setting traps on the port road just after sundown, an animal, then unfamiliar to me, crossed the road from the cocoanut plantation to the deep woods and immediately climbed into the brush along the edge of the road and the forest, disappearing into the trees at once. It was quite evidently a kinkajou. No sign of the species was discovered after that. This animal's tracks were studied, but none of them was seen subsequently in the dusty paths.

Bassariscus sumichrasti ssp. RING-TAILED CAT OR CACOMISTLE.

Tracks of *Bassariscus* were seen on two occasions in the roads around Paracoté. No specimens were taken and the natives, interviewed through Mr. Pinkney Davies, our guide, seemed unfamiliar with them.

Tayra barbara ssp. TAYRA.

A single individual of this species was encountered on a high ridge south of the Mariato Rubber Camp. The animal was running, ferret-like, from tree to tree at a distance of about 200 feet, but stopped at the base of one for half a minute while it smelled something very intently. It gave me an opportunity to observe it through a glass and to shoot at it. My shot went wild, and it forthwith disappeared over a steep bank into a deep dark ravine.

Lutra repanda Goldman. PANAMA OTTER.

Several otters were seen by members of the expedition in the interior mountains of the peninsula. Mr. Davies and Ignacio Alvarado, our native headman, reported seeing an otter on the Mariato River below our camp; I myself saw one above camp on the same stream. The animal was sunning itself on a rock projecting from a pool, but quietly glided into the water as I came into view. It crossed the pool under water and I caught a meagre glimpse of it as it disappeared into the thick under-brush along the stream's edge.

Mr. Aldrich, while sitting on the edge of a rushing mountain rill in the woods near Cavulla, saw two otters stick their heads out of a pool only a few feet from him. He fired point blank and is still nonplussed over their total and instantaneous disappearance. We finally had to purchase a skin from a native, the specimen having been taken along the Rio Negro below Altos Cacao.

This skin is that of a male animal. It is highly imperfect, all four legs, the nose, and most of the tail having been cut off. The color of the upper parts and under parts are precisely those given by Goldman in his original description of the species.[148] The only point

[148]Smithsonian Misc. Coll., Vol 63, No. 5; March 14, 1914, p 4

of divergence discernible from the somewhat meagre data at hand is the length of our specimen. While the skin is certainly badly stretched, it seems unlikely that this wholly accounts for the disparity between the total length given by Goldman and the body measurements available from our skin. The total length of the type of *repanda* is given as 1085 mm; the body alone of our specimen measures nearly 950. Apparently ours is the skin of a very large individual.

Herpailurus yagouaroundi panamensis (Allen). JAGUARUNDI.

Eyra cats are relatively common in the Mariato region, where they are abroad at all hours of the day and night. Their tracks were among the most conspicuous along the roads. Their reactions on being approached were very cat-like—they usually crouched, lowering the head, and hissed or growled or did both. The males greatly exceed the females in size. I saw four pairs in all during our stays at Paracoté and their actions were such as to indicate that smaller females were in heat at the time (February and March). The natives, to whom they were known as "gatos negros" or simply "gatos feos" (black cats or ugly cats) regarded them as inveterate poultry killers.

The female obtained at Paracoté was shot while she crouched hissing at me in full sunshine at a distance of less than thirty feet. The much larger male who accompanied her, although wounded, escaped.

Felis pardalis mearnsi Allen. MEARNS' OCELOT.

Ocelots are much less abundant around Paracoté than the eyras, but their tracks were seen regularly on the dusty roads through the plantations. I also saw their tracks in the wet sand of the river's edge above the Mariato Rubber Camp, and in the soft mud along a streamlet at Cavulla, so their altitudinal range is from sea-level to at least 3300 feet in the region.

They are frequently seen by the light of head-lanterns at night, which was the method by which our specimen, an old male, was obtained at Paracoté. The stomach of this animal contained remains,

in varying degrees of freshness, of *Sylvilagus*, *Proechimys*, and *Zygodontomys*, in addition to fragmentary and unidentified bird material.

Felis onca centralis Mearns. CENTRAL AMERICAN JAGUAR.

The "tigre" of the Panamanians, the jaguar of the American residents, is not, to judge from our failure to see any sign whatsoever of them, very abundant in the region. Hunters familiar with these mountains, including Mr. Davies, have all had various experiences with the big cats and are agreed that here, as elsewhere, they follow the roving bands of peccaries and razor-back hogs. Mr. Davies reported that on other trips into the Azuero Peninsula he had found tracks around his camp in the mornings, and had seen several of the beasts.

Felis concolor costaricensis Merriam. CENTRAL AMERICAN PUMA.

It was Mr. Davies' opinion that the puma was even scarcer in the country than the jaguar, but that like that animal it was most apt to be seen in the wake of the peccary droves. As in the case of the jaguar, we saw no sign of it.

Sciurus hoffmanni chiriquensis Bangs. CHIRIQUI SQUIRREL.

Sciurus (Guerlinguetus) aestuans chiriquensis Bangs, Bull. Mus. Comp. Zool. Vol. XXXIX, No. 2, p. 22, April, 1902. Type from Divala, Chiriqui.

Sciurus hoffmanni hoffmanni J. A. Allen, Bull. Amer. Mus. Nat. Hist., Vol. XX, p. 66, February 29, 1904.

Sciurus hoffmanni chiriquensis J. A. Allen, Bull. Amer. Mus. Nat. Hist., Vol. XXXIV, p. 220, May 17, 1915. There is an error here, the form in question being accidentally listed as *Microsciurus*.

Sciurus hoffmani chiriquensis Goldman, Smithsonian Misc. Coll. Vol. 69, No. 5, 1920, p. 137.

Allen[149] says concerning this squirrel: "As indicated above, *chiriquensis* may be regarded as a rather slightly differentiated form of *hoffmanni*, as the latter is here restricted, confined to the humid tropical lowlands of Costa Rica and Chiriqui, characterized mainly by thinner and more hispid pelage and the slightly more rufous tone of coloration. The characters given by Bangs, based on specimens

[149]Bull. Amer. Mus. Nat. Hist., Vol. XXXIV, 1915, p. 221.

from Divala (Chiriqui) specimens, are the reverse of the actual conditions, the words "more" and "less" in the expressions "more olivaceous" and "less brick-red" having been apparently accidentally transposed. The name, however, may be retained for the lowland form, in contradistinction to the form of the higher elevation of the interior, to which it seems convenient to restrict the name *hoffmanni* so far as the Central American representatives of the *hoffmanni* group are concerned."

The range of typical *hoffmanni* is an interrupted one, the form occurring in Costa Rica and not reappearing southwards until the Cauca Valley of Colombia is reached. I have compared the four specimens obtained by us to the type and topotypes of *chiriquensis* and to an extensive series of that form from various points in Chiriqui, all these specimens being in the collections of the Museum of Comparative Zoölogy at Harvard. At first glance the Chiriqui animals appear quite different from the small Mariato series, but when those taken at the same time of year as ours (March and April) are selected, the differences pretty largely vanish. There is a slight tendency towards a paler general color of the upper parts in one of two of our specimens, but the differences on the whole are exceedingly small. Cranially, there is a tendency in our series towards shortening of the rostrum as compared to the Chiriqui animals, but even this is not very pronounced. The characters of ours overlap those of the *chiriquensis* series in a number of cases and our specimens vary considerably among themselves. In external characters the Mariato animals seem to tend towards *hoffmanni* but cranially they are farther from *hoffmanni* than from *chiriquensis*.

Our four animals were all taken along the crest of the ridge separating the valley of the Mariato River from that of its tributary, the Rio Negro, at elevations of from 1500 to 2500 feet above sea level. Here we found them frequenting the scrubby, rather open ridge-top woods and would often allow a rather close approach. The species is not confined to any elevation on the peninsula, how-

ever, as Mr. Aldrich saw two in brushy second-growth at Paracoté and I saw one south of Cavulla at an elevation of nearly 4000 feet. They were rather common about Cavulla, and one lived in a large hollow tree beside our campsite. These squirrels also inhabit the small islands in Montijo Bay, Cebaco and Gobernador, which are only a few miles off the Azuero shore and from which the British Museum has specimens.[150]

Upon surprising one animal at close range, I heard it emit a series of short husky "barks" terminating in a series of "chucks" reminiscent of its northern relative, the fox squirrel. All the others I saw were silent even when startled.

