

## SUMMARY

Blood respiratory properties have been compared in antarctic birds. Blood hemoglobin content, hematocrit, and mean corpuscular hemoglobin concentration (MCHC) are higher in three species of penguins than in the Giant Fulmar and the antarctic Skua. Penguin chicks show lower hemoglobin values than adults. HbO<sub>2</sub> dissociation curves show higher affinity in diving than nondiving birds. Among penguins, the Chinstrap Penguin, practicing longer and deeper dives, has blood with higher O<sub>2</sub> affinity than the other species. The Bohr effect is similarly higher in diving than nondiving birds. The adaptive value of the blood respiratory properties is discussed in the context of behavior and mode of life of the species studied.

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## OBSERVATIONS ON NEW OR UNUSUAL BIRDS FROM TRINIDAD, WEST INDIES, AND COMMENTS ON THE GENUS *PLEGADIS* IN VENEZUELA

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Since the days of Leotaud (1866) and later Chapman (1894), the avifauna of the island of Trinidad, West Indies, has received considerable study. Major faunal reports by Belcher and Smooker (1934, 1935, 1937) and by Junge and Mees (1958) were substantially updated by the work of Richard and Margaret ffrench (1966) who published an account of new distributional records, and whose continued residence on the island since 1958 has led to the accumulation of much new information (ffrench 1973a). Herklots (1961) published a popular guide to Trinidadian birds, which proved to be only moderately reliable, and it has been properly reviewed by Collins (1962). A variety of biological studies of the birds themselves have been implemented by Williams (1922), by ffrench (1967), and by several workers at the New York Zoological Society field station in the Arima Valley, particularly David and Barbara Snow (e.g., Snow and Snow 1964).

Much of the field work has involved primarily the forest birds of Trinidad, and by comparison, the marsh avifauna has received relatively little attention. Belcher and Smooker (1934, 1935, 1937) collected a

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considerable number of birds and eggs in marshes on the periphery of the Caroni Swamp. A. Rasool collected birds on Trinidad in 1950 and 1951, apparently spending considerable time in marsh habitats. His specimens are deposited in the Peabody Museum at Yale University. C. B. Worth (1963) studied bird populations in the Nariva Swamp in connection with research in ecology of viral diseases. ffrench (ffrench and Haverschmidt 1970) conducted a detailed study of the Scarlet Ibis (*Eudocimus ruber*) in the Caroni Swamp. In view of the incomplete information available on the marsh-dwelling birds, the accompanying records are offered.

In 1965 I spent several months in Trinidad, and during my field work I observed several species previously considered rare or unknown on Trinidad. This report clarifies the status of some of these species. Only sight records are included here since the collecting of specimens was not part of my project. Details of the observations are provided for those species where identification in the field may be difficult. I deal here only with the marsh-dwelling species encountered during my field work. Several groups of ornithology students have visited the marsh subsequently; Guy Tudor and Robert Ridgely have made available to me a considerable amount of observational data.

## STUDY AREA

From February to May 1965, I studied the avian ecology of a marsh along the Caroni River in northwestern St. George Co., Trinidad. The study area included a series of fresh and slightly brackish impoundments in the Laventille Swamp near Lapaille

Village, about 5 km from downtown Port-of-Spain. Within the marsh itself the dominant vegetation was *Cyperus articulatus*, although patches of other plants occurred. A variety of shrub and tree vegetation was along the river, including such natural species as a spiny palm (*Bactris* sp.) and the emergent arum (*Montrachardia arborescens*) as well as coconut palms (*Cocos nucifera*) and immoretelle trees (*Erythrina* sp.). The total area of the marsh covered about 2 km<sup>2</sup>, but my work involved only about one-third of this area. Human activity within the marsh included fishing, hunting, and the pasturing of cattle. During the first week of April a massive fish-kill occurred in the Caroni River, attributable to the discharge of waste material from a nearby rum factory.

My field work was done entirely in the dry season which usually extends from February to April. In 1965 the dry season was unusually severe and prolonged. The 20-year average rainfall at the station at Frederick Estate, Caroni (about 6 km E of the marsh), for February, March, April, and May totaled 30.56 cm (12.03 inches), while in 1965 the total for these months was only 12.90 cm (5.08 inches) (Weh-kind 1955; T. H. G. Aitken, unpubl. data). Belcher and Smoker (1934, 1935) noted that most marsh-dwelling birds in Trinidad breed after the onset of the rainy season (i.e., in June), while Snow and Snow (1964) found many species breeding during the spring months in forests and orchards (some species breed in all months). During my study very little activity suggestive of breeding was observed. R. Ridgely (pers. comm.) visited the marsh in July 1972 and found it to be inundated. If that is typical of other years, it may be that many species must leave the marsh to find a suitable breeding area (but see *Porzana flaviventer* below).

