3. DARTER or SNAKE-BIRD

(Anhinga rufa)

Hindi: *Bānbē* (Bihar)

A large, black water bird with silvery streaks on the back, a long brown snake-like neck, and pointed bill. Found all over India on streams, village tanks and jheels, especially where there are plenty of trees on which it can perch and dry its wings when not fishing. Its staple food is fish, which it catches under water, being an expert diver and swimmer.

4. LITTLE CORMORANT

(Phalacrocorax niger)

Hindi: *Pān kowvā, Gānhil* (Bihar)

A glistening black water bird about the size of a Pariah Kite, found in more or less the same sort of habitat as the Darter, usually in large flocks. Like the latter it is often found sunning its outspread wings on dead tree stumps, sandspits, or partially submerged rocks. Cormorants often hunt in flocks, pursuing shoals of fish and diving after them again and again with feverish activity. Its main food is fish.

MEASUREMENTS

	Wing	Bill (from feathers)	Tarsus	Tail
♂ ♀	257–276	50–61 generally 54–58	*c.* 47–52	132–144 mm.

COLOURS OF BARE PARTS. Iris green or blue-green. Bill dark brown, base of lower mandible reddish horny, gular skin yellow; naked skin of face black-purplish in the breeding season, yellowish at other times. Legs and feet black (Baker).

28. **Little Cormorant.** *Phalacrocorax niger* (Vieillot)

Hydrocorax niger Vieillot, 1817, Nouv. Dict. Hist. Nat. 8: 88 (East Indies=Bengal)
Baker, FBI No. 2182, Vol. 6: 280

Plate 2, fig. 2, facing p. 32

LOCAL NAMES. *Pān kowwa, jograbi* (Hindi); *Pān kawri* also for shag (Bengal); *Neetikāki* (Telugu); *Kădăl kāgăm, Neer kāgăm* (Tamil); *Diya kawa* (Sinhala); *Kākātārāvu* (Malayalam).

SIZE. Jungle Crow +; length *c.* 51 cm. (20 in.).

FIELD CHARACTERS. Smaller size, comparatively shorter bill and longer tail, and absence of yellow on gular skin distinguish it from the Shag. Size difference perceptible only when the two seen together.

Adult (breeding). Black overall with a bluish or greenish sheen. Upper back and wing-coverts dark silvery grey, scalloped with black. A short crest on occiput and nape and a few scattered silky white feathers and plumes on forecrown and sides of head. In non-breeding plumage crest and white feathers in head disappear, and throat becomes white. Sexes alike.

Young (immature). *Above,* brown, the back with paler scalloping. *Below,* paler, with throat and centre of abdomen white.

Chick (*c.* one week old). Head bald shiny livid red, with naked scrawny neck. Body covered with dingy black down.

STATUS, DISTRIBUTION and HABITAT. Resident, with local movements depending on water conditions. Found through the subcontinent and in Ceylon. Absent in the Himalayas and northern West Pakistan. Affects jheels, rivers, irrigation reservoirs and canals, village tanks, tidal estuaries, etc.

Extralimital. Burma, Thailand, Indochina, Malaysia, Indonesia east to the Greater Sunda Islands.

GENERAL HABITS. As of the Family (q.v.) and very similar to the preceding, with which it commonly associates and is frequently confused. Solitary birds, or twos and threes on village tanks and tidal estuaries, to great flocks on the larger inland waters, and enormous congregations at the traditional rookeries, e.g. Keoladeo Ghana in Rajasthan and Vedanthangal in Madras State. When not on water, usually seen perched upright on trees, stakes, or rocks, sunning themselves, wings and tail spread open. In the feverish jostling during the communal hunts, in which densely packed rabbles participate, the birds often leap-frog over their fellows in their eagerness to plunge after a shoal of fish—manoeuvres reminiscent of starlings at a swarm of grasshopper nymphs.

5. GREY HERON

(Ardea cinerea)

Hindi: *Nāri, Kābūd, Ānjān*

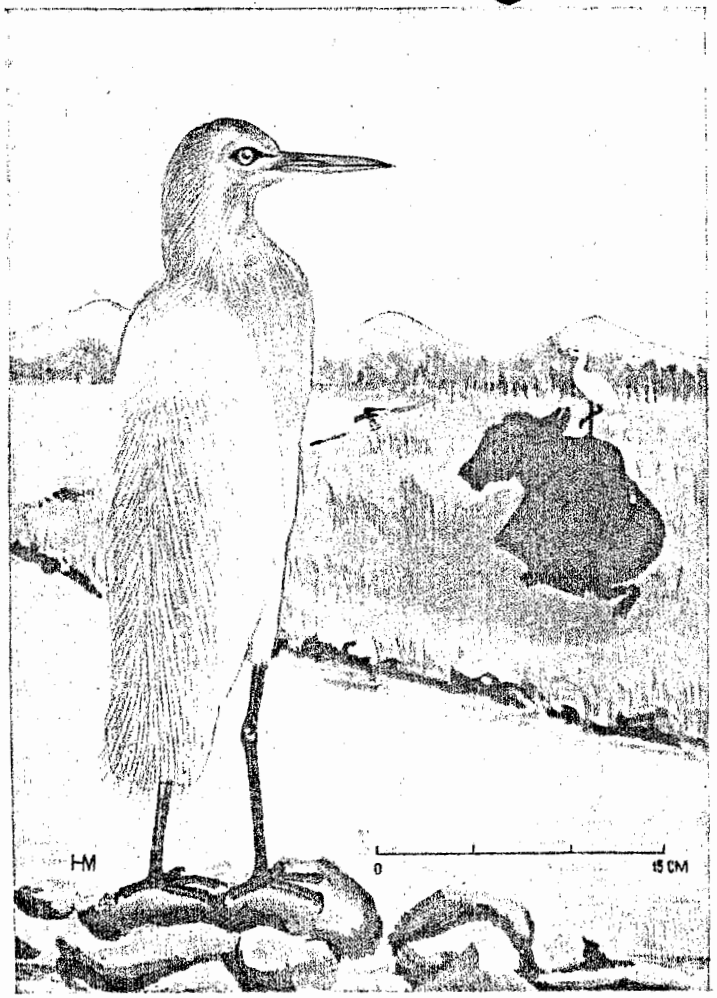
A large, lanky, egret-like marsh bird often found standing motionless in the shallow water on the margin of reedy jheels and tanks. Although it seems to be asleep it is in fact fully alert and peering intently for any fish or frog that might blunder within striking range. The bird keeps quite still, then, at a suitable opportunity, seizes the prey in its beak with lightning quickness.

6. LITTLE EGRET

(Egretta garzetta)

Hindi: *Kilchiā bāglā, Kārchia bāglā*

A snow-white egret found on most jheels, tanks, and ponds in India. In the breeding season it develops fine lacy feathers on its back and breast, and a long drooping crest of two narrow plumes. It was formerly killed in large numbers by professional hunters for these ornamental feathers which fetched high prices. Fish and frogs constitute the main diet of these birds.



7. CATTLE EGRET

(Bubulcus ibis)

Hindi: *Sūrkhiā bāglā, Gāi bāglā*

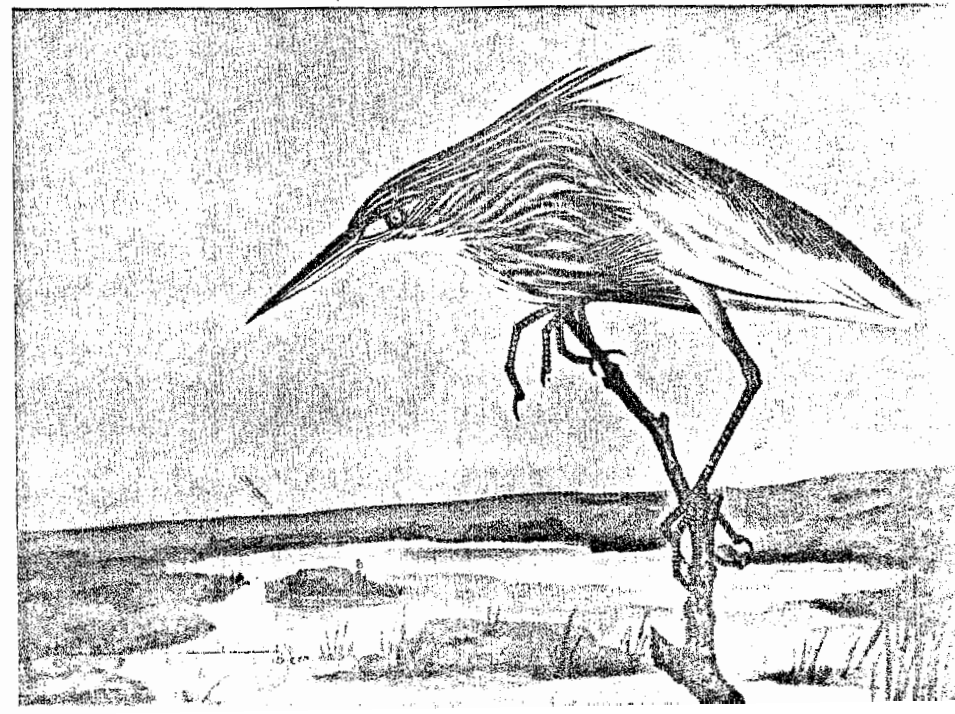
A snow-white bird with a yellow bill, met with on grass and pastureland, and also on the margins of jheels and lakes. In the breeding season flimsy orange-buff feathers cover its head, neck and back. It is usually in attendance on grazing cattle, feeding on grasshoppers and other insects disturbed by the animal's progress. It also relishes frogs, lizards, and flies.

8. POND HERON or PADDY BIRD

(Ardeola grayii)

Hindi: *Āndhā bāglā, Bōgli* (Bihar)

A common waterside bird, earthy brown while at rest, becoming astonishingly transformed when it suddenly opens its snow white wings in flight. Found at most village and temple tanks, and ponds and puddles even in the heart of populous towns. Its food consists of frogs, fish, crabs and insects. Large congregations collect to roost in favourite trees every evening in company with Little and Cattle Egrets.



departure from the normal condition in its close relatives of the genus *Anas*. Previously placed in a separate genus, *Marmaronetta*, considered from structure and habits to bridge *Nettion* with *Anas*, now united (Johnsgaard 1961, Bull. B.O.C., 81: 37–43).

Chick (in down). Like Mallard (q.v.) in pattern, but brownish grey above, pale grey below.

MEASUREMENTS

	Wing	Bill	Tarsus	Tail
♂♂	205–215	43–45	36–38	85–105 mm.
♀♀	198–205	—	—	—
				(Delacour)

Weight ♂ 1 lb. 3 oz. to 1 lb. 5 oz. (*c.* 535–592 gm.); ♀ 1 lb. to 1 lb. 3 oz. (*c.* 450–535 gm.) (Hume & Marshall).