Two of the females were nursing young at the time they were taken, (March 6 and 8, 1932). Specimens obtained: Altos Cacao, 1; Cerro Viejo, 3.

Measurements:—

Spec. No.	Sex	Length	Tail	Hindfoot	Skull: Greatest Length	Zygomatic Breadth	Interorbital Constriction	Breadth of Braincase	Nasals (along midline)	Maxillary Toothrow (alveolar)
1192	♀	362	150	51	49.0	29.6	15.5	23.6	13.8	8.3
1193	♀			53	50.0	30.1	15.1	23.8	13.8	8.5
1197	♀	368	157	49	49.1		16.9		14.8	8.4
1198	♂	365	164	53	48.5	30.2	15.8	24.2	13.6	8.1

Sciurus variegatoides melania (Gray). COSTA RICAN BLACK SQUIRREL.

1867 *Macroxus melania* Gray, Ann. and Mag. Nat. Hist. Ser. 3, Vol. 30, p. 45.

1902 *Sciurus melania* Bangs, Bull. Mus. Comp Zool., Vol. XXXIX, No. 2, p. 22, April, 1902.

[150]See Thomas, Nov. Zoöl., Vol. 10, 1903, pp 34-42.

1920 *Sciurus variegatoides melania* Goldman, Smithsonian Misc. Vol. 69, No. 5, p. 136, April 24, 1920.

Up to the present time *Sciurus variegatoides melania* has been known from western Panama and Costa Rica, and from several islands off the southwest coast of Panama. It has not been known from points east of Chiriqui on the mainland, a specimen from Remedios, Chiriqui and from points farther east having been referred to *Sciurus variegatoides helveolus* Goldman. All of the known specimens of *melania* have been black in color; all of *helveolus*, chocolate and buff, with black and white tail. In the Mariato River district both color phases occur and both are of the same subspecies. In the course of the expedition under discussion, four specimens were obtained, three black and one parti-colored. all shot in exactly the same locality. The two color phases were seen together several times and in other places, and natives assured us that both phases often were found in the same nests. In addition to this evidence, I compared our four specimens to examples of *melania* from Chiriqui and *helveolus* from the Canal Zone; they are indistinguishable cranially from either; the black ones are identical to the black Chiriqui *melania* and the parti-colored one is very close to *helveolus*, although somewhat less grizzled on the back. However, all four specimens have the rudimentary upper premolar characteristic of *melania*, although in the case of one, a black animal, this tooth is missing on one side. I therefore consider it possible that when larger series are available, *helveolus* may prove to be a synonym of *melania*, unless *melania* in turn proves synonymous with some other more northern form. In the district under consideration the black *melania* type squirrels are definitely melanistic individuals of the part colored animal and no more separable from it than is the black squirrel of the northeastern United States from the Northern Gray Squirrel.

These squirrels were seen only in the coastal lowlands and seemed to prefer womewhat older denser woodland than *hoffmanni*, although Mr. Aldrich obtained specimens from the open growth of an abandoned plantation site. They were seen eating young mangoes, but were so wild and wary that little note could be made of their habits.

Measurements:—

Species Number	Sex	Length	Tail	Hindfoot	Length of Skull—Anterior border of foramen magnum to tip of nasals	Zygomatic Breadth	Interorbital Constriction (taken anterior to postorbital process)	Breadth of Braincase	Nasals (along midline)	Maxillary Toothrow (left alveolar)	Remarks
1215	♀	553	263	67	60.0	34.8	19.9	25.4	18.6	11.9	Rudimentary premolar absent on left side of upper jaw, *Melania*–type; black
1244	♀	562	281	67	60.1*35.7		21.3	27.8	18.0	12.5	*Melania*–type; black
1257	♂				60.3*35.7		21.1	26.5		12.3	*Melania*–type; black
1258	♂	540	272	65	60.3	35.3	20.1	26.2	18.6	12.2	*Helveolus*–type; particolored

*In these two individuals the greatest length of the skull is that from the occipital projection to the tips of the nasals, not the one given above. In the other two the greatest length is the measurement given.

Liomys adspersus (Peters). PANAMA SPINY POCKET RAT.

Presumably the brushy and weedy margins of the dry llanos around Paracoté and the drier locations in the near-by cocoanut plantations should provide an ideal habitat for a spiny pocket-rat of the genus *Liomys*. In spite of the apparent suitability of the terrain, however, only two specimens were taken. Both were captured in heavy grass and weeds in much the same sort of places that cane and cotton rats inhabited along the plantation roads. Their cheek pockets in both cases were filled with several types of weed seeds and some tiny greenish fruits. The two animals were entirely clear of external parasites except for a few redbugs around the groin of the larger specimen.

One of our specimens is an adult male, the other a half-grown young animal, badly mangled by ants. Its sex is indeterminable. The male is the only existing adult specimen of its sex, only nine examples of this species having been collected to date. In fact,the only other completely adult specimen is a female in the collection

of the Biological Survey, No. 179575. The Field Museum's specimen. number 19132 is nearly adult. It also is a female. Our male animal, number 1193, is very much larger than any of the other specimens, as may be noted by comparing its hindfoot measurement of 33 mm, with that of the other adult, Biological Survey No. 179575, which is 31.5 mm. It is to be regretted that the skulls of both these animals are imperfect.

These records from Paracoté constitute the only noteworthy extension of the known range of this form that has been reported, all the other specimens having come from the Canal Zone. The adult male in question differs from the Canal Zone animals only the slightly more ochraceous tipping of the small hairs that project above the animal's spiny armament. It is otherwise indistinguishable.

Measurements:—

Species Number	Sex	Length	Tail	Hindfoot	Greatest Length of Skull	Zygomatic Breadth	Interorbital Constriction	Width of Braincase	Length of Nasals	Palatal Length	Interparietals (Breadth times length)	Maxillary Toothrow (Alveolar borders)	Remarks
1193	♂	262	121	33		18.6	7.8	15.3	16.4	14.4	7.9	6.1	Old adult, teeth well worn.
1223	Juv.	186	93	28	29.0	13.3	7.0	13.0	11.0	11.2	x3.9	5.3	M_3 just erupting.

Oryzomys azuerensis sp. nov. AZUERO RICE RAT.

Type Locality.—Paracoté, 1½ miles south of the Angulo River Mouth, Mariato-Suay Lands, Veraguas, Panama, Altitude of type locality, sea level.

Type.—Spec. No. 1178, young male, about two-thirds grown, skin and skull, Cleveland Museum of Natural History. Collected by B. P. Bole, Jr., February 19, 1932. Original Number: B-A 58.

Distribution.—Known only from type locality.

General Characters.—A brownish member of the *couesi* group, lacking the ochraceous suffusions of the nearby races and having a short, broad skull with well-marked supraorbital shelves.

Color.—Upper parts near Prout's brown,[151] slightly paler on sides; somewhat lighter on cheeks and sides of neck, where there is a very faint suffusion of ochraceous buff; much darkened on the top of the head, the color near mummy brown. The dark guard-hairs of the back are mummy brown or bistre, not black. Underparts pale, dull gray, with the faintest suggestion of buffy wash. Outer sides of ears blackish, inner sides clothed with bright ochraceous buffy hairs; feet sparsely covered with short brownish hairs that are conspicuous against the lighter-colored skin; tail dark brownish above, paler below except at tip, finely annulated and nearly naked.