Among more than 125 species observed in the marsh, the records of the Glossy Ibis (*Plegadis falcinellus*), Yellow-breasted Crake (*Porzana flaviventer*), Ruff (*Philomachus pugnax*), and Common Yellowthroat (*Geothlypis trichas*) are particularly noteworthy.

#### ANNOTATED LIST

*Plegadis falcinellus*. Dark Ibis were first reported on Trinidad from the Caroni Swamp during the winter of 1964–65 (R. ffrench, pers. comm.). On 24 April 1965 ffrench and I observed 3 *Plegadis*-type ibis perched in low bushes in the study area, and we were able to approach to within about 25 m. I saw three ibis there again on 6 May 1965 and studied them through a 30× telescope from a distance of about 50 m. G. Tudor (pers. comm.) saw one ibis in the marsh on 8 April 1967, and identified it as *P. falcinellus* rather than *P. chihi*. E. Thompson (pers. comm.) recorded about 20 ibis, identified as *P. falcinellus*, roosting in the Caroni Swamp on 4 April 1966, and there are other recent records for the island.

Thus *Plegadis ibis* seem to have become regular on Trinidad, but there has been some question concerning the species-determination of the Trinidad birds. Knowing the difficulty in distinguishing Glossy from White-faced Ibis (*P. chihi*), ffrench and I studied the birds carefully. Two were in good breeding plumage and showed slatey unfeathered facial skin, with a paler whitish margin that did not quite reach the eye. All birds had dark, blackish eyes. White-faced Ibis have red eyes and red, bare facial areas bordered by white (J. Morony, Jr., pers. comm.; Palmer 1962).

At that date (1965) the Glossy Ibis was almost unknown in South America although it had increased its range dramatically in North America (Post 1962; Bull 1964), in the West Indies (J. Bond, pers. comm.) and had also been found recently in Central America (Slud 1964; Wetmore 1965). A single Colombian record existed for Glossy Ibis (Meyer de Schauensee 1948). On the other hand, the White-faced Ibis, a common species in southern South America, was recorded also from Colombia, albeit uncertainly (Meyer de Schauensee 1964) and from Venezuela (Phelps and Phelps 1958).

The Colombian record of *P. chihi* bears no locality, and the Venezuelan records also do not seem convincing. The first record of *Plegadis* from Venezuela was by Delacour (1923), who examined a fresh specimen and ascertained that the bird was a *Plegadis* rather than a young Scarlet Ibis. Delacour's account, given under the White-faced Ibis (then treated as *P. guarauna*), relates that it was "fairly abundant" on the Apuré River. It is clear that Delacour did not intend to distinguish between the two forms of *Plegadis*, and he adds (pers. comm.) that he was not concerned with that distinction and that many taxonomists have considered the two forms conspecific (e.g., Palmer 1962). The second Venezuelan record, a sight report of flying birds (Phelps and Phelps 1958), was attributed to *P. chihi* on the basis of the previous report. Thus there is no sound evidence that the White-faced Ibis has ever occurred in Venezuela, and Meyer de Schauensee (1970) agrees that records of *Plegadis* from both Venezuela and Colombia probably refer to *P. falcinellus*. On 13 May 1965 I observed a Glossy Ibis in breeding plumage on the llanos of Guarico, about 16 km N of San Fernando de Apure, and in May 1970, with Guy Tudor and Michel Kleinbaum, I saw many *Plegadis* between Calabozo and San Fernando. All birds in breeding plumage proved to be Glossy rather than White-faced Ibis. R. Ridgely (pers. comm.) mentions finding Glossy Ibis commonly along the Rio Apure, 23 July 1972. There is now a breeding record of Glossy Ibis for Venezuela (Paul Schwartz, pers. comm.), and still no verified account of the White-faced Ibis. In Colombia, Denham (1973) recently observed a Glossy Ibis at Salamanca National Park, and he mentions additional specimens from there. Judging by the paucity of accounts in the past, it seems likely that the Glossy Ibis has actually increased in numbers in northern South America.