COLOURS OF BARE PARTS. Iris brown. Bill blackish with a dull grey-green triangle at the base (more pronounced in ♀) and a whitish subterminal line in ♂. Legs and feet olive-brown, the webs blackish.

93. **Pintail.** *Anas acuta* Linnaeus

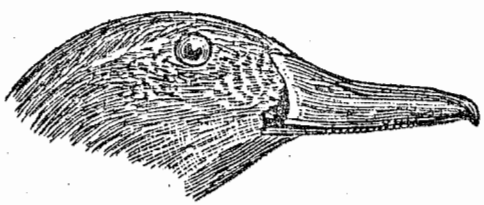
Anas acuta Linnaeus, 1758, Syst. Nat., ed. 10, 1: 126 (Sweden)
Baker, FBI No. 2274, vol. 6: 437
Plate 1, fig. 4, facing p. 16

LOCAL NAMES. *Sand, Seenkh păr* (Hindi); *Kokărăli, Drigōsh* (Sind); *Dhrūgūchho* (Kutch); *Dig hāns, Badā digar, Sholoncho* (Bengal); *Dighōnch* (Mirshikars, Bihar); *Digunch* (Nepal); *Nanda, Nanja* (Orissa); *Nejăl hāns, Dighal negi* (Assam): *Daophlantu loubi* (Cachar); *Meitunga* (Manipur).

SIZE. Domestic duck —; length ♂ *c.* 56–74 cm. (22–29 in.).

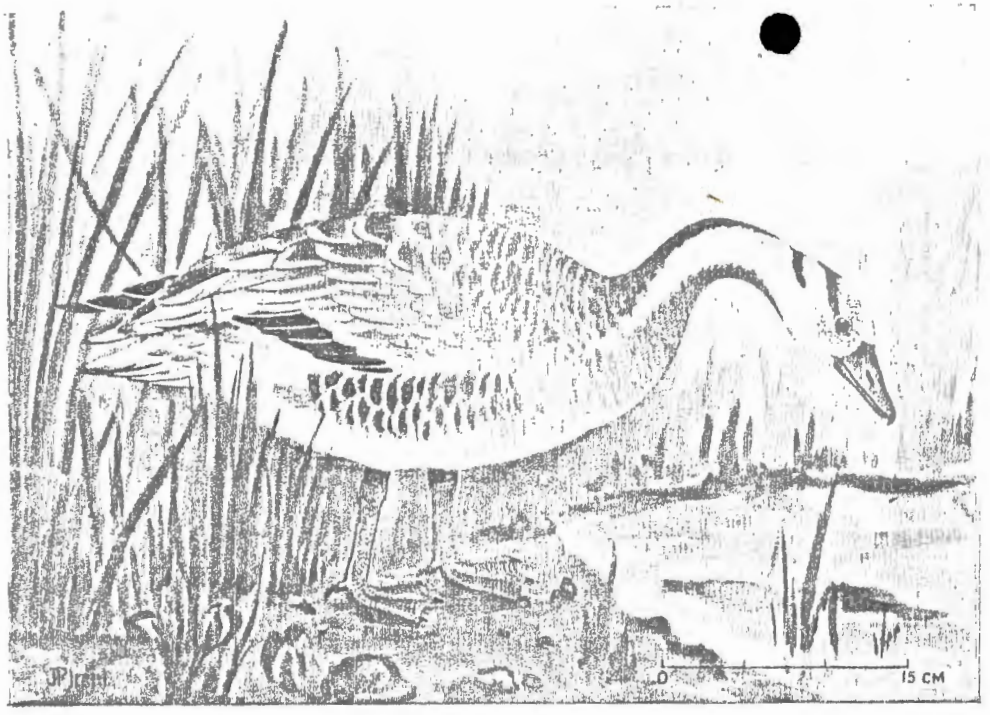
FIELD CHARACTERS.

Male (breeding). Elongated body, slender neck, and long pointed pin-like central tail-feathers diagnostic. Black under tail-coverts with a broad buff patch in front, additional pointers. Head, face, and throat chocolate; hindneck black. A white band running down either side of neck, broadening into white of breast and belly. Upper plumage and flanks largely grey, finely vermiculated with black. Conspicuous silver-grey edges to long black pinnate scapulars and upper tail-coverts. Speculum metallic bronze-green.



× *c.* ½

Male (in eclipse). More or less like female, sometimes with the mantle dark ashy- or blackish grey coarsely vermiculated with greyish white.



15. BARHEADED GOOSE

(Anser indicus)

Hindi: *Barwā, Sāwān, Kārhānch* or *Mōgli* (Bihar)

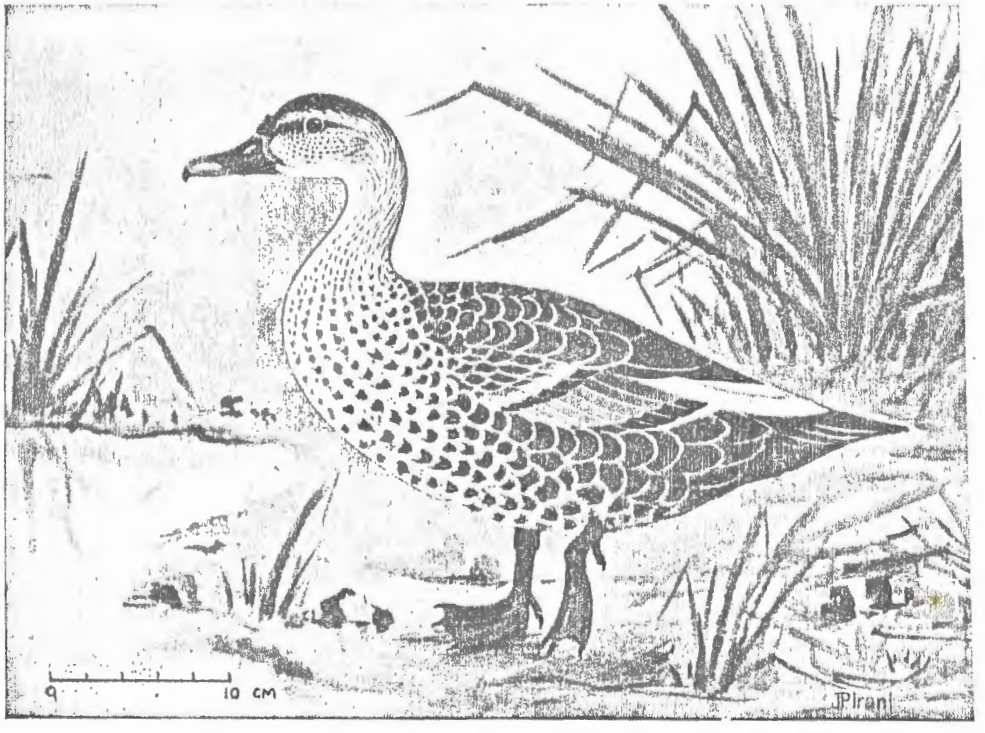
This goose is a winter migrant from Tibet. It is commonly found in flocks ('gaggles') about rivers or jheels, and young winter cultivation of wheat and gram, especially in northern India. The birds spend the day dozing around shallow water becoming active towards evening when flock after flock may be seen winging its way steadily to the feeding grounds: fields and marshy grasslands round jheels and canals.

16. SPOTBILL or GREY DUCK

(Anas poecilorhyncha)

Hindi: *Gārmpāi, Gūgrāl, Lāddim* (Bihar)

One of our few non-migratory wild ducks, found in pairs or small parties on reedy jheels. Though common and widely distributed it is nowhere really abundant. Male and female are alike in plumage, but the male is larger. It is esteemed by sportsmen as a sporting bird and for the table. Its food consists chiefly of vegetable matter, obtained largely by tipping or 'up-ending' in shallow water.



ANAS POECILORHYNCHA J. R. Forster

Key to the Subspecies

		Page
A	No white band posterior to the speculum.....*A. p. zonorhyncha*	159
B	A broad white band posterior to the speculum.....1	
1	A red spot on each side of base of bill.....*A. p. poecilorhyncha*	157
	No red spots on bill.....*A. p. haringtoni*	159

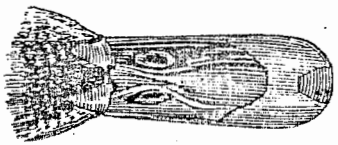
97. **Spotbill Duck.** *Anas poecilorhyncha poecilorhyncha* J. R. Forster

Anas poecilorhyncha J. R. Forster, 1781, Indian Zool. : 23, pl. 13, f. 1 (Ceylon)
Baker, FBI No. 2265, Vol. 6: 421

LOCAL NAMES. *Gărm pāi, Gugral* (Hindi); *Hănjăr* (Sind); *Lăddim* (Mirshikars, Bihar); *Năddun* (Nepal terai); *Kara* (Manipur); *Bŏr mŭghi hāns* (Assam).

SIZE. Domestic duck; length *c.* 61 cm. (24 in.).

FIELD CHARACTERS. A large duck of scaly-patterned buffy grey and dark brown plumage. Narrowly black-and-white margined metallic green wing speculum, bordered above (posteriorly) by a broad pure white bar particularly conspicuous in flight. Bright coral-red legs, yellow-tipped dark bill, and two swollen orange-red spots at its base on either side of forehead, are further diagnostic clues.



× *c.* ½

Female slightly smaller and duller than male; but conclusive sex differentiation possible only on voice (q.v.).

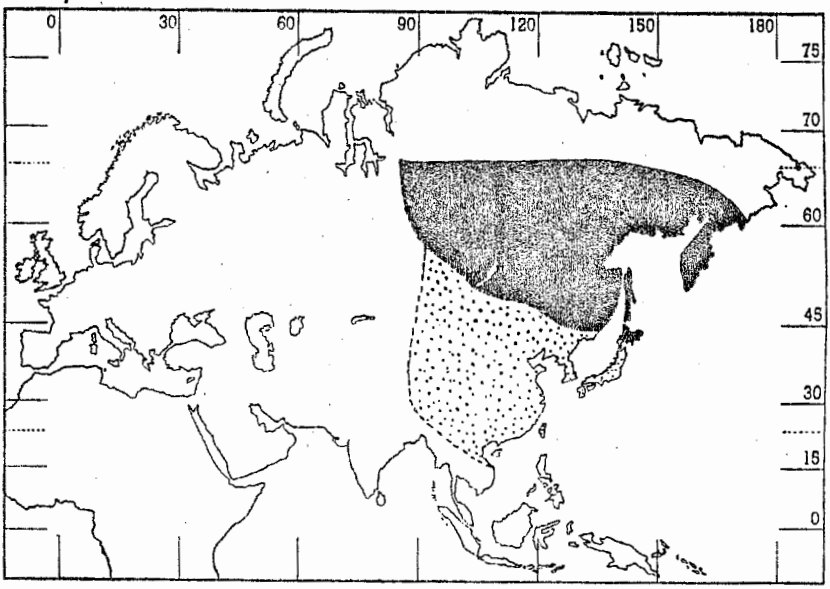
Young (immature). Like adult but paler, less spotted below, and with no red spots at base of bill.

