

FRIGATE BIRDS, TROPIC BIRDS, PELICANS, GANNETS, DARTERS, CORMORANTS

Order STEGANOPODES ¹

Vol. I., p. 54.

THIS somewhat heterogeneous assemblage of birds can at once be recognized by one common character—namely, that all the toes, including the hind one, are united to each other by a web.

The species occurring in the peninsular area are therein uncommon and are not likely to be met with by the ordinary observer.

The following key to the families is largely borrowed from the late Mr Ogilvie-Grant's catalogue :

KEY TO THE FAMILIES OF STEGANOPODES

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|---|---|--|--|
| 1 | { | Tail very strongly forked ; wings very long ; webs between toes strongly incised | <i>Fregatidæ</i> (frigate birds), p. 230 |
| | { | Tail rounded or wedge-shaped ; wing not remarkably long ; web between toes not incised | 2 |
| | { | Middle tail feathers greatly lengthened and very narrow | <i>Phaëthontidæ</i> (tropic birds), p. 235 |
| 2 | { | Middle tail feathers not greatly lengthened, not narrow | 3 |
| | { | Bill greatly flattened ; nostrils visible | <i>Pelecanidæ</i> (pelicans), p. 237 |
| | { | Bill rounded above, nostrils not visible | <i>Sulidæ</i> (gannets), p. 240 |
| 3 | { | Bill compressed and pointed ; edges of mandibles serrated | <i>Anhingidæ</i> (snake birds), p. 243 |
| | { | Bill rounded, strongly hooked ; edges of mandibles not serrated | <i>Phalacrocoracidæ</i> (cormorants), p. 244 |

¹ *Pelicaniformes* of Sharpe, *Handlist of Birds*, i., 1899, p. 232.

Family FREGATIDÆ

Frigate Birds

Vol. I., p. 55.

THE frigates, like the tropic birds, are an oceanic family distributed over the warmer seas of the world.

The characters by which the family can be recognized are the long and sub-cylindrical bill, strongly hooked in both mandibles ; nostrils visible, situated in a groove. Tail of twelve feathers, long and deeply forked. Wing, very long. Tarsus, short and feathered ; toes with strong claws, the middle one with a comb-like inner margin, the web connecting the toes deeply incised. A naked pouch on the throat, generally brightly coloured.

In the first volume of this work Robinson wrote : " Owing to their wandering habits there is much uncertainty as to how many species of frigate birds really exist, but two main sections have been defined, both of which are represented in the seas adjacent to the Malay Peninsula."

Our knowledge of these birds is now more precise and a key for the identification of the local species is given below.

Frigate birds are powerful fliers and can probably remain on the wing as long as, or longer than, any known bird, being equalled in this respect only by the albatross. They are partially raptorial in their habits, and on the Aroa Islands, which are flat-topped, Robinson has, on more than one occasion, on a calm evening, watched the gannets making directly for their roosting rocks, some miles distant, only to be laid in wait for by the pirate frigate birds, and forced to disgorge the fish they had captured. Near Tioman, on the other hand, we have seen the frigate birds fishing for their own living, perhaps because there were no stupid gannets to prey on, while the smaller terns were capable of looking after themselves.

The Malay name for frigate birds is *timbang* ; they are often confused with the cormorant and called *dendang laut* (sea-crows), but few Peninsular Malays know either bird.

Frigate birds are not uncommon off both coasts of the Peninsula. They have been seen near Junk Zeylon, the Langkawi Islands, off the Selangor coast, and Robinson met with immense flocks at the Aroa Islands, in the Straits of Malacca. They are not often seen in the southern half of the Straits of Malacca except during the prevalence of strong winds. On the eastern side of the Peninsula they have been recorded off the coasts of Senggora and Trengganu ; in the Tioman Archipelago they seem to be not uncommon. Unfortunately, there is still much uncertainty about the specific identity of Malayan birds, and this is due to two causes. Firstly, frigate birds rarely approach the mainland and are therefore difficult to obtain ; and secondly, prior to the researches of Mr Gregory Mathews, published in 1915, it was a common view that only two species existed, a larger form, *Fregata aquila*, and a smaller bird, *F. ariel*. In literature visual records were therefore referred to one or other of these two species, but as it has been shown that the *F. aquila* of the older authors actually

consists of several distinct species, such records are not of great value. There is a specimen of the true *Fregata aquila* in the British Museum labelled "Malacca," but we believe that a mistake in labelling has occurred and discredit the record.