Skull.—Short and broad, nearly 2 mm. shorter than that of the type of *gatunensis*, but with greater zygomatic breadth and wider braincase. The shortness of the skull is largely in the rostrum, which completely differentiates its appearance from that of the skulls of the forms *gatunensis*, *richmondi*, and typical *couesi*.

Measurements.—Length, 203 mm.; tail, 107.5; hindfoot, 30. Skull: greatest length, 25.8; interorbital breadth, 4.8; zygomatic breadth, 14.6; width of braincase, 12.6; length of nasals, 9.7; anterior palatine foramina, 5.0; palatal bridge, 5.1; upper molar series (alveolar borders), 4.5. The interparietal of the skull of the type, a feature in which this form differs from *gatunensis*, is imperfect and cannot be measured accurately.

The above described specimen was taken in a grassy salt-water drainage ditch in the cocoanut plantation at Paracoté. It was recovered after an unusually high tide, which permitted a large green crab to remove the skin of the lower jaw. The specimen is otherwise intact and was the only one taken.

I was not sure just what the animal was while I was in the field, but upon my return I ran it down in Goldman's rice-rat key[152] to *Oryzomys gatunensis* Goldman on the basis of its ownership of supraorbital shelves. In other characters, however, it differed notably from the published descriptions of that form. Accordingly I submitted

[151]Ridgway, Color Standards and Color Nomenclature, 1912
[152]N. Amer. Fauna, No 43, pp 17, 18

it, while visiting the Museum of Comparative Zoölogy, to Dr. G. M. Allen, who also was unable to place it elsewhere than under *gatunensis*. Subsequently I sent it on to Major Goldman at Washington. He very kindly compared it to the type and only existing specimen of *gatunensis*. Two paragraphs from his letter regarding the matter follow:

"Your specimen compares with the type of *gatunensis* as follows: Size similar; pelage shorter, perhaps due to a little earlier stage of development; color browner above and grayer below, lacking the ochraceous tawny suffusion of upper parts and ochraceous buffy under parts in the type; skull somewhat shorter, more robust; brain case larger, more inflated; rostrum shorter and heavier; frontal region similarly broad; zygomata more widely spreading; interparietal larger, more extended antero-posteriorly; nasals exceeding premaxillae in posterior extension much as in *gatunensis*; dentition about the same.

"Your specimen compares with typical *couesi* of similar age as follows: Size similar; color browner above and grayer below, lacking ochraceous tawny suffusion of upper parts and ochraceous buffy of under parts; skull somewhat shorter, more robust; brain case larger, more inflated; rostrum shorter and heavier; frontal region broader; supraorbital ridges more prominent than usual in *couesi* of corresponding age, but incidentally a trifle less trenchant than in the type of *gatunensis*; zygomata more widely spreading; interparietal about the same; nasals extending posteriorly beyond premaxillae (ending in about the same transverse plane in couesi)."

Major Goldman goes on to recommend the treatment of this specimen as a subspecies of *couesi*, adding that *gatunensis* is probably a geographic race of that species. Because of the fact that there is a huge gap between the nearest station of *Oryzomys couesi* (extreme northwestern Costa Rica) and the Azuero Peninsula, plus the additional fact that *azuerensis* is not strictly intermediate between *couesi* and *gatunensis*, but diverges from both in several characters, it seems a bit more prudent to describe this form provisionally as a full species, in view of the total lack of specimens of this group from most of Costa Rica and all of Panama west of Veraguas.

I myself have compared the specimen at hand to a series of *O. couesi richmondi* from eastern Nicaragua. Young of the same age and adults too are entirely different in color in that form from my specimen, while the same difference that Major Goldman mentions between the skulls of *azuerensis* and typical *couesi* hold, or are intensified, in the case of *richmondi*. The olivaceous and ochraceous tones of *richmondi* are entirely missing in *azuerensis*.

It is a fortunate thing for the identification of this animal that the type of *gatunensis* is of comparable age.

Oryzomys talamancae Allen. TALAMANCA RICE RAT.

Oryzomys talamancae, Allen, Proc. U. S. Nat. Mus., Vol. 14, p. 193, July 24, 1891. Type from Talamanca, Costa Rica.

Two very large individuals of this species were all that I was able to save out of a series of five taken under logs on the bank of a woodland stream at Paracoté. The other three were so badly torn to pieces by ants and larger animals that they were discarded after I had made sure that they were the same as the two at hand. My specimens are both much more richly colored than the average of specimens I have seen from the Canal Zone, and seem to have a tendency towards rather short incisive foramina; but, as they are not entirely similar to each other and are very close to specimens from Cana in eastern Panama, they are here referred to *O. talamancae*. Both are rather old individuals which doubtless accounts in part for their brightness of coloration.

This rice rat is apparently only locally abundant in the region under consideration. Enders[153] indicates that on Barro Colorado Island these rats are found throughout the forest during the dry season. Such is apparently not the case in the Mariato region, as none was taken anywhere except in deep, moist ravines or in flood-plain woods close to the seashore. A single mangled specimen was taken at the Mariato Rubber Camp and was discarded.

Both specimens saved were entirely free of ectoparasites. Their measurements may be of some use and are here recorded. Both animals were taken at Paracoté, Mariato-Suay Lands, Veraguas, at an altitude of about 100 feet.

Measurements:—

Species Number	Sex	Length	Tail	Hindfoot	Occipitonasal Length of Skull	Zygomatic Breadth	Interorbital Constriction	Length of Nasals	Incisive Foramina	Maxillary Toothrow
1140	♂	271	135	31	32.6	26.8	4.7	12.5	4.5	4.5
1134	♂	279	140	31		26.1	5.1	11.6	5.0	4.7

[153]Bull. Mus. Comp Zoöl., Vol. LXXVIII, No. 4, October 1935, p 451.

Sigmodon hispidus borucae Allen. BORUCA COTTON RAT.

Sigmodon borucae Allen, Bull. Amer. Mus. Nat. Hist., Vol. IX, p. 40, March 11, 1897.

Sigmodon hispidus borucae Bailey, Proc. Biol. Soc. Washington, Vol. 15, p. 112, June 2, 1902.

Sigmodon hispidus chiriquensis Goldman, Smithsonian Misc. Coll., Vol. 69, No. 5, p. 106 (1920).

The status of the cotton rats of western Panama will be clarified only when fairly complete collections are available from all parts of Chiriqui, Veraguas and Coclé. Allen[154] described as new the cotton rat inhabiting the Boqueron district of Chiriqui, recognizing the differences between it and *S. borucae* from Boruca, Costa Rica, which he had earlier described.[155] The first reference to *Sigmodon* in Veraguas was by Alston, who referred animals from northern Veraguas to the species *hispidus*[156] but did not attempt to define their subspecific rank. All subsequent writers until the appearance of Goldman's "Mammals of Panama" in 1920,[157] with the exception of Allen, as noted above, referred their Panama cotton rats to *borucae*, including Bangs,[158] Thomas,[159] and Anthony.[160] Goldman, however, referred all the cotton rats of Panama to *chiriquensis*[161] and his lead has recently been followed by Enders.[162]

I have examined Costa Rica examples of *borucae* and have compared them to the series obtained in the Mariato River country, and am quite unable to detect any constant differences. Chiriqui animals from Bugaba, listed by Goldman[163] under his general account of *S. hispidus chiriquensis*, differ from the Mariato series in their considerably richer and darker coloration, which is especially noticeable on the hind feet. They are clearly referable to *chiriquensis*, the type locality of which (Boqueron) is not far away (only five miles) and at a slightly higher elevation.