STATUS, DISTRIBUTION and HABITAT. Resident, nomadic, and locally migratory. Common and widely though capriciously distributed, and nowhere really abundant. Throughout the Indian subcontinent, locally up to *c.* 1200 m. elevation, east of the lower Indus river (occasionally Baluchistan), and Kashmir (to *c.* 1800 m.) to western Assam. South to Mysore, and occasionally Ceylon. Frequents reedy and vegetation-covered jheels, shallow irrigation tanks, etc. Rarely also on rivers.

A flock of over 200 (subspecies?) reported on Neill Island, Andamans Group (E. G. Silas, *in epist.*, March 1960), but its occurrence there needs confirmation.

GENERAL HABITS. Very similar to the Mallard, usually seen in pairs, family parties, or moderate sized flocks. A strong flier but less quick in take-off than the Mallard, rising less abruptly and vertically. Prized by sportsmen as much for its sporting qualities as for excellence as a table bird. A non-diving duck, obtaining most of its food by walking about and grubbing on marshland or in wet paddyfields, or by up-ending in shallow water to reach the bottom mud, tail sticking above the surface and legs kicking to maintain the vertical stance. But it can dive very effectively to evade capture when wounded or moulting wing, surfacing only momentarily in a flash, or with just the bill showing. Often it holds on thus to partially submerged vegetation and remains completely hidden from view.

Anas falcata



MUSEUM DIAGNOSIS. Upper and lower tail-coverts in both sexes very long, extending beyond the tips of the rectrices. Female confusingly like female Gadwall except for colour of legs, and chiefly the different wing speculum.

In female Gadwall entire visible portions of inner secondaries pure *white*, terminal portions of their larger coverts black; in female *falcata* visible portions of all inner secondaries *black* (with a metallic green reflection) narrowly tipped with white, and terminal portions of their greater coverts white.

For detailed description of plumage see Baker, loc. cit.

MEASUREMENTS

	Wing	Bill	Tarsus	Tail
♂♂	230–242	40–42	37—40	82–85 mm.
♀♀	225–235	38–40	—	— (Delacour)

COLOURS OF BARE PARTS. Iris dark brown. Bill black. Legs and feet drab, olive-grey, or olive-brown; webs and toes black.

103. **Wigeon.** *Anas penelope* Linnaeus

Anas penelope Linnaeus, 1758, Syst. Nat., ed. 10, 1: 126 (Sweden)
Baker FBI No. 2270, Vol. 6: 429
Plate 1, fig. 1, facing p. 16

LOCAL NAMES. *Peasan, Patari, Pharia, Chhōta lālsīr* (Hindi); *Chhōta lālsīr* (Bengal); *Aroon* (Mirshikars, Bihar); *Cheyun* (Nepal); *Pharao* (Sind; Gujarat, Nal Sarovar); *Khaltriya kunda* (Assam); *Thānggongmāl* (= 'like the Brahminy', referring to the drake's ruddy head, Manipur).

SIZE. Domestic duck —; Gadwall —; length *c.* 49 cm. (19 in.).

Extralimital. 'Europe and Asia, breeding in temperate regions north to the Arctic Circle and beyond, from Iceland and Scotland to Kamchatka. Winters in Britain and south to the Nile Valley. Abyssinia, India, S. China and Japan' (Peter Scott).

MIGRATION. Wigeon ringed during winter in Sind (Manchar lake, *c.* 26°N., 68°E.) and in central India (Dhar, *c.* 23°N., 76°E.) have been recovered in summer in Siberia between *c.* 55° & 58°N. and 66° & 85°E. One of these was a female accompanied by ducklings, and another a male in post-nuptial moult and flightless, indicating that they were on their breeding grounds and thus disclosing the provenance of possibly the majority of our winter migrants.

GENERAL HABITS. Gregarious; sometimes in very large flocks. Like other non-diving ducks feeds by walking about and grazing or grubbing on grassy edges of jheels and in squelchy paddyfields, or by up-ending in shallow water. Swift on the wing, but perhaps less so than Teal, rising abruptly off the water on alarm and quickly climbing well out of gunshot. Flies in compact flocks or irregular lines with a distinctive rustling sound. Provides good sport to the duck hunter and is excellent for the table. Dives effectively to evade capture when only winged.

FOOD. Chiefly vegetarian: corms, seeds, and shoots of marsh and aquatic plants, and wild and cultivated rice. Also water insects and their larvae, molluscs, etc.

VOICE and CALLS. Of male a distinctive musical piping whistle *whee-oo*, uttered both on the wing and from the ground or water. Of female a short quack, also described as a 'purring growl'.

BREEDING. Extralimital. *Nest*, of matted grass, reeds, etc. with a thick bed of down for the eggs, hidden in undergrowth usually close to water. *Eggs*. '7 to 12, buffy cream, 54 × 35 mm. on an average; incubation 24 to 25 days' (Delacour).

MUSEUM DIAGNOSIS

MEASUREMENTS

	Wing	Bill (from feathers)	Tarsus	Tail
♂♂	254–273	*c.* 31–35	*c.* 35–40	*c.* 95–110 mm. (Baker)
♀♀	233–256			

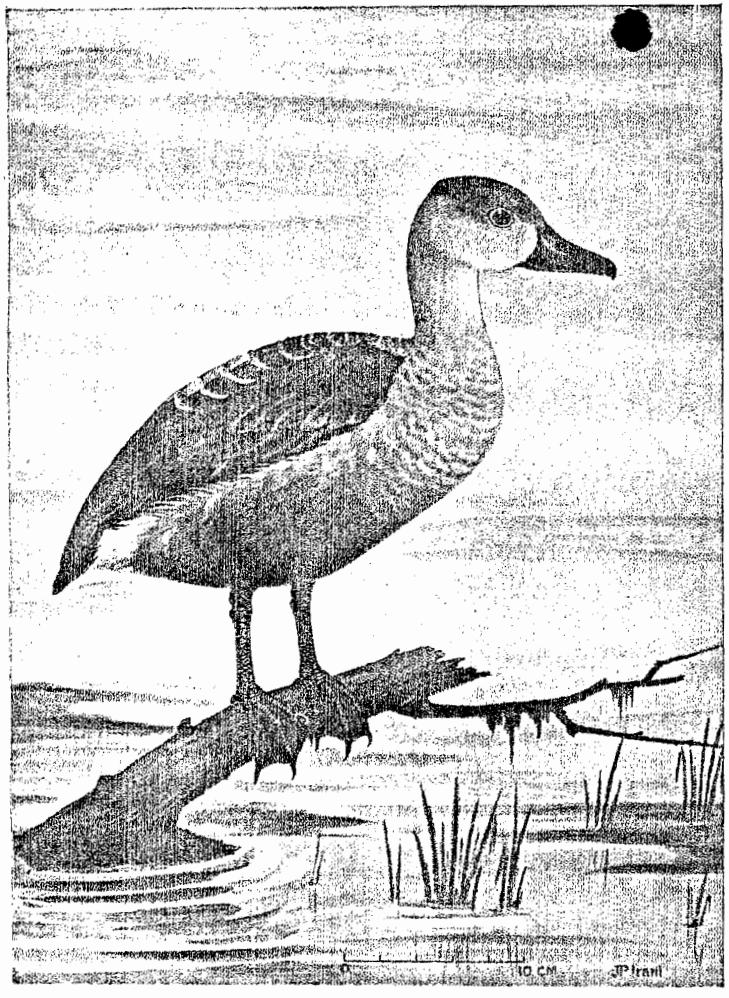
Weight ♂ 1 lb. 5 oz. to 1 lb. 10 oz. (*c.* 590–735 gm.); ♀ 1 lb. 3 oz. to 1 lb. 10 oz. (*c.* 535–735 gm.).

COLOURS OF BARE PARTS. Iris brown or red-brown. Bill grey-blue, livid blue, or slate-blue; tip black. Legs plumbeous tinged with grey or green; joints and webs darker; claws blackish.

104. **Garganey** or **Bluewinged Teal.** *Anas querquedula* Linnaeus

Anas querquedula Linnaeus, 1758, Syst. Nat., ed. 10, 1: 126 (Sweden)
Baker, FBI No. 2275, Vol. 6: 439
Plate 1, fig. 5, facing p. 16

LOCAL NAMES. *Chāita, Khira, Patari* (Hindi); *Ghang roib, Giria hāns* (Bengal); *Ghila hāns* (Assam); *Chārho, Kardo, Kāraro* (Sind); *Kārdio* (Gujarat, Nal Sarovar); *Gendu* (Orissa — most duck); *Surit angouba* (= 'white teal', Manipur).



17. LESSER WHISTLING TEAL or TREE DUCK

(Dendrocygna javanica)

Hindi: *Seelhi, Seelkāhi*

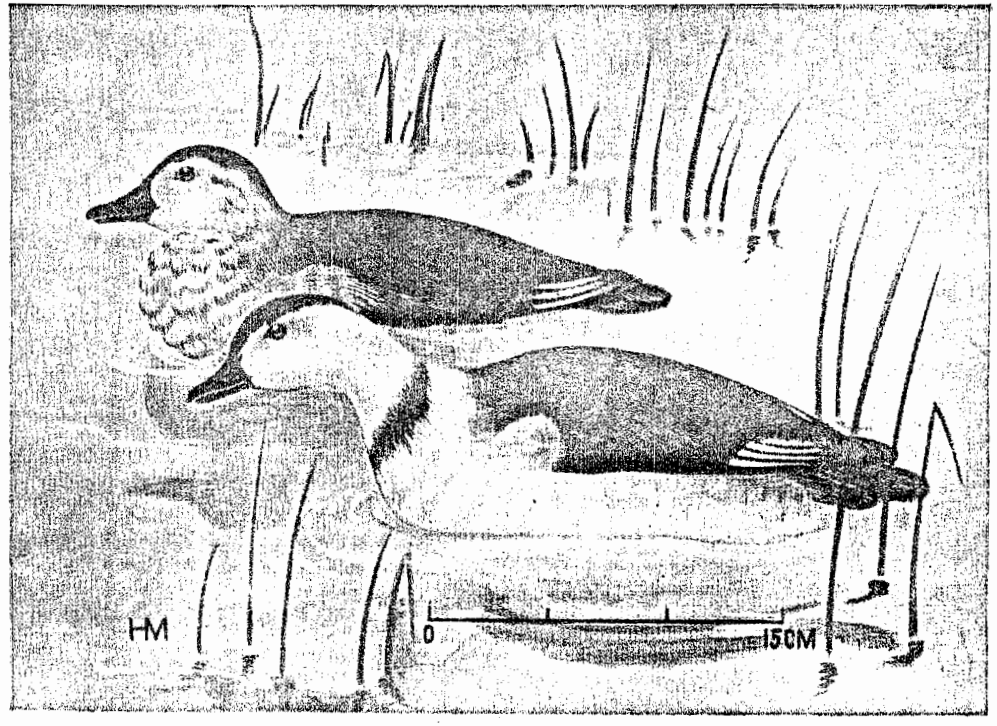
Another resident duck, smaller than the Spotbill, found practically throughout the plains of India, on all reed and floating vegetation-covered tanks and jheels, often also swampy paddyfields. It is a tree duck and loves such water as has trees growing in or around it, on the branches of which it can perch and roost. Though good walkers and divers, the birds have a feeble flapping flight. They eat paddy grains, tender shoots, etc. as well as animal matter.