KEY TO THE SPECIES OF FRIGATE BIRDS (ADULTS) OCCURRING IN
MALAYAN SEAS

1	{	A white band across the hind neck ¹ .	2
		No white band across the hind neck	3
2	{	Centre of abdomen black	<i>Fregata a. ariel</i> (female), p. 233
		Centre of abdomen white	<i>Fregata andrewsi</i> (female), p. 231
3	{	Breast white	<i>Fregata m. minor</i> (female), p. 234
		Breast black	4
		Under parts entirely black	<i>Fregata m. minor</i> (male), p. 234
		Breast black ; abdomen white	<i>Fregata andrewsi</i> (male), p. 231
4	{	Under parts black with a white patch on each side of the abdomen	<i>Fregata a. ariel</i> (male), p. 233

Fregata andrewsi

The Christmas Island Frigate Bird

PLATE 24

Fregata aquila (part), O.-Grant, *Cat. Birds Brit. Mus.*, xxvi., 1898, p. 443 ; Oates, *Cat. Birds' Eggs, Brit. Mus.*, ii., 1902, p. 213.

Fregata andrewsi, Mathews, *Austral. Avian Record*, ii., 1914, p. 110 (Christmas Island, Indian Ocean) ; Stuart Baker, *Faun. Brit. Ind., Birds* (2nd ed.), vi., 1929, p. 295.

Malay Name.—Simbang.

Description.—*Adult male.*—Head, neck and under parts, black, except for a large white patch almost covering the abdomen. Wing coverts, except the greater series, ashy brown, with paler edges and darker shaft stripes ; remainder of upper parts, black, the head and the long lanceolate feathers on the mantle and back glossed with dark oily green with bronze reflections.

Adult female.—Head, foreneck, upper parts except median and lesser wing coverts, which are brown, sides of abdomen, vent and under tail coverts, blackish, glossed with blue-green on the upper parts, but much less so than in the male. Breast and abdomen, white, which colour is carried round the neck as a broad nuchal collar which, however, disappears with age.

Immature.—Head and foreneck, pale rusty buff ; upper parts, mostly brown, the feathers with broad whitish buff edges.

Soft Parts.—*Male.*—Irides, dark brown ; lids, orbital skin and bill, black ; gular pouch, vermilion ; tarsus and soles, fleshy ; toes and webs, blackish brown ; inside mouth, salmon-pink.

¹ Except in very old females of *F. andrewsi*.

Female.—Bill and pouch, pale rose-pink ; feet, pinkish flesh.

Dimensions.—*Male*.—Total length, 36.25 in. ; tail, 16 in. ; wing, 23.75 in. ; bill from gape about 5 in.

Female.—Total length, 39 to 40 in. ; tail, 16.5 in. ; wing, 25.25 to 26 in. ; tarsus, 1 in. ; bill from gape, 6 to 6.25 in.

Range in the Malay Peninsula.—No specimen has ever been obtained near the coasts of the Peninsula, but Chasen has seen this unmistakable species at sea less than forty miles east of Singapore Island and has collected a series in the Anamba Islands about two hundred miles from the Pahang coast.

Extralimital Range.—The only definitely known breeding-place of this bird is Christmas Island in the Indian Ocean. It has been recorded from the Cocos-Keeling Islands and the larger species of frigate reported as breeding in those islands is therefore almost certainly really *F. andrewsi*, but this is not fully established. From its breeding-grounds it strays to the coasts of Java, but there is as yet no record from Sumatra or the Straits of Malacca. It is true that *F. andrewsi* has also been recorded from the west coast of Siam, but the record seems not to be based on any actual specimen, and old records of "*aquila*" from this region may refer to another species, *Fregata minor*. Across the Indian Ocean it strays to Ceylon and the Malabar coast. It wanders to the Anamba Islands in the South China Sea and the coast of Borneo.

Nidification.—According to Andrews, on Christmas Island it nests near the sea, whereas the smaller species (*F. minor*) builds on the higher part of the island, further inland. In a generalized account, apparently including both species, the nest is described as a mere handful of twigs placed on the fork of a small branch. Mr Stuart Baker describes the nest as roughly made of sticks and weeds, and placed actually on the ground, or within a few inches of it, in the scrubby growth on the shores above high-water mark. One or two white eggs are laid, measuring about 2.6 to 2.85 by 1.7 to 1.8 in. Andrews gives the "pairing season" as January to April ; eggs in February and April ; still many young birds in white down in August, and young all flying by October.

Habits.—In the Anamba Islands this frigate bird is common, but its hunting-grounds seem yet farther afield, for it is only at dusk that it becomes really conspicuous, although during the day small parties may be seen fishing in the sheltered water between the islands where the flying-fish forms part of the food. Sometimes in the late afternoon huge flocks of this species mixed with smaller numbers of *Fregata ariel* may be seen wheeling about, high in the air above the island of Siantan. This is a preliminary to the nightly flight to a neighbouring islet, where on bare trees many thousands of frigate birds congregate nightly. The Malays of the Anamba Islands call all frigate birds "*timbang*," and always associate their presence with a fish known to them as "*sémpak*" or "*tongkol*." The movements of the shoals of this fine fish (*Thynnus*) can be detected from a fair distance as they harass the smaller "*tamban*" (small *Clupeidæ*) and these latter, according to the Malays, form the chief food of the frigates.