The arrival of the Glossy Ibis on Trinidad appears to be part of the widespread explosion of this species in the Western Hemisphere. Such explosions have been documented for other vertebrate species including the White-tailed Kite (*Elanus leucurus*) (Eisenmann 1971), the Cattle Egret (*Bubulcus ibis*) (Phelps 1944; Lehmann 1959; Herklots 1961; Shanholtzer 1972), not to mention *Homo sapiens* (Ehrlich 1968).

*Porzana flaviventer*. R. and M. ffrench (1966) first reported the Yellow-breasted Crake from Trinidad, based on three spring observations in 1959 and later years. However, three specimens of this species were obtained by A. Rasool in 1950 and 1951, in the Caroni Swamp. These specimens include a bird in very worn plumage (sex undetermined, December), a male in "breeding" condition (February), and a male in fresh plumage (March), (specimen numbers 25838, 25836, and 25837, Yale-Peabody Museum). On March 1965 the ffrenchs, Linda Gochfeld, and

I were walking transects through the study area when we flushed two small crakes from the rushes. Judging from the small size and yellow legs, we suspected they might be this species. Similar birds were observed subsequently many times in April and May, with up to six seen in one morning. The buffy underparts, barred with black on the flanks, dark-streaked back, yellow legs, black crown, and small size, indicated that the birds were *P. flaviventer*. Examination of the three specimens at Yale showed that they fall well within the range of variation of the nominate race, and are distinguishable from the races *gossi*, *woodi*, and *hendersoni* with which I compared them.

As the dry season advanced, the birds were often observed foraging among the emergent plants, and the dark eyeline and pale buffy-white supercilary stripe were conspicuous. Olson (1970) considers this facial pattern quite distinctive among rails. I estimated 15–20 birds present in 10 ha of marsh. No calls attributable to this species were recognized, and the voice, like that of many rail species, remains to be studied. In April 1967, several crakes were seen in this study area (G. Tudor, pers. comm.). It is noteworthy that I did not find either the Ash-throated or the Grey-breasted Crakes (*P. albicollis*, *Laterallus exilis*) on the study area. Yellow-breasted Crakes were not identified at all by Belcher and Smoother (1935) during their extensive field work in the marshes although they did encounter most of the other rail species known from the island. It is possible that the birds were present and were merely overlooked for they do tend to be somewhat local in distribution (Wetmore 1965). Perhaps the extensive land-reclamation projects during the last two decades have created suitable habitat and allowed either recent colonization of the island or expansion of a formerly small population of crakes. At present, it appears that the species is resident on the island, and Rasool noted that one specimen was "breeding," a term which appears on many of his labels and presumably indicates enlarged gonads. On the study area *P. flaviventer* was one of the commonest species although outnumbered in winter by the Sora (*P. carolina*) (Gochfeld 1972). An analogous situation occurs in México where Dickerman and Warner (1961) obtained the first specimens of *P. flaviventer* for that country and also found it "the commonest rail in the marsh."

*Philomachus pugnax*. Although Bond (1962, 1971) reports the Ruff as a regular visitor to Barbados, only 4 or 5 of the 50 or more reports from that island were in the spring. There were no records from Trinidad (Herklots 1961). On 30 April 1965, Dr. Arthur Bergey found and pointed out to me a large shorebird in the marsh, which we identified as a Ruff. Many ornithologists have examined photographs which Bergey and I took separately and have confirmed the identification. The bird was a male molting into a dark-ruffed nuptial plumage. I observed it subsequently on each of four visits up to 6 May, during which time it associated mainly with Lesser Yellowlegs (*Tringa flavipes*). Undoubtedly the same bird was seen 1 km away by Dorothy E. Snyder (pers. comm.), on 12 May 1965, and her record was mentioned by Meyer de Schauensee (1966).

*Geothlypis trichas*. On 6 March 1965, by making a "shshshshing" noise, I attracted a male Common Yellowthroat out of a dense clump of spiny palms (*Bactris* sp.). Knowing that the species was previ-

ously unrecorded on Trinidad, I observed it carefully for about a minute before it disappeared in the foliage, and I was able to compare it shortly with several individuals of the resident Masked Yellowthroat (*G. aequinoctialis*), which is a common species in the marsh. The bird showed a black "mask" coming well above the bill and bordered superiorly by a whitish-gray margin. In the Masked Yellowthroat the black on the face is less extensive, forms a very narrow area above the bill, and has no pale margin. The crown of the bird was olive-brownish, concolor with the back, and there was no evidence of the gray crown of *G. aequinoctialis*. Moreover, the latter species is greener above than the Common Yellowthroat. Observations showed the bird to have the wren-like behavior typical of the Common Yellowthroat, while the Masked Yellowthroat always seemed to be a more robust species. The bird gave a "chuk" call-note, typical of *G. trichas* and distinct from the more metallic note of the resident species.