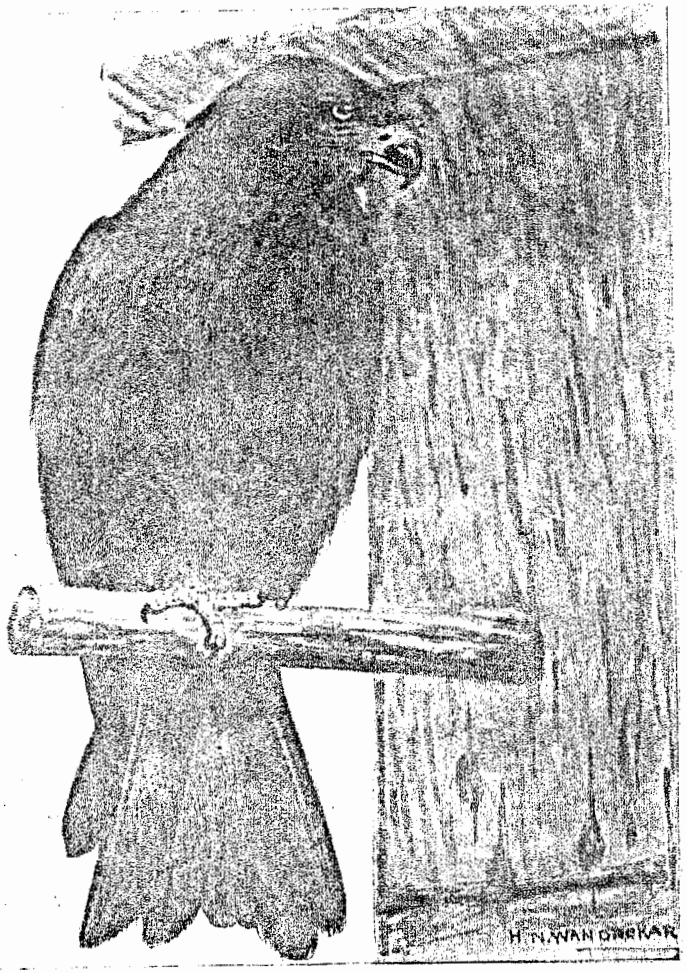
18. COTTON TEAL

(Nettapus coromandelianus)

Hindi: *Girrā, Gūrgūrrā*

The smallest and commonest of our resident ducks. Usually found in small flocks wherever there is water with much floating vegetation. Where unmolested it becomes very tame, swimming about and tipping for food on village tanks near human beings. The birds utter a peculiar clucking during their swift flight, and are good divers. Their food consists of vegetable matter, especially rice, plus worms and crustacea.





19. PARIAH KITE

(Milvus migrans)

Hindi: *Cheel*

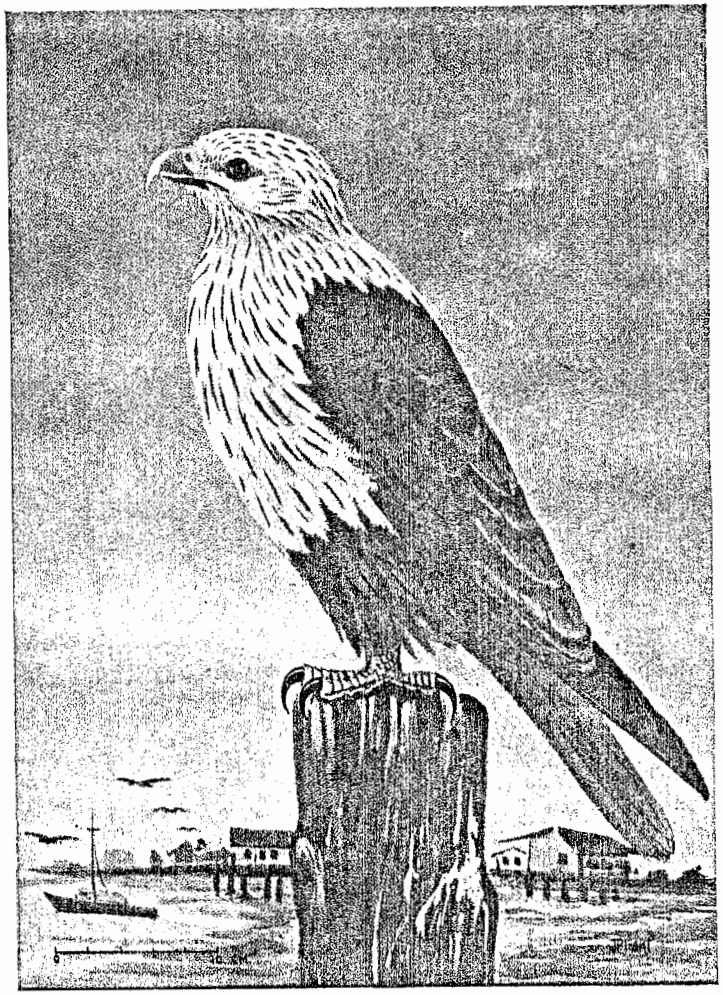
A common and familiar brown fork-tailed hawk found around any habitat [illegible], usually seen perched on a roof-top, pole, or tree, or sailing in the air. It is one of our most useful scavengers and helps to keep urban areas clean. It eats dead rats, offal and every kind of garbage, and sometimes lifts young chickens of poultry. Its call is a shrill *ewe-wir-wir-wir-wir* uttered both from a perch and when on the wing.

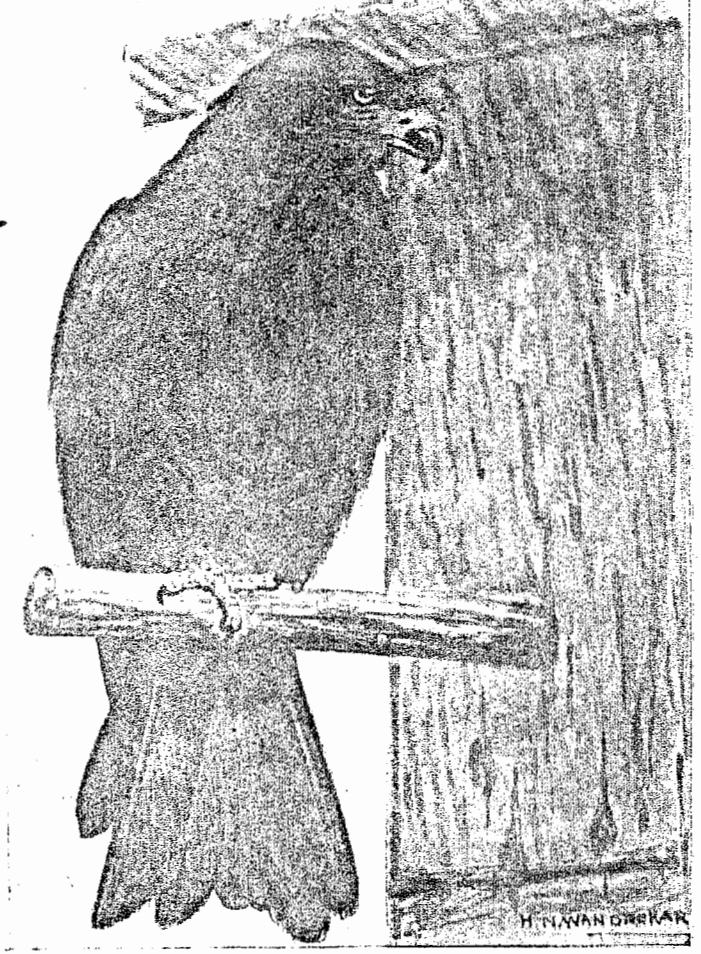
20. BRAHMINY KITE

(Haliastur indus)

Hindi: *Dhōbiā cheel, Khēmkārni* (Bihar)

A rather less common bird of prey, usually found near any kind of fresh or sea-water, although it freely enters the precincts of towns and villages to scavenge in the company of the Pariah. Docks and harbours are amongst its favourite haunts. Apart from offal, which it prefers to pluck off the surface of the water, it eats land crabs in the monsoon, and also lizards, fish, frogs, and small snakes.





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(Milvus migrans)

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20. BRAHMINY KITE

(Haliastur indus)

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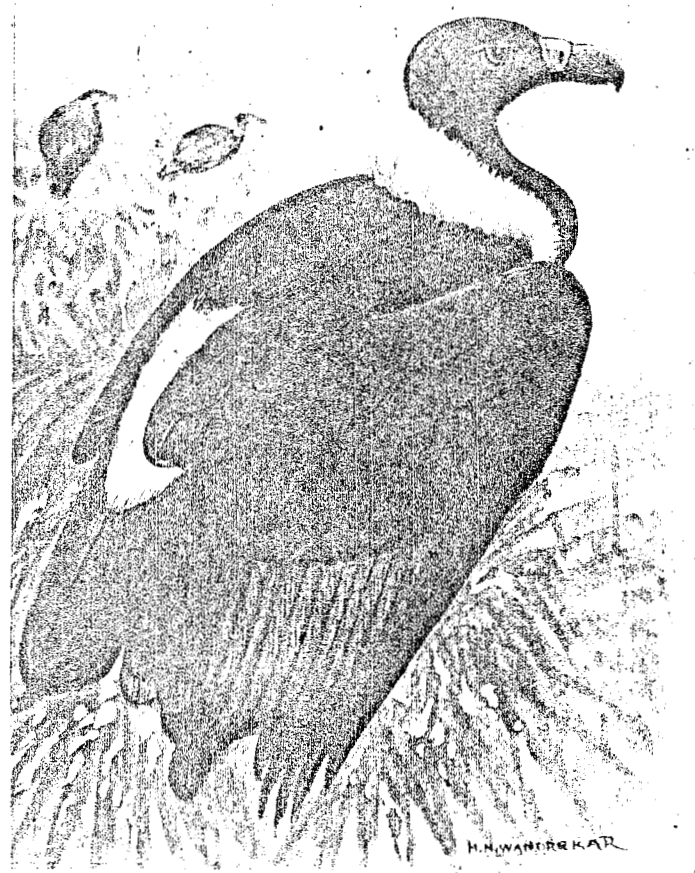
A rather less common bird of prey, usually found near any kind of fresh or sea-water, although it freely enters the precincts of towns and villages to scavenge in the company of the Pariah. Docks and harbours are amongst its favourite haunts. Apart from offal, which it prefers to pluck off the surface of the water, it eats land crabs in the monsoon, and also lizards, fish, frogs, and small snakes.