The birds figured are a pair from the Anamba Islands in the South China Sea, collected by F. N. Chasen on 11th September 1925, and an immature bird from Christmas Island in the Indian Ocean, 19th November 1923.

*Fregata ariel ariel***The Lesser Frigate Bird**

Atagen ariel, Gray, *List Gen. Birds*, iii., 1845, p. 669 (Queensland).

Fregata ariel, O.-Grant, *Cat. Birds, Brit. Mus.*, xxvi., 1898, p. 447 (part); Blanford, *Faun. Brit. Ind., Birds*, iv., 1898, p. 338 (part); Robinson and Kloss, *Journ. Nat. Hist. Soc. Siam*, v., 1921, p. 84.

Fregata ariel iredalei, Stuart Baker, *Faun. Brit. Ind., Birds* (2nd ed.), vi., 1929, p. 298.

Malay Name.—Simbang.

Description.—*Adult male.*—General colour of plumage, black, but a large white patch on each side of the abdomen. On the upper parts, the feathers on the head and neck lengthened and pointed and glossed with dark green. On the mantle lanceolate plumes are glossed green, blue or purple. The wings glossed with bronzy green.

Adult female.—Head, neck, upper parts, abdomen and under tail coverts, black, without lengthened lanceolate feathers and with much less gloss than in the male. Breast, white, which colour is continued round the hind neck as a distinct collar. Median wing coverts, brown with paler edges and darker shaft stripes.

Immature.—Head and neck, bright rusty brown, later becoming almost white before the adult plumage is assumed.

Soft Parts.—*Male.*—Irides, brown; lids and orbital skin, black; bill, whitish horn, very faintly washed with rose-pink; interramal skin, vermilion; gular pouch, fleshy spotted with vermilion; tarsi, whitish flesh becoming black-brown on the toes. Inside mouth, red.

Female.—Irides, brown; lids and orbital skin, deep rose-pink; bill varies from pale bluish slate to whitish rose-pink; gular pouch, dull brownish red; feet, pale orange; inside mouth, fleshy or salmon-pink.

Dimensions.—Total length, 30 to 33.5 in.; tail, 14 to 15 in.; wing, 21 to 22 in.; tarsus, 0.75 in.; bill from gape, 4.1 to 4.5 in. Females average larger than males.

Range in the Malay Peninsula.—Found off both coasts of the Peninsula, but there are few formal records. Sometimes common at the eastern entrance of the Singapore Straits. The Tioman Archipelago.

Extralimital Range.—The Western Pacific, chiefly the north Australian seas; the eastern part of the Indian Ocean. It has been recorded from the coasts of Java and Borneo and a frigate bird, probably this species, is also found far inland on Korinchi Lake in West Sumatra. A form of the species, presumably the present race, breeds in the Cocos-Keeling Islands, south-west of the Sunda Straits.

Nidification.—According to Dr F. Wood-Jones the race breeding on Keeling Island makes a nest of twigs, stolen from the nesting gannets, and placed on the flat tops of *Pemphis* bushes. The nests are crowded together in

thousands, two species of frigates nesting freely together. One pure white egg is laid.

Habits.—Although frigate birds rarely approach the port of Singapore they are common a few miles out to sea, and the present species is often numerous at the Horsburgh Lighthouse, thirty-three miles east of Singapore, at the entrance to the South China Sea. This species seems to be the frigate bird found most commonly along the coasts of the Malay Peninsula.

Fregata minor minor

The Frigate Bird

Pelecanus minor, Gmelin, *Syst. Nat.*, i., 1789, p. 572 (Christmas Island).

Fregata aquila, O.-Grant, *Cat. Birds, Brit. Mus.*, xxvi., 1898, p. 442 (part); Blanford, *Faun. Brit. Ind., Birds*, iv., 1898, p. 338.

Malay Name.—Simbang.

Description.—*Adult male.*—The whole plumage, except the median wing coverts and innermost secondaries which are dark brown, black. Elongated, lanceolate feathers on the upper parts, highly glossed with dark green, with bronze and bluish reflections in certain lights.

Adult female.—Throat and foreneck, ashy, remainder of head and neck, the abdomen and under tail coverts, black; breast, white. Median wing coverts and mantle, brown; remainder of upper parts, darker, brownish black or faintly metallic black.

Immature.—Head and neck, white; a rusty patch on the upper breast; under parts coloured according to sex and age.

Soft Parts.—Iris, brown; eyelids, red; bill, grey to brown in males, steel-blue in females; feet, dark brown in males, pink in females. Gular pouch of male red.

Dimensions.—Total length, 33.75 to 36.5 in.; tail, 15 to 17 in.; wing, 22 to 23.25 in.; tarsus, 0.6 in.; bill from gape, 4.5 to 5 in. Females run larger than males.

Range in the Malay Peninsula.—A number of records such as Davison's visual records of "*minor*" from the Malayan area as limited in this book are now impossible to allocate to species and no local specimen has been examined, but the species is so likely to occur along, at least, the east coast of the Peninsula that we have included it here.