The Common Yellowthroat has not previously been reported from Trinidad, although there is a record from Tobago attributed to Kirk in 1883 (Belcher and Smoother 1937). However, French (1973b) notes that the origin of the Kirk specimen is open to doubt. In the Lesser Antilles it is casual in occurrence, and there were no records prior to 1960 (Bond 1961, 1971). In South America the species is known only from two Colombia records and a questionable report from western Venezuela (Meyer de Schauensee 1964; Phelps and Phelps 1963). Undoubtedly it is accidental on Trinidad, although it is possible that observers unfamiliar with the North American bird might overlook it because of its superficial similarity to the resident species.

In addition to these four species the following birds previously considered rare in Trinidad (e.g., by Herklots 1961), were observed in the marsh.

*Agamia agami*. The Agami or Chestnut-bellied Heron was seen once in the marsh by C. B. Worth, 20 August 1961.

*Ixobrychus exilis*. The Least Bittern was seen regularly in the marsh, particularly in the taller vegetation along the wettest ditches and along the Caroni River. It was outnumbered about 5:1 by *I. involucris*.

*Ixobrychus involucris*. The Stripe-backed Bittern was common in the marsh where 2–16 birds were flushed on each visit. Leotaud (1866) had two specimens which he considered immature, and he took considerable pains to distinguish between this species and *I. exilis*. It is not explicitly stated that the birds came from Trinidad and, unlike most of his species accounts, he does not indicate the status of *I. involucris* on the island. Belcher and Smoother (1934) considered the Stripe-backed Bittern very rare, but found at least three nests (July–September). In the study area this species was generally flushed from rushes (about 1 m tall). This species was distinguished in flight from the Least Bittern by its straw-colored back with conspicuous dark streaks, and the relative lack of contrast between back and wing. Least Bitterns appeared dark-backed, without streaks, and with marked contrast between back and the pale wing patch.

*Botaurus pinnatus*. Although Herklots (1961) considered Pinnated Bitterns rare, they are probably more common than the few records would indicate. Belcher and Smoother (1934) found at least three nests

(July-October). One bird, probably the same individual, was observed three times in the study area in March and April 1965, and on one afternoon a Trinidadian hunter stalked it unsuccessfully for over 2 hr.

*Oxyura dominica*. Although Belcher and Smooker (1934) considered the Masked Duck very rare, they reported two nests (September). Leotaud (1866) mentions it as fairly common, and Herklots (1961) observed it several times in water-lily-covered areas of the Caroni. Herklots mentions that land reclamation projects have favored the growth of Water Hyacinth (*Eichornia crassipes*) providing much new habitat for this species. In the study area M. Kleinbaum and I observed an adult female and one to three ducklings in April 1965. C. T. Collins (pers. comm.) found an adult with four young there on 21 January 1968. French (pers. comm.) has a breeding record from elsewhere on the island.

*Circus buffoni*. A single Long-winged Harrier, recognized by a missing primary, was seen regularly in spring 1965, and one bird was present in April 1967 (G. Tudor, pers. comm.).

*Porzana carolina*. The Sora is a very numerous winter resident in the marsh (Gochfeld 1972), but apparently rarely found or sought elsewhere on the island (French, pers. comm.). Belcher and Smooker (1935), who never collected this species, hypothesized the existence of a resident race, based on a nest with eggs. This was certainly erroneous, and the nest and eggs they describe must belong to some other species, perhaps even *P. flaviventer*.

*Pardirallus maculatus*. Leotaud (1866) did not list the Spotted Rail for Trinidad. Belcher and Smooker (1935:281) considered it an extremely rare resident and described a nest found in the Caroni marshes among dead rushes (June). A. Rasool obtained nine specimens in marshes and lagoons of the Caroni Swamp between 15 August 1950 and 1 May 1951. Four specimens taken August to October were described as "breeding," while a February specimen bears, on the label, the words "not breeding." A half-grown chick, still bearing traces of down, was taken 23 September 1950. These specimens are in the Peabody Museum at Yale University (numbers 25656 to 25663). In the study area it was fairly common, particularly in the dense grasses, although it was seen on the border of ponds as the water level in the marsh declined. The Yale specimens and two Trinidad specimens in the American Museum of Natural History fall within the range of variation of the nominate subspecies.