21. SHIKRA

(Astur badius)

Hindi: *Shikrā*

A small familiar hawk found throughout the Indian subcontinent in open wooded country and light deciduous jungle. It captures its prey—ground-feeding small birds, lizards, rats, frogs, locusts, etc.—by taking them by surprise, pouncing on them without warning from an ambush in a leafy tree. Individuals sometimes become a nuisance by taking to chicken-lifting. It has a number of harsh, loud calls.



22. WHITEBACKED VULTURE

(Gyps bengalensis)

Hindi: *Gidh*

Our commonest vulture found throughout India in all types of country except dense humid forest, singly or in gatherings or rabbles. Ugly and repulsive at rest, but very graceful and majestic when soaring and circling high up in the sky. As scavengers, the birds are invaluable to Man. Whenever their keen eye detects a carcase, large numbers collect from all sides and dispose of it within an incredibly short time.

157. **White-eyed Buzzard-Eagle.** *Butastur teesa* (Franklin)

Circus Teesa Franklin, 1832 (1831), Proc. zool. Soc. Lond., pt. 1: 115
(Farther India = Ganges-Nerbudda, *apud* Baker)
Baker, FBI No. 1774, Vol. 5: 104
Plate 11, fig. 1, facing p. 208

LOCAL NAMES. *Tīsa* (Hindi); *Buda mali gedda* (Telugu); *Yellur* (Yerkali); *Parundu* (Malayalam, for all hawks).

SIZE. Jungle Crow ±; length *c.* 43 cm. (17 in.).

FIELD CHARACTERS. A small greyish brown hawk with white throat, two dark cheek-stripes, and a third central stripe running down from chin. A small whitish patch on nape. Underparts brown and whitish. Orange-yellow cere and white (or pale yellow) eyes conspicuous at close range and through binoculars. At rest closed wings reach almost to end of rufous-tinged tail. Sexes alike.

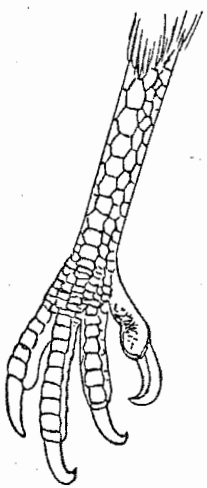
In overhead flight silvery grey-brown undersides of broad, blunt wings, contrasting with darker body, a suggestive clue. From above a patch of buffy grey on wing shoulder is conspicuous.

Young (immature). Feathers of crown and nape brown with broad pale edges. Forehead and a broad supercilium buffy white. Underparts variable, white to buff, the feathers more or less streaked with dark brown. Cheek-stripes narrow or absent.

STATUS, DISTRIBUTION and HABITAT. Resident practically throughout our area from about 1200 m. in the Himalayas (less common south of Madhya Pradesh) to Kanyakumari, and from W. Pakistan (Baluchistan) to Assam and E. Pakistan. Nepal. Absent in Ceylon. Affects open deciduous forest, and scrub-and-bush and cultivated country in the plains. Avoids moist forest biotope.

Extralimital. Northern and western Burma south to Tenasserim.

GENERAL HABITS. Sluggish and usually tame. Single birds seen day after day perched on the same stump, tree-top or telegraph pole in a chosen locality whence they pounce on any small animals of manageable size that show themselves in the surroundings below. Sometimes one will take up its position on the ground, on some mound or boundary stone in scrub jungle or cultivation whence to hurl itself on any lizard or grasshopper that stirs in the proximity, changing the coign of vantage from time to time. Occasionally walks about in the open, picking up flying termites as they emerge from their holes, or on charred ground after a forest fire, even while the rubbish is still smouldering, looking for roasted lizards and other titbits. Although somewhat sluggish, its flight is swift and direct, attained by rapid strokes of the rounded wings, reminiscent of a shikra. In the breeding season the birds become very noisy. Pairs commonly soar in circles high up in the sky for long periods and also indulge in spectacular aerial play, side-slipping, somersaulting, and stooping at each other with astonishing velocity.



× *c.* 2/3

MUSEUM DIAGNOSIS. Differs from Kestrel in wing formula (see diagram); in male having the brick-red mantle *unspotted*, and lores and feathers next the bill rufous *v.* white or creamy white. Claws in both sexes *pale yellow* instead of black. Nominate race *naumanni* (Europe, W. Asia) usually has less grey in median and lesser wing-coverts, but this character variable. For details of plumage see Baker, loc. cit.

MEASUREMENTS

	Wing	Bill (from feathers)	Tarsus	Tail
♂♀	222–244	16–17	*c.* 32–35	142–156 mm.

Two adults measured in the flesh:

		(from skull)		
♂	250	20	34	161 mm.
♀	241	20	34	146 mm.

Both in body moult and very fat, 8 January (SA).

COLOURS OF BARE PARTS. Iris deep brown. Bill bluish horn, yellowish at base, blackish at tip; cere and orbital skin orange-yellow. Legs and feet bright chrome yellow; claws paler.

FALCO TINNUNCULUS Linnaeus

Key to the Subspecies

222. **European Kestrel.** *Falco tinnunculus tinnunculus* Linnaeus

Falco Tinnunculus Linnaeus, 1758, Syst. Nat., ed. 10, 1: 90
(Europe, restricted type locality, Sweden, *apud* Hartert)
Baker, FBI No. 1740, Vol. 5: 61

LOCAL NAMES. *Karontia, Koruttia, Khermutia, Narzinak* ♂, *Narzi* ♀ (Hindi); *Thondălă muchi găddă, Thondălă doshi gādu* (Telugu); *Ting kyi* (Lepcha); *Cherupullu* (Malayalam).

SIZE. Pigeon±; length *c.* 36 cm. (14 in.).

FIELD CHARACTERS. A small, slender falcon with pointed wings and rather rounded tail remarkable for its habit of hovering stationary in one spot for many seconds at a time — 'hanging in the air'.

Male (adult). *Above*, crown, nape, and sides of neck ashy grey finely streaked with blackish. A blackish cheek-stripe. Mantle bright brick-red with pear-shaped black spots. Rump, upper tail-coverts, and tail grey, the last tipped with white and with a broad black subterminal bar. *Below*, vinous-buff streaked on breast and spotted on abdomen and flanks with blackish.

Female. *Above*, including crown and nape, pale rufous, cross-barred on back with black. Rump and tail normally tinged with grey. *Below*, paler than in male and with the markings denser and browner. Also slightly larger.

Young (immature). ♂ like ♀, but soon acquiring a good deal of grey in tail, and grey rump and upper tail-coverts. (Completely blue-grey tail at *c.* 15 months' moult — Ticehurst.)

STATUS, DISTRIBUTION and HABITAT. Breeds in W. Pakistan (Baluchistan, NWF. Province, Punjab) and India in the W. Himalayas (Ladakh, Kashmir, Himachal Pradesh) between *c.* 700 and 3300 metres alt. Commonly observed (non-breeding) above tree-line up to *c.* 5500 m. No direct evidence as yet of breeding in E. Himalayas or Assam. If found, racial identity will need establishing. Winters throughout both Pakistans, Nepal and all India — plains and up to the highest peninsular hills — its numbers vastly augmented by extralimital migrants, and overlapping with the other races. Also winters in Ceylon, Andaman, Laccadive, and Maldive islands. Affects open grassland, hill and plain; also cultivation and semi-desert.

Extralimital. Also breeds in the Palaearctic Region, in Europe roughly from between latitude 60° and 70°N. and eastward through the Ural Mountains and W. Siberia to Tarbagatai and Altai; southward to N. Africa and east through most of W. Asia to Mongolia and the Amur. Winters south of these areas including the Indian subcontinent.

MIGRATION. Seen in the plains (non-breeding localities) in winter, between September/October and March/April. No ringing or other precise data. Visual records of earliest and latest dates of arrival and departure vitiated by uncertainty in racial identification. In N. Baluchistan (Chagai) northward migration (of nominate race) observed in progress in April (Christison, JBNHS 43: 484); near Kabul and in N. Afghanistan (race?) between 13 April and 11 May (Meinertzhagen, *Ibis* 1938: 702). From the fact of single birds (same individuals?) frequently found roosting in the selfsame spots winter after winter — e.g. a particular niche or cornice in a ruin — the species probably 'home true' to its winter quarters.

GENERAL HABITS. Usually met with singly in well staked-out feeding territories, perched on the selfsame mound, bush or telegraph pole day after day on the lookout for creeping prey, bobbing its head up and down to focus on some movement in the grass, pouncing to the ground from time to time and returning with the victim to its base. But the kestrel's most characteristic method of hunting, in which it surpasses all other birds of prey employing similar tactics, is its hovering. As it quarters its feeding territory, 30 metres or so above, the bird suddenly stops dead in its flight face to wind, poising stationary in mid-air for many seconds at a time on rapidly vibrating wing-tips and fanned-out tail to investigate the ground below. On further suspicion the bird drops a step lower, finally pouncing silently on the quarry and bearing it away in its claws. In a strong headwind seems to enjoy remaining effortlessly suspended aloft, as on some invisible wire, for minutes together (once timed 5 minutes +, SA) with no movement except an almost imperceptible spreading and narrowing of the tail and tilting of wingtips, the bird often drifting backwards with the current. In hovering flight body held horizontally, not tilted to wind as in Lesser Kestrel, q.v. In the breeding season pairs engage in spectacular aerial display around their nesting cliffs, stooping and darting at each other, zooming upward with the wind currents and eddies, and hovering prettily on vibrating wings (quite distinct from normal hovering) to the accompaniment of a shrill *ki-ki-ki* or *tit . . . wee.*

FOOD. Chiefly insects, frogs, lizards, small rodents, and rarely nestlings or small birds. Specifically recorded: locusts, grasshoppers, mole-crickets (*Gryllotalpa*), beetles (Coleoptera), winged termites. Above tree-line in Garhwal (*c.* 4500 m. alt.) mainly a single grasshopper (*Anaptygus* sp.) and a lizard (*Lacerta* sp.). Birds: crag martin (*Hirundo rupestris*), warbler (*Scotocerca inquieta*), painted bush quail (*Coturnix erythrorhyncha*) and lark (sp.?). Mammals: field mice, voles (*Microtus* spp.).

VOICE and CALLS. As above. No others recorded in India.

BREEDING. *Season*, in the W. Himalayas April to June. *Nest*, of twigs, roots, rags, and rubbish placed in a hole or crevice, or on the ledge of an inaccessible cliff; rarely in the wall of a ruined building. Occasionally a disused nest, e.g. of magpie or crow, utilized. *Eggs*, 3 to 6, oval, pale pinkish or yellowish stone-colour, profusely speckled and blotched with various shades of red. Average size of 100 British eggs 39·73 × 31·77 mm. (Witherby). Baker gives for 68 eggs (apparently this race and *interstinctus* mixed) 39·3 × 31·6 mm. Eggs laid at least at two-day intervals, sometimes three and even four; incubation period 27–29 days (Witherby). Both sexes incubate, but chiefly female.