Extralimital Range.—From Christmas Island in the Indian Ocean, south of the Sunda Straits, it ranges to the west across the eastern part of the Indian Ocean to the Chagos Islands. Eastwards it is found at least as far as the Banda Sea; to the north it is found in the Sulu Sea and along the coast of China. Other closely allied subspecies are found in the West Indies, the South Atlantic Ocean, the West Indian Ocean, Australia and the South Pacific.

Nidification.—Little that is specific has been recorded of this subspecies from its breeding-grounds on Christmas Island in the Indian Ocean beyond that it builds on the higher parts of the island, farther inland than *Fregata*

andrewsi. Of the very closely allied subspecies, Mr G. Mathews records that the rather bulky nest of sticks is placed in trees, or on the ground, and also that one white egg, covered with creamy lime, is laid. The egg is, of course, smaller than that of *Fregata andrewsi*, but series are not available for measuring.

Habits.—"Perhaps the most interesting of the birds of Christmas Island are the frigate birds, two species of which occur. Numbers of these birds could nearly always be seen sailing and circling in the air at all heights; in calm weather they often soar till scarcely visible. The flight is wonderfully graceful, and it is a pleasure to watch a group moving along the coast in a succession of sweeping circles, rising against the wind, or descending with it. In flight the head is carried close to the body, so that the bird seems to have no neck, and the tip of the beak is about on a level with the anterior angle of the outstretched wings. The feathers are often cleaned during flight, and occasionally the bird shakes itself like a dog that has just left the water, dropping through the air meanwhile. The young birds seem to be able to fly perfectly well as soon as they leave the nest, and groups of them could often be seen near the coast stooping to the water, one after the other, to pick up leaves and other floating objects, and then dropping them, apparently practising the method by which their parents obtain their food, which consists of surface fish and cephalopods" (*Andrews*).

Family PHAËTHONIDÆ

Tropic Birds

Vol. I., p. 55.

THE tropic birds, of even more oceanic habits than the frigate birds, are found in the warmer seas of the whole world. They have the general appearance of a large heavily built tern, from which they can be distinguished by the character of the webbing of the toes, by the compressed bill, with the mandibles slightly serrated at the tips, and by the tail, which is composed of twelve to sixteen feathers, with the central tail feathers narrow and elongate, very much so in some species. There is only one genus, with six or seven species. The general colour is white, but some species are a delicate apricot-colour in life; this colour is very fugacious after death. One species has the elongate central tail feathers partially scarlet.

Only one species has occurred in Malayan Seas, where, however, it is extremely rare. Outside our area two species, *Phaëthon rubricauda* and *P. lepturus fulvus*, are found breeding on Christmas Island, south of Java.

Phaëthon æthereus indicus

The Short-tailed Tropic Bird

Phaëthon indicus, Hume, *Stray Feathers*, iv., 1876, p. 481 (Mekran coast); O.-Grant, *Cat. Birds, Brit. Mus.*, xxvi., 1898, p. 459; Blandford, *Faun. Brit. Ind.*, *Birds*, iv., 1898, p. 349; Robinson and Kloss, *Journ. Nat. Hist. Soc.*

Siam, v., 1921, p. 84; Stuart Baker, *Faun. Brit. Ind., Birds* (2nd ed.), vi., 1929, p. 291.

Malay Name.—Not recorded.

Description.—*Adult.*—"White, with a satiny gloss, barred with black on the hind neck, back, scapulars, rump, and upper tail coverts, the bars more or less crescentic; a single broadly crescentic black patch in front of the eye extending to the gape, and a black streak, more or less broken, running back from each eye to the nape and forming a band round the crown; outer webs, shafts and portions of inner webs near shafts of first five primaries, black, except the narrow extreme white tips of the feathers; tertiaries, primary coverts, greater tertiary coverts, and long flank feathers black with white borders; shafts of rectrices black except at the ends."

Soft Parts.—Bill, dull orange-red, inner margins of both mandibles, dusky; irides, blackish brown; legs, hind toe and base of other toes and of their webs, yellowish white; rest of feet, black.

Dimensions.—Length (including long tail feathers), about 21 in.; tail, 7.5 to 12 in.; tail without median rectrices, 4 in.; wing, 11.5 in.; tarsus, 1 in.; bill from gape, 3.25 in.

All the information given above is extracted from Blanford; we have never examined a local specimen of this bird.

Range in the Malay Peninsula.—Only known from a point at sea off the southernmost point of Tenasserim and from the Straits of Malacca, probably in the vicinity of Penang.

Extralimital Range.—From the Red Sea and Persian Gulf, across the northern parts of the Indian Ocean to the northern entrance of the Straits of Malacca.