Specimens from the Canal Zone, kindly lent for comparison by the Biological Survey, are also indistinguishable from the Mariato series, the only differences being minor ones in the skulls of a few individuals. Therefore it seems best to refer the present series to

[154]Bull. Amer. Mus. Nat. Hist., Vol. XX, February 29, 1904, p. 68
[155]Bull. Amer. Mus. Nat. Hist., Vol. IX, March 11, 1987, p. 40.
[156]Biologia Centrali-Americana, Mammalia, 1879-1882, p. 152
[157]Smithsonian Misc. Coll., Vol. 69, No. 5, 1920, pp. 1-309
[158]Bull. Mus. Comp. Zoöl., Vol. XXXIX, No. 2, April, 1902, p. 32.
[159]Nov. Zoöl., Vol. 10, April 1903, p. 41.
[160]Bull. Amer. Mus. Nat. Hist., Vol. XXV, June 9, 1916, p. 368.
[161]Smithsonian Misc. Coll., Vol. 69, No. 5, 1920, pp. 1-309.
[162]Bull. Mus. Comp. Zoöl., Vol. LXXVIII, No. 4, October, 1935, p. 455.
[163]Smithsonian Misc. Coll., Vol. 69, No. 5, 1920, p. 107.

borucae, although the range of this form, as thus determined, is almost or wholly divided in two parts by the range of *chiriquensis* in western Chiriqui. Further collections from western Chiriqui are eminently desirable.

Cotton rats proved to be almost strictly diurnal at Paracoté, as only two were taken before our traplines were kept functioning by day as well as by night. When I began rebaiting my traps in the mornings a small series was soon captured. These rats made indistinct runways like those of *Zygodontomys*, with which genus of rats they are constantly associated at Paracoté, the same traps often yielding the two forms on alternate days or in the evening and morning. In general cotton rats seem to prefer heavier ruderal growth than the cane rats, as none was taken in the grassy llanos or along their edges. All of the Paracoté series came from the cocoanut plantations, which are heavily overgrown with thick grass and weeds.

Young of all ages were taken, and one nest was discovered. I stepped through the roof of this nest, which was situated about nine inches under-ground in easily friable soil. The chamber was of irregular shape and was grass-lined; there were several tunnel leading into it. There were about half a dozen young at home at the time, one of them being crushed under foot when I broke through the roof. The others, just old enough to climb about, escaped into the tunnels.

One female *Sigmodon* contained the astonishing total of seventeen embryos, each about half an inch in length; another contained eleven, and a third but three. If they are usually so capably prolific, it is a cause for amazement that they do not greatly outnumber *Zygodontomys*, the commoner genus. Our catch of *Sigmodon* and *Zygodontomys* together comprised over half of our total catch of mammals during the course of the expedition.

Specimens.—Paracoté, 17; Cavulla, elevation 3300 feet, 1. About twenty others were discarded at Paracoté.

Measurements:—

C. M. N. H. Number	Total Length	Tail	Hindfoot	Skull: Greatest Length (Occipitonasal)	Zygomatic Breadth	Interorbital Breadth	Nasals (Length)	Width of Braincase (Taken anterior to descending process of supraoccipital)	Width of Rostrum (Maxillae at antorbital notch)	Length of Interparietal (At median line)	Maxillary toothrow (Alveoli)
Males											
1145	243	106	30	31.1	18.0	5.2	10.6	12.7	5.8	3.1	6.2
1161	224	97	28	29.6	16.9	4.9	10.3	12.4	5.5	3.0	6.3
1212	244	102	29	32.6	18.3	5.0	11.6	12.8	5.8	3.5	6.9
1227			31	36.0	20.0	5.3	13.3	13.5	6.4	2.8	6.5
1244				32.4	18.6	5.2	11.8	13.0	5.8	2.8	6.1
1245	236	98	28								
1246	251	102	35	32.4	18.5	5.2	11.6	13.2	5.8	2.5	6.2
1247	264	114	32	33.3	18.6	5.2	11.9	13.4	6.1	3.0	6.1
Averages	243.7	103.2	31	32.5	18.4	5.1	11.6	13.0	5.9	2.9	6.3
Females											
1213	241	104	31	30.3	18.0	5.0	10.3	12.9	5.5	2.6	5.7
1216	233	107	31.5	30.0		4.8	10.2	13.0	5.8	2.2	5.8
1226	235	100	28	30.5	17.6	5.0	11.0	12.6	5.5	2.7	6.1
1253	262	111	29	33.6	18.5	5.2	11.8	13.1	5.5	2.9	6.0
Averages	242.7	105.5	29.9	31.1	18.0	5.0	10.8	12.9	5.8	2.6	5.9
Biol. Survey											
Males											
170973	272	115	33.5	33.9	20.0	5.3	12.1	13.5	6.1	2.2	6.1
171257	270	108	32.5	33.7	18.9	5.3	12.2	13.3	5.9	2.2	5.9
171249	257	109	33.5	34.5	20.0	5.6	13.0	13.3	6.4	2.3	6.3
171247			32	34.5		5.3	12.8	13.4	6.4	2.5	6.0
Averages	266.3	110.7	32.9	34.15	19.6	5.4	12.5	13.8	6.2	2.6	6.1
Females											
171252	270	111	32.5	34.1	19.5	5.5	12.5	13.2	6.5	2.1	6.0
171255	261	110	32	33.2	18.8	5.7	11.5	13.2	6.2	2.4	5.8
171256	291	128	32.5		19.6	5.5	11.9		6.3		6.0
171523	251	101	33.5	32.7	18.5	5.1	12.2	13.3	6.1	2.1	5.8
Averages	268.2	112.5	32.6	33.3	19.1	5.5	12.0	13.2	6.3	2.2	5.9

Nyctomys sumichrasti ssp. VESPER RAT.

Along one of my forest traplines at Paracoté I placed a rat trap on a leaning tree-trunk about fifteen feet above the ground. It yielded on successive nights, the hopeless mangled remains of a *Marmosa mexicana*, a *Proechimys*, and the hind foot and tip of tail of an arboreal rat of some sort. From the coloroing and shape of the fragments, I recognized them as the remains of a specimen of some race of *Nyctomys*, a genus of vesper rats, and one which frequently reaches Cleveland in banana shipments. No other trace of the animal was noticed at Paracoté.

At Altos Cacao our camp was situated on the crest of a ridge between jungle-choked ravines. From a spring at the bottom of one of these we got our water, and we washed in a small pool just below it. On evening at dusk when I was washing my hands, two of these rats appeared on the side of a liana-covered tree trunk less than fifteen feet from me. After hesitating for a moment, one pursued the other around and around the trunk much as chipmunks do. One of them finally stopped in plain sight on the fold of a crinkly liana and watched me, its blackish tail hanging straight down, making a most attractive picture. There it stayed for but a moment, then disappeared either into the dense underbrush behind the tree or up the tree on the side away from me. On the next evening I again startled one of these creatures near the pool. This time it came part way around the trunk to look at me, then fled at once, going up the tree.

With all this provocation, I covered the vicinity with traps, using all the baits at our disposal. The only yield was a *Proechimys*.

At Cavulla these rats were heard scurrying about on tree trunks and branches along the ravine beside our camp. I was finally able to turn the beam of a flashlight full on one of them. It sat blinking for an instant on a small branch twenty feet above ground, seated

crosswise with its tail hanging vertical. I was unable to duplicate the performance and no specimens were taken despite intensive efforts.

Such is the evidence of the occurrence of *Nyctomys* on the Azuero Peninsula. According to Goldman[164] the form *nitellinus* is typical of the Upper Tropical Zone, although our Cleveland stowaways always originate in banana plantations close to sea level. Our Paracoté record belongs to the most basal lower tropical—the edge of a mangrove swamp.

Zygodontomys cherriei ventriosus Goldman. CANAL ZONE CANE RAT.

Cane rats are by far the commonest mammal of the open country around Paracoté. They are confined to the open llanos, weedy places along roads, recently cleared land and the cocoanut plantations, where I was able to take nearly a hundred individuals of all ages, although not all were saved. They apparently are nocturnal in habit as none was taken in the daytime although our traps were rebaited morning and evening after the first few days. They made runways only in the thickest grass and these were never as well marked or as pronounced as those made by our northern *Microtus* whose ecological niche cane rats fill at Paracoté. Many of even these runways may have been made by *Sigmodon* which we always found in the same sort of environment and often caught on the same trap-lines. They came readily to fruit and rolled oats used as bait and it was possible to catch them in mouse-traps set in the middle of roads, several feet from cover. The dust of roadways was often peppered with their tracks in the morning, showing that they had made many transits from cover to cover during the night.