MUSEUM DIAGNOSIS. Differs from Lesser Kestrel in wing formula (see diagram under 221). Brick-red mantle of male spotted with black. Claws *black* in both sexes *v.* pale yellow. For details of plumages see Witherby 1939, 3: 28–31; Baker, loc. cit.

MEASUREMENTS of nominate European birds:

	Wing	Bill (from cere)	Tarsus	Tail
♂♂	230–252	13–15	37–41	150–173 mm.
♀♀	235–267	—	—	— mm. (Witherby)

Of Indian specimens including breeding birds from W. Himalayas:

		(from skull)		
23 ♂♂	231–258	19–22	36–46	154–175 mm.
17 ♀♀	241–270	20–22	36–43	158–183 mm. (SA, HW)

COLOURS OF BARE PARTS. Iris brown. Bill slaty blue, black at tip, yellow at gape and base; cere and orbital skin yellow. Legs and feet yellow to orange-yellow; claws black.

223. **East Himalayan Kestrel.** *Falco tinnunculus interstinctus* McClelland

Falco interstinctus McClelland, 1840 (1839), Proc. zool. Soc. London, pt. 7: 154 (Assam)

Falco tinnunculus japonensis Ticehurst, 1929, Bull. Brit. Orn. Cl., 50:10 (New name for *Falco tinnunculus japonicus* Temminck & Schlegel, 1844 *in* Siebold, Fauna Jap., Aves, 2, pl. 1 and 1B (Japan) *nec Falco japonicus* Gmelin)

Baker, FBI No. 1741, Vol. 5: 62

Plate 12, fig. 5, facing p. 224

LOCAL NAMES. As for 222.

SIZE. Same as the European Kestrel.

FIELD CHARACTERS. Indistinguishable from European Kestrel with certainty in winter when their ranges overlap. See Museum Diagnosis.

STATUS, DISTRIBUTION and HABITAT. Status uncertain. No evidence of breeding in Eastern Himalayas as yet. Breeding birds from NW. Himalayas, assigned by Baker as *interstinctus* (*Nidification*, 4: 41), shown by Ticehurst (*Ibis* 1923: 262) and Whistler (JBNHS 38: 420-1) not to differ from nominate race. Therefore, as presently known, only a winter visitor to the Eastern Himalayas (west at least to Nepal); Assam, Manipur, E. Pakistan (Sylhet, Chittagong), eastern India (Orissa), S. India (Coimbatore, Kerala). Also to Ceylon, and Andaman Islands (Biswas). But dispersal and numerical status imperfectly known due to great variability in the species, difficulty of discrimination and wide overlapping of the races in winter.

Extralimital. Breeds in Japan, NE. China, SE. Tibet, east Central Asia and Szechuan. Winters in India, Burma, (Indochinese countries?), SE. China.

GENERAL HABITS, FOOD, VOICE. As in 222.

BREEDING. Extralimital. Nest, eggs, etc. as in nominate race.

MUSEUM DIAGNOSIS. Differs from the nominate race in both sexes being more heavily barred above. Also has a bright foxy red phase not found in *F. t. tinnunculus*.

MEASUREMENTS. The range covers that of the nominate race. Three recent specimens from Nepal and Sikkim measure:

	Wing	Bill (from skull)	Tarsus	Tail
2 ♂♂	235–252	20–21	—	153–169 mm.
1 ♀	260	22	41	179 mm. (BB, SA)

COLOURS OF BARE PARTS. As in 222.

224. **Indian Kestrel.** *Falco tinnunculus objurgatus* (Baker)

Cerchneis tinnunculus objurgatus Baker, 1927, Bull. Brit. Orn. Cl., 47: 106 (Ootacamund, Nilgiris, S. India)
Baker, FBI No. 1744, Vol. 5: 65

LOCAL NAMES. As for 222.

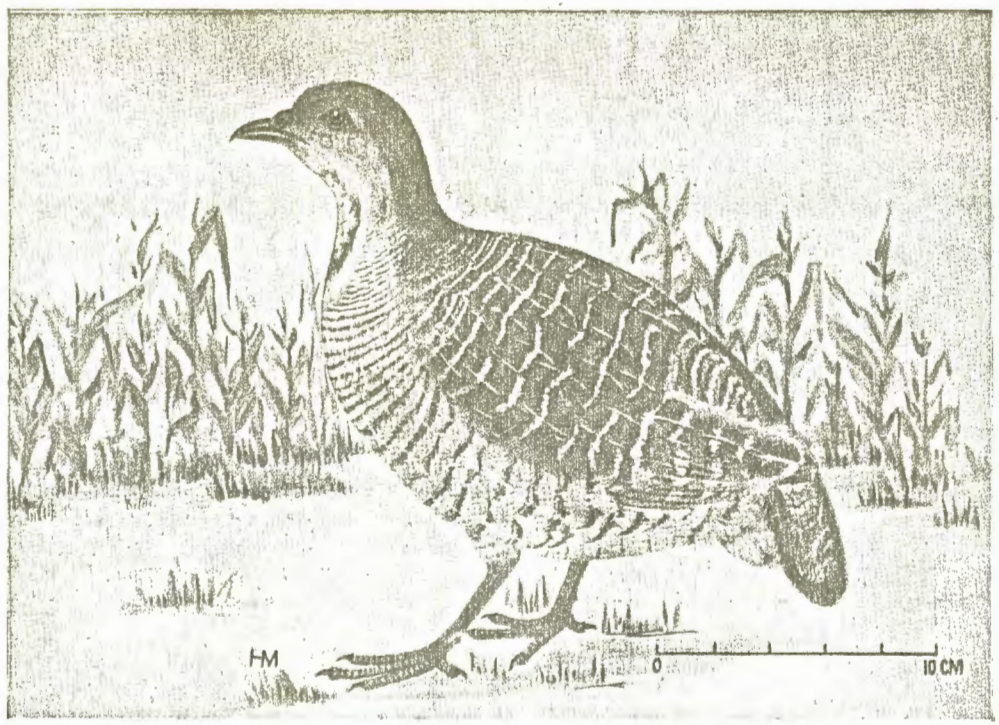
SIZE. European Kestrel ±.

FIELD CHARACTERS. Like the European Kestrel (222) but slightly smaller. Both sexes more brightly and richly coloured generally, with very rufous underparts. Not always distinguishable from other races. See Museum Diagnosis.

STATUS, DISTRIBUTION and HABITAT. Breeds in the Western Ghats complex from Khandesh south to Kanyakumari, including the Nilgiri, Palni, and associated hills; the Shevaroy Hills and possibly other portions of the Eastern Ghats. Breeds also in Ceylon (hills of the Central Province). Winter dispersal not properly known.

GENERAL HABITS, FOOD, VOICE, etc. As in 222.

BREEDING. *Season*, January to March in the peninsular hills (*c.* 1200–2500 m.); March to June in Ceylon (*c.* 1000–1440 m.). *Nest*, a sketchy pad of straw, etc. in a cleft or hole in a precipitous cliff, usually inaccessible. *Eggs*, 3 to 6 indistinguishable from those of the nominate race, q.v. Average size *c.* 38 × 30 mm. (Baker).



27. GREY PARTRIDGE

(Francolinus pondicerianus)

Hindi: *Sāfēd teetăr, Teetăr*

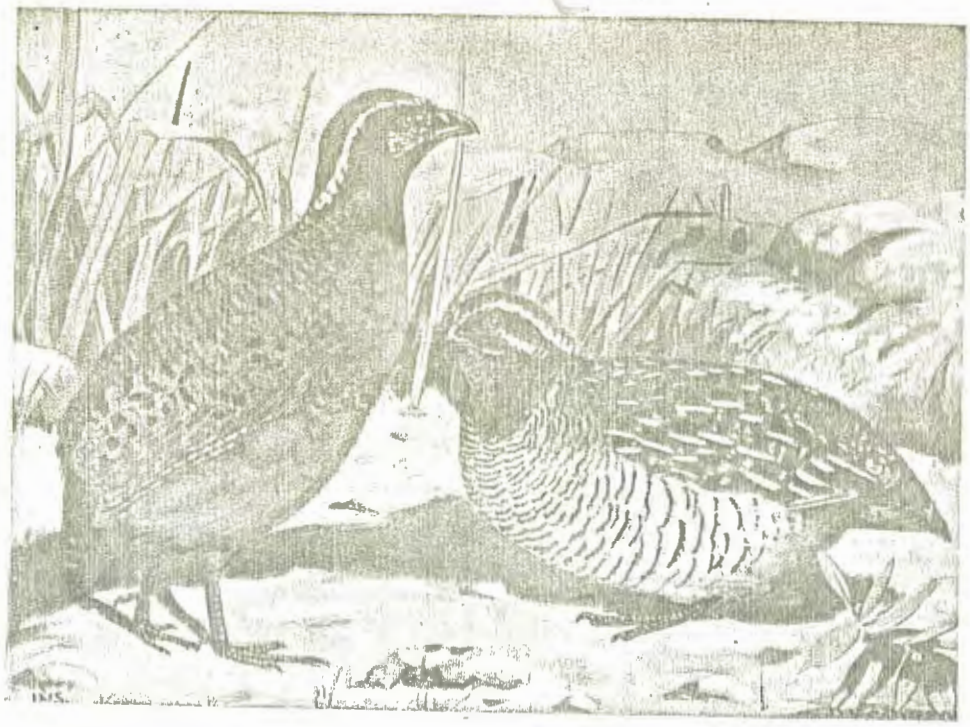
A resident of dry open scrub country, commonly found in small coveys except when paired off for breeding. The birds scratch the ground and cattle dung for seeds, grain and insects, and run about swiftly with a jaunty carriage. The call of the cock is a loud challenging *pateela pateela pateela* familiar to most mofussil dwellers. Young birds are easily tamed.

28. BLACKBREASTED or RAIN QUAIL

(Coturnix coromandelica)

Hindi: *Chinā bătēr, Chănăk*

A typical quail found in pairs or small parties around cultivation and grassland, paddyfields or mofussil gardens, particularly in the monsoon due to the widespread availability of food and cover. It moves about the country a good deal, but its seasonal wanderings are as yet little understood. The call of the male is a musical double whistle *which-which, which-which*, and so on.