Nidification.—Breeds on islands in the Persian Gulf in March and April, and also recently recorded by Messrs Delacour and Jabouille as nesting in large numbers on the Paracel Islands off the coast of Annam. No nest is made, but the single egg is laid on the bare rock in a fissure, or other sheltered position. The few eggs in collections are said to be very variable in colour, white marked with reddish brown, most prominently at the larger end. The first really authentic egg of this species was taken by Mr La Personne in April 1921, on Nabi-u-Tanb Island, in the Persian Gulf: according to Dr C. B. Ticehurst, this egg measures 2.3 by 1.7 in.

Habits.—Davison met with this tropic bird off the southern point of Tenasserim, which is within our limits, but we cannot find any actual specimen in the Hume collection in the British Museum. A single specimen obtained by Dr Cantor in the Straits of Malacca, probably in the vicinity of Penang, is in the British Museum. The species can only be regarded as extremely rare, or of accidental occurrence, in Malayan waters. Like other species of the genus, this tropic bird, known to sailors as the "bosun-bird," is normally oceanic in habits, rarely approaching large land masses. It is a strong flier, spending much time on the wing, but it is also well known to follow ships and occasionally to rest on the mast-heads. The food, consisting of fish and other forms of marine animal life, is mostly obtained from the surface of the sea.

The family should probably be regarded as consisting only of a single genus comprising about a dozen species spread over the whole of the temperate and tropical seas of the world and represented in the British seas by the Solan goose.

Pulau Perak, an isolated and barren rock, some seventy miles from Penang, on the direct course to Ceylon, is commended to the notice of ornithologists interested in birds of this family and other sea-birds.

The proper Malay name for the booby is *olak olak*; it is, however, much more frequently known as *itek laut* (sea-duck).

Sula leucogaster plotus

The Booby or Brown Gannet

Pelecanus plotus, Forster, *Descr. Anim.* (ed. Licht.), 1844, p. 278 (near New Caledonia).

Sula sula, O.-Grant, *Cat. Birds, Brit. Mus.*, xxvi., 1898, p. 436 (part); Oates, *Cat. Birds' Eggs, Brit. Mus.*, ii., 1902, p. 212; Robinson and Kloss, *Journ. Nat. Hist. Soc. Siam*, v., 1921, p. 85.

Sula leucogaster, Blanford, *Faun. Brit. Ind., Birds*, iv., 1929, p. 346.

Sula leucogaster plotus, Stuart Baker, *Faun. Brit. Ind., Birds* (2nd ed.), vi., 1929, p. 285.

Malay Names.—Olak olak; itek laut.

Description.—*Adult.*—Head, neck, upper breast and entire upper parts, including the wings and tail, deep sooty brown. Remainder of under parts and axillaries, white, the two zones of colour meeting in a sharp line across the breast. Under surface of wing, dark brown, with a white patch of varying size in the middle.

Immature.—Differs greatly from the adult. Entirely pale brown, the feathers of the upper parts with narrow, slightly paler fringes. Lower breast and abdomen washed with grey, the feathers with indistinct buffy white edges, the line of demarcation between these paler under parts and the darker upper breast being fairly well defined, but not so decisively as in the adult.

Soft Parts.—Iris, grey; bill, light greenish blue, paler at the tip; gular pouch and orbital skin, dull blue; feet, green to bluish green.

Dimensions.—Total length, 30 to 32.5 in.; tail, 9 in.; wing, about 15 to 16 in.; tarsus, 1.75 to 2 in.; bill from gape, 4.75 to 5 in.

Range in the Malay Peninsula.—The whole length of the Straits of Malacca, south to Singapore, but rarely approaching land. Specimens from Langkawi, the coast of Perak, Pulau Jarak, the Aroa Islands and the One Fathom Bank Lighthouse. Also found on the north-east coast, but southern limit on this side of the Peninsula not known.

Extralimital Range.—The booby is found almost throughout the sub-tropical and tropical seas and coasts of the world, breeding on isolated islands. The subspecies are ill-defined and their ranges have yet to be worked out in detail. The typical form is found in the Atlantic, and *plotus*, to which we have

referred Malayan birds, may be regarded as the Indian and Pacific Oceans' race.

Nidification.—On Christmas Island, in the Indian Ocean, the nest of sticks is placed on the ground, usually near the edge of the sea-cliff, but sometimes on the high inland cliffs at some distance from the sea (*Andrews*). One or two chalky white eggs are laid which, according to Oates, measure from 2.3 to 2.6 in. in length and 1.55 to 1.75 in. in breadth. When first hatched the young birds are almost naked and bluish in colour, but they soon become covered with white down.

Habits.—This gannet is common in the Straits of Malacca, but does not approach the shores very closely except in stormy weather, and is therefore not a familiar bird to the ordinary resident. There is a breeding colony on a small rocky island in the Aroa group in mid-channel between the coasts of Selangor and Sumatra. When Robinson visited the Aroa Islands he found numbers roosting on a small rock known as Pulau Tokong, rising vertically from the sea to a height of forty or fifty feet; the entire colony, consisting of some hundreds, appeared to be adult birds. Davison reported the species as numerous the whole way up the western coast of the Peninsula, from Singapore to the Mergui Archipelago, but we have never seen a specimen anywhere near Singapore Island. On the east side of the Peninsula it does not seem so common except in the far north, where there is a breeding-place on a small island off the coast of Nakon Sri Tammarat.