Several nests were found and all were of grass and down of the flowers of an unidentified plant. They were most frequently situated

[164]Smithsonian Misc. Coll., Vol. 69, No. 5, 1920, pp. 1-309.

just under the surface of the ground near the edges of the ditches along the roadways, from which underground entrances led to the nest. Other entrances were furnished by short tunnels into the nests from the landward sides of the ditches and runways usually fed the holes at the ends of these. One nest was found in very thick grass directly on the surface; three nearly full-grown individuals were driven from it.

The series at hand contains animals of all ages from quarter-grown young to shaggy old adults, and many of the females contained embryos of different sizes. Four was the usual number, but the totals varied from two to eight and one female contained eleven.

Ruderal growth seems to be the favorite habitat of these rodents, as not one was taken even in second growth woods, and only two in the open llanos far from weedy cover. About the edges of the llanos they were common, however, because it was here that low bushes and thick weeds were abundant. Enders[165] mentions the continued existence of one animal inside the Barro Colorado Laboratory, apparently of its own choice; it is interesting in this connection that I took one in the bathroom of the plantation house at Paracoté in a rat trap that had captured a *Rattus* the previous night.

A single specimen was taken in an abandoned native hillside garden at Altos Cacao at an elevation of about 1500 feet. Densely forested mountains surrounded this spot for miles, so apparently *Zygodontomys* passes through forested areas readily.

These Mariato specimens show much variation, but are on the whole identical to *Z. cherriei ventriosus*, being much larger and uniformly paler than the Chiriqui animals referred by Goldman[166] to typical *cherriei*. The darkening along the back characteristic of that form is missing in the present series. Measurements of the adults of the series follow:

[165]Bull. Mus. Comp. Zoöl., Vol. LXXVIII, No. 4, October, 1935, p. 455.
[166]Smithsonian Misc. Coll., Vol. 69, No. 5, 1920, p. 107.

Measurements:

C. M. N. H. Number	Total Length	Tail	Hindfoot	Occipitonasal Length of Skull	Greatest Zygomatic Breadth	Interorbital Constriction	Greatest Width of Braincase (Across squamosals)	Length of Nasals	Incisive Foramina	Width of Rostrum (Posterior border of Premaxilla)	Interparietal (at median line)	Maxillary Toothrow (alveolar)
Males												
1123	185	87	23	25.7	13.4	4.5	11.1	9.6	5.3	4.4	3.2	4.1
1125	201	84	24	26.4	14.0	4.4	11.3	10.3	4.7	4.6	3.8	4.1
1126	229	92	26	29.2	15.2	4.6	11.8	11.7	5.3	5.2	4.0	4.1
1131	220	85	24		14.8	4.8	12.1	11.0	6.0	5.0	2.9	4.4
1136	249	110	25		15.8	4.8	12.5	11.5	6.4	5.0	3.0	4.3
1138	192	82	23	25.7	13.5	4.5	11.6	9.4	5.1	4.3	3.0	4.0
1139	229	99	25	29.1	14.9	4.6	12.0	11.7	5.9	4.9	2.7	4.5
1144	230	94	26		15.7	4.7		12.0	6.4	5.2		4.3
1146	204	87	26	27.7	14.1	4.4	11.5	10.6	5.5	4.6	3.6	4.2
1147	203	84	24	27.2	14.3	4.4	12.0	10.0	5.3	4.6	3.6	4.4
1149	195	86	24	25.6	13.1	4.3	11.6	9.6	4.7	4.3	3.0	4.2
1151	199	83	24	26.1	13.5	4.7	11.6	9.6	5.1	4.5	3.1	4.2
1152	243	95	26			4.5		11.0	5.7	4.6	2.8	4.6
1153	190	85	23		13.7	4.6	12.0	10.0	5.4	4.5		4.4
1155		95	25			4.5	11.5	11.0	5.5	5.1		4.3
1160	208	86	25	27.2	13.6	4.2	11.2	10.2	5.3	4.5	2.6	4.1
1163	232	104	26	29.5	15.0	4.9	12.0	11.3	5.8	5.0		4.2
1168	200	92	25	27.3	14.2	4.5	12.0	10.6	5.8	4.5	3.1	4.3
1169	199	93	24	27.4	14.1	4.7	11.8	10.9	5.8	4.4	3.4	4.3
1170	211	87	24	28.1	14.3	4.9	11.8	10.6	5.8	5.2	3.3	4.8
1171	233	97	25	30.9	16.0	5.0	12.8	12.3	6.6	5.8	4.6	4.5
1176	181	89	25		12.9	4.3	11.4		5.0	4.4	3.3	4.2
1177	209	96	26	28.6	14.8	5.2	12.3	10.4	6.1	5.1	3.2	4.7
1188	212	89	26	28.7	14.4	5.0	11.8	10.8	5.7	5.1	3.6	4.7
1207	213	87	24	28.2	19.2	4.7	11.6	10.5	6.0	4.8	2.6	4.6
1209	200	85	23	26.7	13.7	4.5	11.2	10.5	5.5	4.4	3.1	4.2
1222	235	100	26	30.2		4.9	12.2	11.4	6.2	5.4	3.9	4.5
1229	190	86	24	26.0	13.6	4.9	11.0	9.3	5.4	4.9	3.4	4.3
1230	225	99	25	27.9	14.7	4.7	11.7	10.2	5.8	5.1	2.7	4.3
1231	242	102	27	30.2	15.5	5.0	12.0	12.2	6.1	5.2	3.1	4.5
1232	190	87	24	26.2	13.0	4.6	11.2	9.4	5.5	4.4	3.4	4.4
1239	235	96	26	30.0	15.4	4.6	12.2	11.6	5.8	5.1	2.3	4.6
1240	239	106	27	31.0	16.0	4.2	12.5	12.7	6.2	5.2	2.8	4.6
1243	212	93	24	28.9	14.7	4.9	12.3	10.5	6.2	5.0	3.3	4.5
1249	238	104	25	29.9	15.6	4.9	12.2	11.4	6.0	5.2	2.5	4.6
1250	237	103	26	28.3	14.8	4.5	12.0	10.7	5.9	4.5	2.8	4.2
Averages	214.6	92.6	24.9	28.1	14.4	4.6	11.8	10.8	5.7	4.9	3.2	4.4

Measurements:

C. M. N. H. Number	Total Length	Tail	Hindfoot	Occipitonasal Length of Skull	Greatest Zygomatic Breadth	Interorbital Constriction	Greatest Width of Braincase (Across squamosals)	Length of Nasals	Incisive Foramina	Width of Rostrum (Posterior Border of Premax.)	Interparietal (At median line)	Maxillary Toothrow (Alveolar)
Females												
1121	174	75	22		12.5	4.6	11.0		4.9	4.2	3.5	4.1
1124	191	82	24		14.0	4.5	11.4	10.2	5.4	4.5		4.1
1148	207	89	23			4.6		11.5	6.5	4.9		4.4
1159	180	82	22	25.1	13.1	4.2	11.6	9.1	5.1	4.1	2.0	4.3
1164	201	84	24			4.6		9.5	5.8	4.5	3.3	4.4
1165	240	101	25	29.4	14.9		12.5	12.0	6.5	4.9	2.9	4.1
1166	218	93	23	28.4	14.4	4.3	12.0	11.2	5.6	4.9	2.7	4.6
1208	206	88	24	27.3	14.1	4.8	11.7	10.0	5.6	4.9	2.8	4.1
1210	197	88	24		13.6	4.4	11.4		5.5	4.6	3.2	4.2
1211	203	91	22	26.1	13.7	4.2	11.5	9.8	5.5	4.4	3.3	4.2
1218	201	88	24	27.5	13.9	4.6	11.7	10.9	5.9	4.4	2.6	4.3
1219	193	85	24					9.8	5.1	4.8	3.2	4.3
1220	188	77	21	25.6	13.5	4.6	12.1	9.6	5.1	4.4	2.9	4.2
1228	199	90	25	27.1	13.6	4.4	11.3	10.6	5.6	4.7	2.6	4.3
1229				26.1	13.4	4.8	11.0	9.5	5.6	4.7	3.0	4.2
1233	191	85	21	26.1	13.0	4.5	11.4	9.5	6.2	4.2	2.3	4.3
1238	210	92	23	28.0	14.6	4.5	11.8	10.3	5.8	4.6	2.2	4.7
1241	183	80	23	27.0	13.5	4.5	11.6	10.0	5.9	4.7	2.5	4.4
1242	226	96	24	29.0	15.2	4.9	12.1	11.2	6.3	5.0	2.5	4.2
1248	229	88	24	29.0	15.1	4.6	11.8	10.6	6.5	5.2	2.2	4.5
Averages	201.9	86.8	23.3	27.3	13.9	4.53	11.64	10.3	5.72	4.63	2.76	4.29