*Nyctibius griseus*. The Common Potoo, a strictly nocturnal species, is actually quite common on Trinidad where it attracted the attention of and comments by Leotaud (1866) and Chapman (1894, 1895), the latter finally ascertaining that the "poor-me-one" call came from this species and not from an opossum as the local people believed. Although often considered a forest bird, it is actually very common in the mangroves and marshlands of the Caroni Swamp area, where it was frequently heard at night. In the study area it was seen twice, on 6 May 1965 and 10 April 1967, perched on posts in the open marsh.

*Lurocalis semitorquatus*. Leotaud (1866) considered the Semi-collared Nighthawk as "not very common," but Herklots (1961) listed it as "very rare," mentioning two observations by G. D. Smooker, and

his own observation of a bird flushed from a nest. Herklots (1961) seems to have overlooked the fact that Taylor (1864) obtained this species on Trinidad, and that Chapman (1895) collected two birds at Caparo, Trinidad. Thus most authors on Trinidad birds seem to have encountered the species at least once. I observed it several times during 3 months on Trinidad, usually over marshes. It was seen once in the study area in 1965 and again by Tudor and others on 10 April 1967. C. T. Collins (pers. comm.) found it regularly in the Arima Valley after 1964, but not before that time. Leotaud (1866) and Chapman (1895) have adequately described its crepuscular habits and foraging behavior. It seems rather bat-like in flight, as it flies erratically low over the ground. Its short tail is a conspicuous mark, allowing it to be separated from other Caprimulgids of Trinidad.

The Semi-collared Nighthawk has been present on Trinidad since the earliest records, but there is some indication that its numbers may be increasing. In Costa Rica, where the species was formerly not known (Slud 1964), I encountered it at Puerto Viejo and Finca La Selva in the lowlands near the Rio Sarapiquí, and there are other recent records from the country (L. Kiff and F. G. Stiles). It is possible that earlier collectors overlooked the species. However, to the extent that *Lurocalis* benefits from clearing, it may be extending its range with the clearing of forests. On the other hand, in Trinidad, Collins (pers. comm.) suggests that it is increasing in forested areas as well as in marshes.

#### SUMMARY

Among the more than 125 species observed in the Laventille Marsh, 5 km SE of Port-of-Spain, Trinidad, the records of Glossy Ibis, Yellow-breasted Crane, Ruff, and Common Yellowthroat are noteworthy. The latter two represent the first record of these species for Trinidad. The occurrence and status of other species, formerly considered rare, are discussed.

C. Brooke Worth first showed me the Laventille Marsh and answered numerous questions about Trinidad and its birds. Richard and Margaret French aided me immensely in several aspects of my work in Trinidad, providing information and accompanying me in the field. Dean Amadon, C. T. Collins, and Richard French criticized the manuscript. Robert Gochfeld, Michel Kleinbaum, and Robert W. Dickerman accompanied me on visits to the marsh. I thank C. B. Worth, C. T. Collins, Robert Ridgely, Dorothy E. Snyder, Edward Thompson, and Guy Tudor for providing me with specific observational data. John Morony, Jr., discussed with me the biology and identification of *Plegadis* species. B. Kalloo of the University of the West Indies Herbarium identified plant material. Charles G. Sibley kindly allowed me to examine the Rasool collection in the Peabody Museum of Natural History at Yale University. I thank the Albert Einstein College of Medicine and the Trinidad Regional Virus Laboratory of the Rockefeller Foundation for the opportunity to work in Trinidad.

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## FOOD HABITS AND BREEDING RANGE OF HERRING GULLS IN THE CANADIAN PRAIRIE PROVINCES

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There appears to be little information on the food habits of Herring Gulls (*Larus argentatus*) in the inland environment of North America. Herring Gulls

breeding along the Atlantic coast of North America subsist mainly on fish (Mendall 1935; Pimlott 1952). To learn more about their diet in the inland environment, food pellets regurgitated by Herring Gulls were collected at Kawinaw Lake (52°50' N; 99°29' W), Manitoba, during the egg-laying season in May and June 1971. Kawinaw Lake was chosen for this food study because of its large breeding colony (161 nests on two small islands) and its accessibility to the observer.

Although the A.O.U. Check-list (1957) and Godfrey (1966) indicate the breeding range of Herring Gulls in the Canadian prairie provinces of Alberta,