The food consists almost entirely of fish, which the bird catches by plunging into the sea from the wing, or by diving from the surface of the water.

Note.—Until a comprehensive review of this species is published we can only refer Malayan birds to *Sula leucogaster plotus*, but this must only be regarded as a tentative measure, for we are inclined to think that, ultimately, two forms of the species will be recognized for Malaysia. Some birds from the Straits of Malacca have noticeably less robust bills than those breeding on Christmas Island, in the Indian Ocean.

In dealing with sea-birds whose breeding-places are many isolated colonies, their exact classification seems to be complicated by the existence of local "strains" within the more easily recognizable broad subspecific divisions of the species.

The red-legged gannet, *Sula sula rubripes* Gould, although unrecorded from Malayan waters is likely to occur, especially on the east coast, as there are breeding colonies on Christmas Island, in the Indian Ocean; the Paracel Islands off the coast of Annam; and also in the Sulu Sea between North Borneo and the Philippine Islands. When adult this species is white with the greater wing coverts and quills blackish; the feet are bright red. Young birds are brownish grey. A peculiar frosted grey appearance of the wing quills is characteristic of the bird at all ages.

Family ANHINGIDÆ

Snake Birds or Darters

Vol. I., p. 57.

THE snake birds or darters, as explained in the key, differ from the cormorants in having the bill very slender, compressed and pointed, not hooked, with the edges of the mandibles finely serrated. The neck is very long, slender and curved.

The family, which comprises five species of fresh-water divers, is spread over the whole of the warmer parts of the world, including New Zealand, but not Oceania.

Only one species is found in the Malay Peninsula.

Anhinga rufa melanogaster

The Indian Darter or Snake Bird

PLATE 25

Anhinga melanogaster, Pennant, *Ind. Zool.*, 1769, p. 13 (India).

Plotus melanogaster, O.-Grant, *Cat. Birds, Brit. Mus.*, xxvi., 1898, p. 414; Blanford, *Faun. Brit. Ind., Birds*, iv., 1898, p. 338; Oates, *Cat. Birds' Eggs, Brit. Mus.*, ii., 1902, p. 207.

Malay Name.—Unrecorded.

Description.—*Adult male.*—Head and neck, brown, darkest on crown and middle of hind neck, palest on the foreneck and whitish on the throat and upper foreneck; a narrow white line several inches long on each side of the head and upper neck. Under parts, including under wing coverts and axillaries, black, with a gloss and a faint green cast. Mantle, back, rump and upper tail coverts, deep seal-brown, the feathers of the mantle very small and with very pale brown edges, thus producing a scaly appearance. Wings and scapulars, black, the wing coverts, scapulars (except the concealed long feathers) and innermost secondaries with broad silvery-white streaks. Tail, black, the visible feathers peculiarly and transversely ribbed.

Female.—The sexes are much alike, but females have the neck and mantle conspicuously paler than in males; those in the Raffles Museum collection also have the lateral regions of the mantle spotted with white. A pale whitish-buff band borders the black under parts on the breast and lower foreneck; there is only a faint indication of this band in the male.

Soft Parts.—Iris and lids, yellow; bill, pale yellow, the culmen and tip dusky brown; feet, fleshy, tinged with greenish yellow or grey and washed with brown on the toes and the back of the tarsi (specimens from Borneo). It is noteworthy that most authors, basing their descriptions on Indian birds, record the colour of the legs as *black*.

Dimensions.—Total length, about 36 in.; tail, 9 in.; wing, 13.75 in.; tarsus, 1.6 in.; bill from gape, about 4.25 in.

Range in the Malay Peninsula.—The snake bird almost certainly occurs in Peninsular Siam, but we have no record. We know little of its present distribution in the Malay States, but in the past it has been recorded from the

Langkawi Islands and Penang ; and on the mainland, from Province Wellesley and Perak, south to Malacca and " Johore." It has been uncertainly recorded from the head-waters of the Perak and Pahang rivers, but the observers were not ornithologists.

Extralimital Range.—India and Ceylon ; apparently common in Burma, Siam and French Indo-China, and a straggler to extreme South-East China. Sumatra, Borneo and Java, east to the Celebes and Philippines. The species also occurs in Mesopotamia, but the racial identity of the bird in that region is rather uncertain.

Nidification.—Not known to breed in the Peninsula. In India proper and Burma it nests in colonies often containing hundreds of birds. The nests are placed in trees, usually standing in water. The three or four white eggs measure about 2·13 by 1·37 in.