29. JUNGLE BUSH QUAIL

(Perdicula asiatica)

Hindi: *Lowwā*

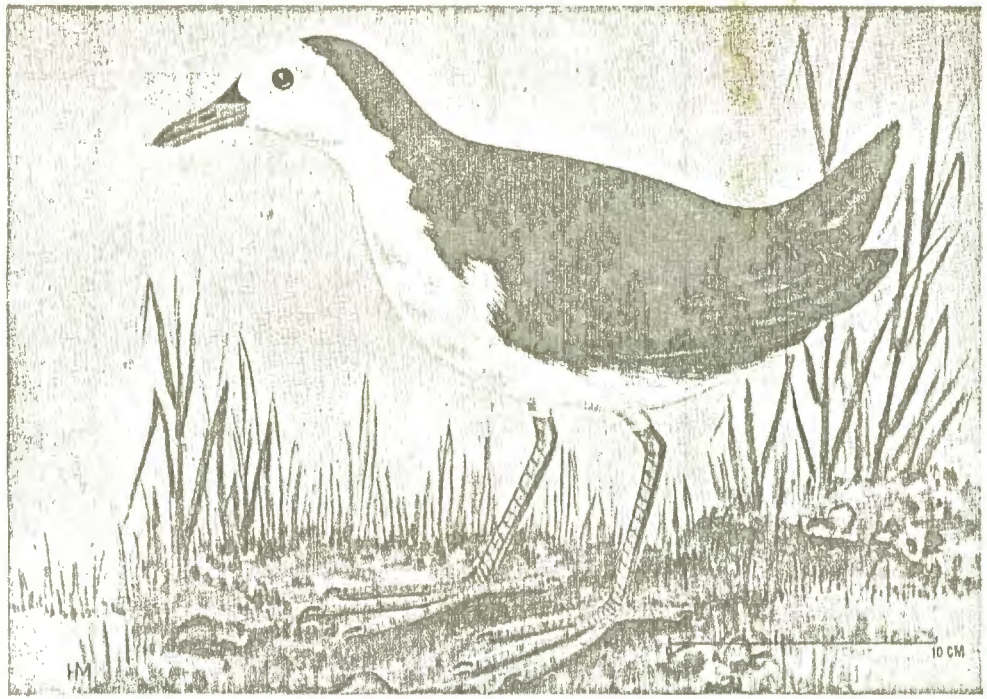
Resident throughout India in dry open forest and stony country as well as grass-and-scrub jungle. They live in coveys of five to twenty and have the habit of bunching together when resting, all the birds facing outwards, and rising simultaneously with a whirr, or 'exploding', when almost trod upon. At night they roost on the ground within a bush in the same formation. Their food consists of grain, grass-seeds and tender shoots.

30. GREY JUNGLEFOWL

(Gallus sonneratii)

Hindi: *Jăngli mūrghi*

The Grey Junglefowl, restricted to western India, is met with singly, in pairs, or in small groups in forest, especially in the neighbourhood of cultivation. It is shy and timid and when feeding in fields or on cross-country forest roads in the mornings and evenings it seldom ventures far from cover. Its food consists of grain, shoots, and windfallen figs and berries; also termites and other insects. The crow of the cock is a loud *kuck-kaya-kaya-kuck.*



33. WHITEBREASTED WATERHEN

(Amaurornis phoenicurus)

Hindi: *Jăl mūrghi, Dāhūk* (Bihar)

A denizen of reeds and shrubbery on the margins of jheels and village tanks, the birds becoming quite tame and unafraid of man where unmolested. They are exceedingly noisy in the rainy season which is their nesting time. The call which begins with loud croaks, grunts and chuckles, settles down to a monotonous *kook-kook-kook*, repeated endlessly throughout the night and on cloudy days.

34. PURPLE MOORHEN

(Porphyrio porphyrio)

Hindi: *Kaim, Kharim, Kalim, Kărmā* (Bihar)

This handsome, long-legged, purplish blue rail also frequents reed and rush-covered swamps, tanks, and jheels. The birds keep in parties and spend their time searching for food—vegetable matter, insects, and molluscs—stalking or skulking through the reed-beds or clumsily clambering up and clinging to the stems. The flight, though it seems feeble, is quite fast, the long red legs and large feet trailing awkwardly behind.

WHITE-BREASTED WATERHEN,

Amaurornis phoenicura

(app. 32 cm - 12 in)

This species of waterhen is found in many parts of the Orient. The typical race occurs throughout India, Ceylon and Burma. Other races live in Japan, China and Indonesia.

White-breasted Waterhens live in the vicinity of water in places where there is sufficient cover, and are often seen close to villages and in gardens. In behaviour they are very similar to the European waterhen though rather more timid. When alarmed they scuttle away to conceal themselves in reeds or under bushes. They jerk their short tails up and down as they walk. If they are unable to seek refuge in the undergrowth they will fly up, trailing their feet. They feed on worms, seeds, grasshoppers and many other kinds of insects.

They are very noisy, particularly in spring, and the pairs defend their territory vigorously against other members of the species. The hen makes the nest in a hollow using a few water-plants and lays 4-8 eggs, which are creamy-stone in colour marked with purple and reddish-brown. The breeding season is from June to October.

Then suddenly lowers head steeply and utters a number of deeper, hollower, metallic notes *utumb-utumb-utumb* (*u* as in 'put') more rapidly than the previous series. (The *utumb* sound is of the volume and quality of a lemon-sized pebble dropped into a deep well.) After 10 or 12 *utumbs* raises head again, uttering maybe 5 or 6 *kluck-kluck-kluck* notes while doing so. With head back in the original position the bird is now ready to begin it all over again. The calling continues thus for half an hour (or more) at a stretch. It is accompanied by a puffing out of the neck and raising of its feathers as in a Bittern (*Botaurus*) booming (K. K. Neelakantan, JBNHS 55: 560-1).

BREEDING. *Season*, chiefly the monsoon months, June to September. In Ceylon, May and possibly July-August (January-February also recorded); in the Maldives June-July (Phillips). *Nest*, a large concave or deep cup-shaped pad of sedges, rush-leaves, grass, etc. sometimes domed over with the surrounding substrate to form a bower. Placed in tangled reed-beds in large swamps and jheels, or amongst standing rice plants in an inundated rice-field. *Eggs*, normal clutch 3 to 6 (sometimes up to 8 and even 9) rather long ovals closely resembling Coot's; from almost white through pale pink or yellowish stone-colour to deep brick-pink, with longitudinal blotches and spots of reddish brown fairly profuse all over but slightly denser at the broad end. Average size of 100 eggs 42·2 × 31·0 mm. (Baker). Cock probably monogynous, but not proved. Also not known whether he assists in incubation; period unrecorded.

MUSEUM DIAGNOSIS

Chick (in down). Black above, more brownish below.

MEASUREMENTS

	Wing	Bill ('culmen')	Tarsus	Tail
♂♂	211–227	37–38	75–77	77–83 mm.
♀♀	172–184	32–34	65–68	65–75 mm.

(Baker)

COLOURS OF BARE PARTS. ♂ (breeding). Iris bright red. Bill and shield at base blood red, paling to dusky yellow at tip; 'horn' bright red. Legs and feet dull to bright red. ♀ and non-breeding ♂: iris yellow or yellowish brown. Bill and small triangle at its base (on forehead) yellowish. Legs and feet dull greenish brown.

MISCELLANEOUS. Highly prized as a fighting bird in Sylhet, East Pakistan, large sums of money being wagered on the mains. Fanciers used to collect the eggs and hatch them with the heat of their own bodies in a half-coconut shell for protection, wrapped in cloth and kept tied against their bellies day and night. Incubation takes about 24 days, during which time the human incubator is constrained to eschew all baths! Whether this practice is still in vogue is not known.

Genus GALLINULA Brisson

Gallinula Brisson, 1760, Orn. 1: 50; 6: 2. Type, by tautonymy, *Gallinula* Brisson = *Fulica chloropus* Linnaeus

Toes extraordinarily long, fringed with narrow straight-edged lateral membranes (not broad and lobed as in Coot). Middle toe without claw much longer than tarsus. Bill of moderate length, base of culmen continued on forehead as a flat rounded frontal shield, red in adults; nostrils long and narrow. Second primary (as.) longest, or 2nd and 3rd subequal; 1st primary about equal to 5th or 6th.

Genus widespread in the Old and New Worlds; only a single species within our limits.

347. **Indian Moorhen.** *Gallinula chloropus indica* Blyth

Gallinula chloropus? var. *indicus* Blyth, 1842, Jour. Asiat. Soc. Bengal 11: 887 (Calcutta)
Baker, FBI No. 2026, Vol. 6: 28

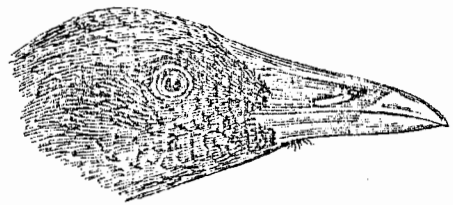
Plate 24, fig. 3, facing p. 128

LOCAL NAMES. *Jāl mūrghi, Pāni mūrghi* (Hindi); *Tech* (Kashmiri); *Bodor* (Bihar); *Jāl mūrgi, Dakab paira* (Bengal); *Jumbu kōdi, Bolli kōdi* (Telugu); *Paat ūren* or *ūrel* (= 'lake waterhen'—Manipur); *Wil kukkulā* (Sinhala); *Tannīr kōzhi, Kānān kōli* (Tamil); *Pātta kōzhi* (Malayalam); *Jāl kūkādi* (Gujarati); *Pān kōmbdi* (Marathi).

SIZE. Grey Partridge ±; length *c.* 32 cm. (12½ in.).

FIELD CHARACTERS. General effect on land typical of rail; on water that of a small duck.

Adult. *Above* black, slaty grey and brown with a diagnostic white border to the closed wings. *Below* slaty grey, paler and whitish on centre of abdomen. Under tail-coverts white with a black central patch. Green bill, bright red frontal shield on forehead, longish green legs with long slender toes are additional pointers. Sexes alike.



× *c.* 1

Young (immature). Overall more brown less grey, the lower parts much mixed with white. Bill and frontal shield greenish brown.

For downy chick see Museum Diagnosis.

STATUS, DISTRIBUTION and HABITAT. Resident and partly winter visitor, when its numbers everywhere get vastly augmented. All India, both Pakistans, Nepal, Ceylon. Chiefly lowlands, but also breeding up to considerable elevations in the outer Himalayas and peninsular hills, e.g. to *c.* 2400 metres in Kashmir and *c.* 2000 m. in the Nilgiris. Affects jheels and swamps, with beds of sedges and bulrushes, and tangles of lotus and other floating vegetation interspersed with sheets of open water. Also reed-margined ponds, village tanks, ditches, etc. Shifts locally with water conditions.

Extralimital. Southern Tibet, S. and E. China, Japan, Burma, Thailand, central Malay Peninsula, Cambodia, Hainan (?), Formosa and the Ryukyu Islands.

MIGRATION. No ringing data. In the Kurram Valley, NW. Pakistan (where small numbers breed) recorded as occurring chiefly on spring migration passage in March and April (Whitehead, 1909, *Ibis*: 271). Passes through Chitral in May (Perreau, JBNHS 19: 920). Common only on passage in Gilgit in April and October (Scully, SF 10: 142).