Measurements:

C. M. N. H. Number	Total Length	Tail	Hindfoot	Occipitonasal Length of Skull	Greatest Zygomatic Breadth	Interorbital Constriction	Greatest Width of Braincase (Across squamosals)	Length of Nasals	Incisive Foramina	Width of Rostrum (Posterior border of premax.)	Interparietal (at median line)	Maxillary Toothrow (Alveolar borders)	M_3 Development
Juvenile Males													
1122	181	80	23	25.2	12.7	4.2	10.7	8.9	4.7	4.3	3.7	4.3	M_3 fully erupted
1157	160	70	21	24.2	12.5	4.3	11.1	8.5	4.9	4.0	3.7	4.5	M_3 almost fully erupted
1167	179	84	23	24.5	12.8	4.5	11.5	8.6	4.9	4.5	3.3	4.7	M_3 fully erupted
1175	151	70	21		11.9	4.5	11.0	8.3	4.7	4.1	3.0	4.7	M_3 just emerging
Juvenile Females													
1128	154	64	21	23.3	12.0	4.4	11.4	8.2	4.8	4.2	3.1	4.5	M_3 fully erupted
1156	149	66	20	22.2	11.5	4.6	10.6	7.7	4.6	3.9	2.6	3.5	No sign of M_3 yet
1158	133	57	19	22.0		4.4	10.6	5.1	4.6	4.1	3.0	4.4	M_3 just starting

Rattus rattus rattus (Linnaeus). BLACK RAT.

Black rats inhabit the various buildings of the Paracoté settlement, where they do the usual amount of damage. They also wander out into the cocoanut plantations on occasions, as I saw one of these creatures descend from a cocoanut tree and run across the beach road into thick weeds one evening. Two specimens were taken in rat-traps inside the main building of the plantation. The rats inhabiting native huts and gardens on the Mariato-Suay property away from the seacoast are usually *Zygodontomys* and *Proechimys*, not *Rattus*. No trace of this introduced species was discovered in the interior of the Mariato-Suay region.

Proechimys semispinosus goldmani ssp. nov. AZUERO SPINY RAT.

Type Locality.—Altos Cacao, Mariato-Suay Lands, Veraguas Province, Panama. (Altitude 1500 feet, on the ridge between the Mariato and Negro Rivers.)

Type.—Spec. No. 1191, adult male, Cleveland Museum of Natural History; collected by B. P. Bole, Jr. on March 3, 1932. Field Number B-A 71.

Geographic Distribution.—Azuero Peninsula of Panama, probably on both slopes of the mountains, but known only from the western (Veraguas) side.

General Characters.—A dark, dull-colored, slightly differentiated race with a number of cranial characters peculiar to it.

Color.—Type: Upper parts between argus brown and Mars brown[167] the color being given by the dark bone-brown, almost blackish spines and guard hairs which are tipped either with ochraceous-tawny or a dark brownish black. The sides are a pale russet, underparts white; under fur along sides light to dark gray; feet pale silvery drab with conspicuous white tufts at bases of claws; the under surfaces of the forelimbs are white.

Skull.—Much like that of *panamensis*, but with a proportionately narrow rostrum, especially noticeable in the middle; interorbital breadth less, the posterior part of the frontals consequently appearing laterally expanded; occipital region slightly narrower proportionately than in *panamensis*; interpterygoid fossa narrower, the angle being smaller. The skulls of fully adult animals are extraordinarily rugose, the frontals often containing deep pits, and the sutures between the nasals and premaxilla being much sunken.

Remarks.—The Azuero spiny rat—called macangué here as elsewhere in Panama by the natives—is an abundant species. The number we took was limited only by our supply of rat traps. The number of these instruments in our possession became smaller and smaller as the expedition progressed, owing to the irresistable appeal these articles had for our native porters. Each group of Indians, as they

[167]Ridgway, Color Standards and Color Nomenclature, 1912, Washington, D. C.

left us, appropriated a few traps, as these appeared to be the only means they had ever seen of effectively ridding their huts of rodents. A variety of baits were used by us successfully in trapping *Proechimys*—dates, raisins, dried prunes, bananas and rolled oats served equally well. Meat was not taken, but I was able to attract them with two species of insects—a large cicada and a huge green katydid. They readily entered steel traps set around fallen logs in the forest. One was taken in a tree.

Of the fifteen individuals taken, three were "bob-tailed", which proportion corresponds pretty well with figures reported by Enders[168] for the form *panamensis*. One steel-trapped specimen had evidently thrashed about until the skin at the base of the tail was completely ruptured. The flat-faced vertebrae then parted at the merest touch when the animal was picked up.

Nearly all were found to be badly infested about the neck, inner surfaces of the legs, groin, and ears, by those scourges of Panamanian field endeavor, redbugs. In some cases the massing of these small parasites was so extensive as to cause a distinct reddish appearance of the surface of the skin. They evidently caused these animals great annoyance as the areas were usually scarred and cut by scratching. I noticed that the redbugs apparently did not, or perhaps had not imbedded themselves in the skin, but were conducting operations from the surface. On ourselves they invariably "dug in". Perhaps, in a thin-skinned mammal like these octodonts, they are able to play the role of the larger but no less familiar ticks.

Mention is made above of a specimen (C.M.N.H. No. 1130) that, caught in a steel trap, had nearly accomplished the losing of its tail. The circumstances indicate that this animal, while trapped, had been attacked by some blood-sucking mammal, as it had a circular hole between the shoulder-blades through which it had bled profusely. Although alive when I found it, the animal was completely unconscious. If the attacker was a weasel, an animal we could find no evidence of in the vicinity, the spiny rat would certainly have been killed, but might have thrashed about considerably at first. I conclude that the guilty species was probably a vampire bat, individuals of which were fairly abundant in the region. The fact

[168]Bull. Mus. Comp. Zoöl., Vol. LXXVIII, No. 4, October, 1935, p. 458.

that the animal bled continuously after the attack further supports this conclusion. The rupture of the skin of the rat's tail must have occurred as soon as it was trapped, as the bat would have been unlikely to have attacked a violently agitated subject.

No evidence as to their breeding habits was obtained, as only two females were secured and neither was pregnant. The smaller of the two looked, however, as if she might have been nursing young some time rather near to the date of her capture, (February 14th). This is somewhat earlier than the nursing period reported by Enders[169] for the form *panamensis*.

Proechimys is occasionally eaten by the natives, and although we tried none ourselves, the flesh has been reported excellent.[170]

Spiny rats were taken up to an elevation of about 2200 feet on the mountains, but none was captured at the highest camp, (Cavulla, 3000 feet) where the vegetation showed many upper tropical characteristics.

The present race is closer to the animal of Chiriqui, described by Thomas as a distinct form,[171] than it is to typical *panamensis* from the Canal Zone.