Habits.—This bird is now rare in Malaya, though fifty-five years ago it was common in Malacca territory, especially in the Kessang district, and also, according to Kelham, near Kuala Kangsar, in Perak, but we have never seen recent specimens from any part of Malaya proper. At one time there were two or three on the fresh-water lake on Dayang Bunting, in the Langkawi Islands, but on our last visit they had disappeared. The snake bird is an inhabitant of rivers, lakes and fresh-water swamps, and is exclusively aquatic in its habits, feeding entirely on fish. The vertebræ of the neck are peculiarly modified so that by straightening its neck the bird is enabled to project its bill forward with extreme rapidity and so transfix its prey. It is an expert diver.

The bird figured (one-fifth natural size) is a female, collected by F. N. Chasen, at Gomantong, on the Kinabatangan river, British North Borneo, 19th July 1929.

Family PHALACROCORACIDÆ

Cormorants

IN the cormorants the straight bill is furnished with a terminal hook. About forty species are known, and the family is almost world-wide in distribution. The plumage is usually glossy black, or black and white, and some very striking forms are found in the southern hemisphere, in South America, New Zealand, etc.

Although cormorants often breed near inland waters, they are more often found on salt water, in which they are perfectly at home, being expert swimmers and divers. They can remain for a long time under the surface of the water, pursuing their prey, aided by wings and feet. The normal food is fish, and the young are fed by regurgitation. In China and Japan they are trained to catch fish for their owners, a strap being placed round the bird's neck to prevent it from swallowing all but its smaller captures.

KEY TO THE MALAYAN SPECIES OF CORMORANTS

- I { Larger ; wing about 13 to 14 in. . . *Phalacrocorax carbo sinensis*, p. 245
 { Smaller ; wing about 7·5 to 8·5 in. . . *Phalacrocorax pygmaeus niger*, p. 246

*Phalacrocorax carbo sinensis***The Cormorant**

Pelecanus sinensis, Shaw and Nodder, *Nat. Misc.*, xiii., 1801, pl. 529 (China).

Phalacrocorax carbo, Oates in Hume's *Nests and Eggs Ind. Birds* (2nd ed.), iii., 1890, p. 270; O.-Grant, *Cat. Birds, Brit. Mus.*, xxvi., 1898, p. 340 (part); Blanford, *Faun. Brit. Ind., Birds*, iv., 1898, p. 340; Oates, *Cat. Birds' Eggs, Brit. Mus.*, ii., 1902, p. 198 (part).

Phalacrocorax carbo albiventer, Robinson and Kloss, *Journ. Nat. Hist. Soc. Siam*, v., 1921, p. 85.

Phalacrocorax carbo sinensis, Stuart Baker, *Faun. Brit. Ind., Birds* (2nd ed.), vi., 1929, p. 277.

Malay Names.—Burong kosa; burong dëndang ayer.

Description.—*Adult in breeding plumage.*—Head, neck, back, rump, upper tail coverts, tail and under parts, black, strongly glossed with purplish or greenish blue. Top of the head and the upper neck copiously sprinkled with thin, fine, white feathers. A broad white band bordering the naked throat skin. Feathers of the nape and hind neck lengthened into a crest. Mantle, scapulars, wings, except the primaries, glossy bronze-green, the feathers broadly edged with blue-black. Primaries and primary coverts, black, glossed with green. A patch of white feathers on the flanks.

Adult in non-breeding plumage.—Without the thin white feathers on the head and neck and the white patches on the flanks.

Immature.—Upper parts, brown, the feathers with glossy black edges; throat and breast, white; foreneck and centre of abdomen largely white. Older birds are darker, blacker and less brown, with black feathers of the adult plumage scattered over the white of the under parts.

Soft Parts.—Iris, emerald; throat skin, yellow; bill, black, the culmen yellowish; feet, black.

Immature.—Bill, pinkish horn, with the culmen brownish black and the tip whitish (*Jacobson*).

Dimensions.—Length (*male*), 32 in. (*Blanford*); tail, 6.5 in.; wing, 13.75 in.; tarsus, 2.4 in.; bill from gape, 3.75 in. *Females* usually rather smaller. Length, 30.5 in. (*Aggaard*); wing, about 13 in.

Range in the Malay Peninsula.—From the northern limit to the southernmost point of the mainland, at Johore Baharu, but very rare in the south. Recorded from both coasts and also from inland waters in the lowlands.

Extralimital Range.—As a species the cormorant extends from the Atlantic coast of North America across Europe to the extreme east of Asia. It ranges south throughout Africa and India and is found in Burma and Tenasserim; it is common in some parts of Siam and is found throughout French Indo-China. It occurs in Sumatra (but not Java or Borneo) and the Philippines, Australia, New Zealand and Chatham Island. Within this extensive range a number of subspecies, some apparently of doubtful value, have been recognized. The typical form from North and West Europe is rather larger than *sinensis*, which

some recent reviewers consider as extending from Holland and South Europe, east to China and Japan, and south to India, Siam, Malaysia and the Philippines.