Considerable variation is present in my series, but in only one are the colors light enough on the sides to warrant confusion with the northwestern (Chiriqui) form. It is quite likely that specimens from the region in which we collected are partly intermediate between *panamensis* and a uniformly larger and darker animal living in the rich, rainy woods south of the Mariato River, toward Cape Mariato.

In the specimens of *panamnesis* that I have seen, which have come from Chiriqui and the Canal Zone, the white of the under parts, if present at all on the inner and under surfaces of the fore-limbs, occurs as a narrow white line about an eighth of an inch wide or less. In all but one of the specimens of *goldmani* at hand, this white line is widened to completely cover the inner and under surface of the fore-limbs. This is the only very distinctive divergence in coloring from *panamensis*, by which a single specimen may usually be determined. However, in series, the Azuero race is noticeably duller

[169]Bull. Mus. Comp. Zoöl., Vol. LXXVIII, No. 4, October, 1935, p. 459.
[170]Allen, G. M., and Barbour, Bull. Mus. Comp. Zool., Vol. LXV, No. 8, 1923, p. 264.
[171]Ann. Mag. Nat. Hist., Series 7, Vol. 5, 1900, p. 220.

in the coloration of the sides than Chiriqui *panamensis* and has less ochraceous on the flanks and back. This race is further distinguished by certain cranial characters, namely the slenderer central portion of the rostrum, narrower interorbital width, and much more sharply recurved incisors. These characters are all much more noticeable when comparison is made between *goldmani* and typical *panamensis* from the Canal Zone.

It seems fitting that this form be named after Major E. A. Goldman whose "Mammals of Panama" remains the standard reference of Panamanian mammalogy.

Specimens Obtained.—Paracoté, 7; Mariato Rubber Camp, 6; Altos Cacao, 1; Cerro Viejo, 1.

Measurements:—

C. M. N. H. Number	Sex	Length	Tail	Hindfoot	Greatest Length of Skull (Occipitonasal)	Zygomatic Breadth	Mastoid Width	Interorbital Constriction	Length of Nasals	Maxillary Toothrow (crowns)
1251	♂	(229)		53	55.7	26.6	20.5	12.6	20.3	9.0
1184	♂	405	167	54	60.5	28.5		13.8	22.7	8.7
1191 Type	♂	395	155	52	56.8	28.1	22.3	12.6	21.1	8.8
1162	♂	375	150	51		27.6		13.1	21.1	9.0
1196	♂	385	158	54	58.4		21.5	12.8	22.0	9.1
1130	♂	353	150	51	53.5	25.7	20.6	12.5	19.6	8.5
1255	♂	(235)		53	57.1	27.0	21.2	12.8	21.8	8.6
1214	♂	410	170	54		29.0		13.8	22.8	9.1
1179	♂	(242)		56	61.7	28.6	22.4	13.7	22.7	9.1
1135	♂	353	144	51						
Average (Males)		382.3	156.3	53.9	57.7	27.6	21.4	13.1	21.6	8.9
1180	♀	352	142	51		27.0		12.3	19.2	8.8
1154	♀	310	131	46						

N. B. The numbers in parentheses refer to tail-less individuals.

Dasyprocta punctata pallidiventris ssp. nov. PALE-BELLIED AGOUTI.

Type Locality.—Paracoté (Plantation headquarters of the Boston-Panama Cocoanut Company), 1½ miles south of the mouth of the Angulo River, Mariato -Suay Lands, Veraguas Province, Panama. (Altitude: Sea level.)

Type.—Spec. No. 1226, young adult female, Cleveland Museum of Natural History; collected by Ignacio Alvarado, March 21, 1932. Field Number, B-A 105.

Geographic Distribution.—Known only from the type locality, and presumably confined to the southern tip of Veraguas.

General Characters.—A dark-rumped, narrow-skulled agouti with pale under parts and pale lemon yellow or straw-colored annulations on the hairs of the back, sides and shoulders.

Color.—Prevailing color of the upper parts dark brown, much darker on the rump than on the neck and shoulders, the hairs nearest warm-sepia[172] with straw-colored annulations or tips. The width of the light-colored bands on the individual hairs becomes steadily less from neck to rump, and the light color becomes invaded by the dark. Basal annulations are irregularly present on the rump-hairs, which are either very narrowly tipped with the palest straw or are sepia to the ends; sides brighter, the light tips and annulations nearly lemon-yellow and more extensive than on back and head; feet same color as rump; fore-legs and outer surfaces of hind-legs like sides; inner surfaces of hind-legs like rump.

Skull.—Much narrower in all proportions than that of *isthmica* or *dariensis;* rostrum not nearly so massive or deep as in these forms; premaxillae almost excluded from contact with the frontals, meeting them over an area of less than 2 mm.; lacrimal fronting widely on the antorbital foramen; nasals more sharply truncated posteriorly than in *isthmica;* angle of the mandible weak and dentition of lower jaw much smaller than in other forms from this region.

Measurements.—The type: Length, 507 mm; tail, 13; hindfoot, 119. Skull: Occipitonasal length, 103; zygomatic breadth, 44.9; inter-

[172]Ridgway, Color Standards and Color Nomenclature. 1912, Washington.

orbital constriction, 28.9; mastoid breadth, 30.8; least depth of rostrum, 22.1; width of rostrum (at least depth), 17; length of nasals, 37.7; maxillary toothrow (alveolar), 18.1; width of premaxillae at contact with frontals, 1.5 mm.

Remarks.—The lone individual at hand seems sufficiently different from other Panama agoutis to merit recognition as the type of a new race. One would expect the black-naped agouti (*D. punctata nuchalis* Goldman) to be the form found in the Mariato River district, but such is apparently not the case, as the color-scheme of *nuchalis* as reported by Goldman[173] is almost directly opposite to that of the present race. From *isthmica* the Mariato animal seems distinct enough in its dark rump and contrasting colors of the upper parts, while from *dariensis* it differs in numerous cranial details and paler sides and shoulders. From *Dasyprocta callida* Bangs from San Miguel Island *pallidiventris* is easily separable on the basis of the latter's dark rump, and yellowish back and sides, while from *coibae* it differs in a much narrower skull and lack of the conspicuous barring of the long hairs on the rump. While the narrowness of skull of the present form might conceivably be emphasized by the age of the specimen, the essential characteristics are so extreme that they are not shared by immature specimens of *isthmica* or by young adults of that race. I was able to see several other agoutis besides that one secured at fairly close range and all were noticeably dark-rumped and pale-shouldered.

Agoutis were common about Paracoté and were active at all hours, even at high noon on burning hot, sunny days. As they were quite regularly hunted by the natives they were very shy, and if seen at close range hesitated only for an instant before slipping into dense cover. As is so often the case, I had my best look at one when I was without a gun. While returning to the plantation one day from a trap-line, I stopped under a mango tree, cool as if air-conditioned, for a brief rest. While standing there I saw an agouti emerge from the thick brush beside the cart road about twenty feet away and sit down, rabbit-like, in the dust of one of the cart tracks. The animal looked at me very intently, lowering its head once or twice as if for a better look; it seemed to be thoroughly at home in the broiling noon-day sun and disappeared only when I moved incautiously.

[173]Proc. Biol. Soc. Washington., Vol. 30., 1917, pp. 113-116.

Where the agoutis make their burrows I was unable to discover with certainty, although the deep recesses among the roots of the giant creek-bottom figs were often thoroughly trampled by these animals. There are no ledges or rocky cliffs in the immediate vicinity of Paracoté. They may burrow in the thick brush that speedily overgrows abandoned cocoanut plantations.

We did not run across agoutis—"nequis" to the natives—in the mountains.

Coendou sp. PREHENSILE-TAILED PORCUPINE.