Nidification.—The cormorant is known to breed in Burma, French Indo-China and Sumatra, but there are no records of it doing so in the Malay Peninsula, and we have never seen a Malayan specimen in breeding plumage. It nests in colonies, the large nest of sticks being placed on trees or rocks near water and containing, usually, three to six eggs, actually very pale blue in colour, but always covered with a white, chalky layer. Size about 2.5 by 1.6 in.

Habits.—The cormorant is quite common on the east coast of Peninsular Siam, where it has been collected on the coast of Patani and on Koh Pennan, in the Bandon Bight, and seen in the Singgora Roads, but it is rare on the west. North of the Kelantan river on the east coast and in Patani Bay it is not uncommon. The shores of the southern portion of the Malay Peninsula are not suitable for it, and the southernmost recorded coastal locality is Pulau Lalang, one of the Sembilan Islands, off the mouth of the Perak river. In the southern half of the Peninsula it is, in fact, a rare bird. Wray got a specimen on the Batang Padang river, near Tapah, South Perak, many years ago, and in July 1910 Mr E. Seimund shot one on the small lake at Taiping, in Perak, in which state Kelham also collected the species. It has occurred on the Pahang river, and in 1904 a solitary specimen was shot on a fresh-water pond at Johore Baharu, in the extreme south of the Peninsula, by Mr C. Boden Kloss. Specimens in the British Museum are from Kedah and Malacca.

In South-East Asia the cormorant is found singly or in flocks. It usually roosts in flocks in trees. The food, consisting largely of fish, is pursued under water. It shows a decided preference for fresh water, but the reverse is the case in many parts of Europe.

The Malay names, *dendang ayer* (water-crow) and *burong kosa* (crow), are not familiar ones. *Kosa* is an elephant goad, and the cormorant's beak is supposed to resemble this implement in its turned-down tip.

Phalacrocorax pygmaeus niger

The Little Cormorant

Hydrocorax niger, Vieill., *Nouv. Dict. d'Hist. Nat.*, Nouv. ed., viii., 1817, p. 80 (India).

Phalacrocorax pygmaeus, Oates in Hume's *Nests and Eggs Ind. Birds* (2nd ed.), iii., 1890, p. 273.

Phalacrocorax javanicus, O.-Grant, *Cat. Birds, Brit. Mus.*, xxvi., 1898, p. 402; Blanford, *Faun. Brit. Ind., Birds*, iv., 1898, p. 342; Oates, *Cat. Birds' Eggs, Brit. Mus.*, ii., 1902, p. 206.

Phalacrocorax niger, Stuart Baker, *Faun. Brit. Ind., Birds* (2nd ed.), vi., 1929, p. 280.

Malay Name.—Unrecorded.

Description.—*Adult in breeding plumage.*—General plumage, deep glossy black, the thin shafts of the feathers on the mantle very shiny; wing coverts and

scapulars, shining grey-black, or steely, with deeper black borders. Top of the head with short, thin, white stripes, a tuft of hair-like white feathers along the sides of the head (*Siam* ; June).

Adult in non-breeding plumage.—Without the white markings described above, but with the chin and feathered area bordering the naked gular pouch white.

Immature.—Chin and throat, white ; under parts, brown, becoming black on the sides of the body ; head and neck, brown ; mantle, lower back and rump, shining black ; wings as in the adult, but the wing coverts narrowly fringed with whitish buff, as are the feathers of the mantle and most of the under parts.

Soft Parts.—" Iris, green ; bill, horny brown, blackish at the tip and livid purple at the base ; gular skin and orbital skin, black in the non-breeding season, purple in the breeding season ; legs and feet, blackish, tinged with purple flesh-colour when breeding " (*Stuart Baker*).

Dimensions.—Total length, 20 in. ; tail, 5·5 in. ; wing, 7·75 to 8 in. ; tarsus, 1·3 in. ; bill from gape, 2 to 2·5 in.

Range in the Malay Peninsula.—The island of Junk Zeylon and the province of Bandon, in Peninsular Siam.

Extralimital Range.—Ceylon and throughout India to Burma, Assam and Yunnan. Found throughout the length of Tenasserim and French Indo-China ; common in suitable localities in Siam. Borneo and Java.

Nidification.—Not recorded breeding in the Peninsula. In Ceylon and India it nests in colonies. The nests are placed in trees, and the eggs resemble those of the common cormorant, but are, of course, smaller, measuring only about 1·8 by 1·15 in.

Habits.—With the exception of the island of Junk Zeylon this bird is, in Malaya, only known from the head-waters of some of the larger rivers, chiefly on the east coast, but no specimens have yet been actually obtained, though Robinson and Seimund saw it in some numbers on the Bandon river. It is said to be the commonest Indian cormorant, found commonly on fresh water, either alone or in small flocks, collecting into large flocks to roost.