Spines found in the hide of a big king vulture (*Sarcorhamphus*) constitute the only direct evidence we found of porcupines. Two species are found in Panama, *Coendou rothschildi* and the somewhat rarer form *C. mexicanum laenatum*.[174] Mr. Davies said he had seen them on the peninsula in earlier years, but was of course unable to identify the species. King vultures are capable of extended flights and the presence of spines in their skins is in no sense proof that they were from the Azuero Peninsula; however, this was very likely the case.

Sylvilagus gabbi ssp. FOREST RABBIT.

Rabbits were common but wary at Paracoté, the only station at which we found evidence of them. Three or four customarily fed along the edge of the "port" and beach roads, and on one occasion I caught just a glimpse of one of these as it ducked into weedy cover. They left their tracks nightly in the dust, but occasionally were abroad during the day as well. One individual made a nuisance of himself along a mousetrap line I was running in a ditch. The fleeting impression I retain of the animal I saw is that in coloring it was somewhat more reddish than our Ohio cottontail, lacks white on the under surface of the tail, and has remarkably short ears. Their tracks were much smaller than those made by northern cottontails, if all I saw were made by adults.

Rabbits would have been very welcome accessions to our collection from the region, as the Mariato River is somewhat intermediate between the ranges of the subspecies *gabbi* and *consobrinus*.

[174]See Goldman, Smithsonian Misc. Coll., Vol. 69, No. 5, 1920, pp. 113-35; also Thomas, Nov' Zoöl., Vol. 10, April, 1903, pp. 39-42.

Dasypus novemcinctus ssp. NINE-BANDED ARMADILLO.

While we encountered no sign of armadillos during our stay in the district under consideration, Mr. Pinkney Davies assures me that they were occasionally seen in the region. The country would seem to be preeminently suited to their needs, and no barriers exist for them between the main cordillera and the Azuero Peninsula. From descriptions, only the nine-banded species appears to be known in the region. We could garner no evidence of *Cabassous*.

Tamanduas tetradactla chiriquensis Allen. CHIRIQUI THREE-TOED ANTEATER.

On the last day of our second stay at Paracoté I took one final walk along one of the trails that the natives had cut for our use—the one that passed through the mequinque palm bottoms northwest of the plantation. I followed this to its extremity, and while standing perfectly still in midtrail, noticed a rustling of leaves, as of an animal walking. A tamandua appeared shortly and when it got to within forty feet of me, I fired at it with the .410 barrel of my game-getter, using No. 5 shot. Subsequent examination revealed that not one shot had penetrated the hide. Instead, it knocked the animal down and frightened it into immediate flight which instead of being overland, was by way of a crinkly liana that stretched from the ground to the crown of the forest, about a hundred feet overhead. The animal went up the liana with the speed of a monkey—I had barely time to put my one remaining shell, a .22 long, into the .22 barrel, aim and fire. The anteater had reached the lowermost level of the forest crown. My shot broke the unfortunate creature's back and it fell to the ground, but without being further incapacitated. It immediately braced itself, and I was faced with a dilemma. I stepped on the animal to put it out of its misery, and forthwith learned another lesson from the big book of experience. The anteater seized one of my shoes with one paw, gave a squeeze and drove her huge talons clear through the heavy leather sole! By the purest accident the claws went between my toes and not into them.

The stomach of this specimen was nearly empty, but contained a few remains of termites.

These animals are apparently fairly numerous as the natives were thoroughly familiar with them, and evidence of their diggings were frequently noted, especially in the vicinity of the Mariato Rubber Camp.

Pecari angulatus crusniger (Bangs). Chiriqui Collared Peccary.

Collared peccaries are among the mammals more commonly seen at Paracoté. On one of my first visits to my trapline along the "port" road, I was attracted by a slight noise in the ditch behind me. Turning, I made out the forms of forty or fifty zahinos within a stone's throw, just standing or moving very quietly among each other, their fingers obscured by brush and broken patches of early morning sunlight filtering through the leafy crown overhead. They had not crossed the road, yet the nearest was only fifteen feet from me. If they had, my trapline would have fared badly. Although I was armed with a 30-30, a lot of peccary stories flashed to my mind and I didn't shoot. Local advice subsequently proved to be that although the herds near the plantation were much hunted and fearful of man, it was well not to kill one when you are practically in the middle of the flock. Familiarity apparently breeds contempt. One of this drove was subsequently collected at night.

At our Cerro Viejo station at 2200 feet, Mr. Aldrich entertained callars in the form of this species one afternoon while he was skinning birds. They came through camp, minding their own business, while he stuck strictly to his.

I have not compared the specimen we obtained to other peccaries and it may prove to be the Canal Zone *bangsi*. Its dark color and tawny shoulder stripes are, however, characteristic of *crusniger*. It was taken on March 28, 1932 at Paracoté, Mariato-Suay Lands, Veraguas.

Tayassu pecari spiradens Goldman. Costa Rican White-lipped Peccary.

This species is the "puerco del monte" of the Azuero natives, and is distinguished from the "puerco grande" or razorback hog and

the "zahino" or collared peccary. Like the other pigs, the white-lipped peccary has been much hunted and is said to be much afraid of man. Mr. Davies reported that in the wilder districts southwards towards Cerro Hoya and the Arenas River they are less accustomed to hunters and are dangerous. We found no certain traces of them in the course of our trip.

Sus scrofa ssp. RAZORBACK HOG.

Razorback hogs have been at large on the Azuero Peninsula for a long, long time, perhaps for several hundred years. The time when they were a disturbing new element has long since past and they are now part and parcel of the natural scheme of things, food supply of big cats and man, rooters-up of the mountain slopes. They are, according to Mr. Davies, locally abundant. I myself saw them but once, on March 14 at about 10 A. M., when with glasses I watched three crossing a grassy ridge between two points of ravine-bottom woods at an elevation of about 3100 feet near Cavulla.

Odocoileus chiriquensis Allen. PANAMA WHITE-TAILED DEER.

The Panama white-tailed deer is very abundant about the Mariato drainage, yet circumstances were such that the writer got only one long-range shot at one, which went wide of its mark. On certain mornings when I did not want to carry my gun in addition to heavy bags of traps, I would be sure to see three or four; while organized deer-hunts by me and our men were entirely unproductive. I somehow could not bring myself to collect the little spotted fawn that was part and parcel of the plantation's compound menagerie.

In the heaviest brush these deer would permit a close approach—occasionally to within a hundred feet before they would bound off stiff-legged and "barking" in a manner identical to their northern relatives. In fact, all their habits seemed to be entirely typical of the Virginia deer. The little fawn of our plantation door-yards browsed on most of the trees of the compound and like the big green iguanas, was very fond of hibiscus blossoms. I watched him take quick bites of *Mimosa* leaves, and he never took two bites in the same place as each fat thorn of these plants was inhabited by

a tiny agile wingless bee, incredibly authoritative for its size; besides, every surviving frond of leaves on any one branch "collapsed" after being shaken!

Deer were seen at all our camps and on several of the marches. On the high llanos about Cavulla they were excessively wary, and gauged to a nicety the distance necessary for safety between themselves and a man. Those on the ridge I happened to be on would vanish in front of me, while those 500 yards away, on the next ridge across a deep, wooded draw, would stay out in plain view watching me. On these llanos they repaired to the sunniest slopes in the early mornings, just as their lowland brethern took similarly to the open spots in the plantations. As in the low country, they were presistently hunted by natives, at all seasons.

These deer are said to be smaller on the average than the Virginia deer, but we saw some very impressive big stags with excellent heads. In a country teeming with every conceivable arthropod parasite, these heads should be reasonably safe from sportsmen for some time.

The deer had apparently begun to shed their horns by the middle of February, as no males with horns were seen after that date. One male with new velvet was observed on April 3, the new horns being only three or four inches long. Enders [175]reports that a captive animal at Barro Colorado first grew horns in April.

Odocoileus is the only deer of the region here considered, as *Mazama*, the brocket, is entirely unknown both to white and Indian hunters.

[175]Bull. Mus. Comp. Zoöl., Vol. LXXVIII, No. 4, October, 1935, p. 482.

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