GENERAL HABITS. Keeps in pairs or small parties; after influx of winter migrants in larger congregations, often of 50 or more. Spends most of its time on the water, paddling about amongst the lily pads and other floating

vegetation. Rides high like a duck, its swimming accompanied by rhythmical jerky bobs of the head and upward flicks of the erect tail, flashing the white coverts underneath. This action also characteristic as the bird saunters about with an upright carriage over the floating tangles in search of food. Usually keeps to the edge of reed-beds, withdrawing into them quickly and quietly on alarm. Trusts to its legs and paddling for escape, and flies reluctantly, either clambering up reed stems to launch itself from a height or skittering along the water like a coot to get airborne. Is a seemingly feeble flier with rapidly flapping wings and dangling legs but capable of sustained long-distance migration over high mountains. Can dive creditably when hard pressed.

FOOD. Omnivorous: seeds, fruits, and shoots of water-plants, molluscs, insects and their larvae, young frogs and small fish. Sometimes wanders into cultivation away from swamps to feed in the early morning and at dusk, and to some extent nocturnally.

VOICE and CALLS. Normally very quiet, only an occasional loud *karuck* announcing its presence in a reed-bed. Noisy when breeding, mostly in the mornings and evenings — a sharp, loud and abrupt *kirrik-krek-rek-rek* constantly uttered. Also a number of softer chuckling notes. 'A cackling "laugh" lower in pitch than the Little Grebe's' (Nicholls). Clucking noises when alerting or commanding chicks: 'Unborn chicks even before breaking the shell understand these calls of their parents, ceasing their subdued chirping the moment they hear the danger call' (R. S. P. Bates, 1952: 295).

BREEDING. *Season*, in Kashmir (where it is perhaps the commonest water bird and breeds abundantly on the Dal, Anchar, and other lakes) May to August, chiefly June and July; in the Peninsula during the SW. monsoon months July, August, September; in Ceylon March to August. Sometimes two successive broods raised. *Nest*, a bulky mass of sedges and bulrush leaves placed in a dense reed-bed a few inches above water level; rarely even in a tree near or overhanging water. *Eggs*, 5 to 12, pale yellowish to warm buff stone-colour, thinly and more or less evenly spattered all over with small blotches of dark reddish brown. Average size of 71 eggs 41·4 × 29·6 mm. (B. B. Osmaston, 1927, JBNHS 32: 146). Both sexes share nest-building, incubation and care of the young; incubation period *c.* 21 days. The perturbed parents occasionally slap the water with the wings (akin to injury-feigning) in an attempt to draw away the intruder from the brood.

MUSEUM DIAGNOSIS. For details of plumages (and bionomics) of the nominate race see Witherby, 1941, 5: 197–204. *G. c. indica* differs from it only in being somewhat smaller, with a relatively smaller bill.

Chick (in down). Deep grey-black all over.

MEASUREMENTS

	Wing	Bill (from feathers)	Tarsus	Tail
♂♀	152–172	♂♂ 38–41 ♀♀ 32–35	47–50	52–68 mm. (Baker)

Female only slightly smaller than male.

11 ♂♀ tarsus 46–50 mm.; middle toe without claw 55–67 mm. (V. C. Ambedkar).

COLOURS OF BARE PARTS. Iris red. Frontal shield and base of bill red, the terminal third greenish yellow. 'Tibia and front of tarsus greenish yellow, hinder part of tarsus and all toes slaty green; an orange ring round the tibia just below the feathered portion' (Oates).

347a. **Malay Moorhen.** *Gallinula chloropus orientalis* Horsfield

Gallinula orientalis Horsfield, 1821, Trans. Linn. Soc. London, 13: 195 (Java)

LOCAL NAMES. None recorded.

SIZE and FIELD CHARACTERS. As of 347. See Museum Diagnosis.

STATUS, DISTRIBUTION and HABITAT. A single example collected in March 1964 near Port Blair marks an addition to the avifauna of the Andaman Is. as well as of India. Status not known (Abdulali, JBNHS 61(3): 514–15).

Extralimital. Southern Malay Peninsula, Sumatra, Java, Borneo, Kangean, Bali, Lombok, Sumbawa and Celebes (Sulawesi) — Peters.

GENERAL HABITS, FOOD, VOICE and CALLS. Unrecorded.

BREEDING. Unrecorded.

MUSEUM DIAGNOSIS. Differs from 347 in having the frontal shield wider, extending back on forehead to above the eyes. Plumage somewhat darker, practically the entire upperparts being without any olive-brown tinge.

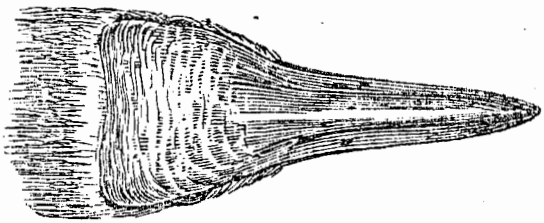
MEASUREMENTS. Sex? Wing 170; bill (from gape) 30 mm. (Abdulali).

COLOURS OF BARE PARTS. As in 347.

Genus PORPHYRIO Brisson

Porphyrio Brisson, 1760, Orn. 1: 48; 5: 522. Type, by tautonymy, *Porphyrio* Brisson = *Fulica porphyrio* Linnaeus

Large moorhens distinguished by blue coloration and by the broad frontal shield covering the whole anterior crown, and truncated posteriorly. Bill deep, short, and compressed. Nostril short, rounded, not placed in a groove. Wing rounded: 1st



From above, × *c.* 1

primary (as.) equal to 6th or 7th; 2nd, 3rd and 4th longest and subequal. Tarsus and toes very long and powerful. Sexes alike.

Genus represented in Africa, Madagascar, the Mediterranean region, S. Asia, Malay Archipelago to Australia, New Zealand and the Pacific islands. A single species within our limits.

PORPHYRIO PORPHYRIO (Linnaeus)

Key to the Subspecies

Generally larger, particularly tarsus and toes. Tarsus 92 to 97 mm.; middle toe without claw 100 to 104 mm.....*P. p. seistanicus*

358. **Pheasant-tailed Jaçana.** *Hydrophasianus chirurgus* (Scopoli)

Tringa Chirurgus Scopoli, 1786, Del. Flor. et Faun. Insubr., fasc. 2: 92
(' In nova Guiana ' = Luzon *ex* Sonnerat)
Baker, FBI No. 2032, Vol. 6: 42
Plate 24, fig. 8, facing p. 128

LOCAL NAMES. *Piho, Pihuya* (Hindi); *Gūnd kāv, Gair kov* (Kashmir); *Surdal, Sakdal, Mīwa, Dal kūkra, Bhepi, Jāl manjor, Jāl māyūr, Jāl kokra, Chitra billai* (Bengal, Bihar); *Lobo dak* (Santhali); *Rāni didao gophita* = ' Little White Water Princess ' (Cachar); *Yem pārābā* = Cock fowl (Manipuri); *Pān kukkulā, Ballal sēru, Vil giravā* (Sinhala); *Mīwa, Manal purā* (Tamil); *Tāmara kōzhi* (Malayalam).

SIZE. Grey Partridge. Length (excluding tail) *c.* 31 cm. (12 in.).

FIELD CHARACTERS. In breeding plumage a striking white and chocolate-brown rail-like marsh bird with enormous spidery toes and pointed sickle-shaped pheasant tail. Face and foreneck white; hindneck pale silky golden yellow. In flight, the large amount of white in plumage and pointed down-curved tail are diagnostic pointers. In the distance pied colour pattern, long gently curving tail and slow flapping wing-action reminiscent of Magpie (*Pica pica*). Sexes alike; female slightly larger.

In non-breeding (winter) plumage chiefly pale brown and white with a black ' necklace ' on upper breast, and minus the long tail. In flight, hair-brown head and back, and white wings with black tips conspicuous.

Young (immature). No yellow on sides of neck; dark gorget broken up with white. Crown dull rufous-brown; feathers of upperparts pale-edged producing a faintly scalloped effect.

STATUS, DISTRIBUTION and HABITAT. Resident; moving locally with conditions of flood and drought. All India (including Assam and Manipur), both Pakistans, Nepal, Ceylon. In summer normally up to *c.* 1500 metres in Kashmir Valley (once recorded on Vishan Sar lake, *c.* 3700 m.) and the outer Himalayas. A straggler taken in Gilgit (Scully, 1882, SF 10: 142), and once recorded at Patseo in Lahul, *c.* 3800 m. (Whistler, 1925, *Ibis*: 203). Mostly descending to the plains in winter. Affects lotus, *singara* (*Trapa*), water hyacinth (*Eichhornia*) and other floating-vegetation-covered jheels, tanks, and ponds.

Extralimital. Burma, Thailand, and eastward to S. China and Formosa, south to Malay Peninsula, Java, Cambodia, Philippine Islands.

GENERAL HABITS. Feeds in the open among the surface vegetation on large jheels as well as small village and temple tanks, sometimes submerging head completely. Trips about lightly on the floating water-lily and *singara* leaves and tangles, the enormous spreading toes functioning like snow-shoes to distribute and support its weight; calmly steps on to the next leaf when the supporting one has slowly sunk down to belly level. Normally not shy: frequently seen moving about complacently on village tanks in the proximity of people noisily bathing and washing round the edge. Gregarious in winter, then often collecting in flocks of 50 to 100 birds. Non-breeding dress very obliterative when feeding amongst the surrounding dry lily pads, but black-tipped white wings flash into prominence, as in pond heron, when the bird rises. Flight feeble and rail-like, reminiscent also of lapwing, with the large feet dangling behind; seldom more than 2 or 3 metres above the surface. The purpose of the wingspur is obscure. It is apparently not used in fighting.

FOOD. Chiefly vegetable matter — seeds, roots, etc. Also aquatic insects and their larvae, and bivalves and other molluscs.

VOICE and CALLS. In winter a peculiar nasal mewing *lewn, lewn* uttered chiefly when a flock flies off on alarm. In breeding season — ' a loud musical *me-e-ou, me-e-ou* or *me-onp* ' often taken up by another bird in the vicinity. It has many shortened variants ' perhaps the commonest being a loud open *kloo* ' (R. S. P. Bates). A third call described as uttered by the cock alone to attract the female (A. Hoffmann).

BREEDING. *Season*, in Kashmir from about 2nd week of May into July; in the plains during the SW. monsoon, principally June to September; in Ceylon mainly March to July, but also in January. *Nest*, an insignificant skimpy pad or raft of grass or weed stems freely floating or resting on partly submerged vegetation (*Hydrilla*); sometimes eggs laid directly on *singara*, water-lily, or water hyacinth (*Eichhornia*) leaves. *Eggs*, 4, peg-top shaped, glossy greenish bronze or rufous-brown, unmarked. Average size of 100 eggs 37·4 × 27·6 mm. (Baker). Incubation by male alone; period *c.* 26 days.

Contrary to accepted belief and published accounts, now ascertained that the larger female is polyandrous as in Painted Snipe (*Rostratula*). The following facts also established: Male acquires territory in rivalry with other males which female later helps to defend vigorously while her liaison with the owner lasts. Eggs laid at 24-hour intervals, in the morning. Male commences incubation from the first egg. Frequently removes the clutch to a distance maybe of several metres, when disturbed, as by observer's hide. This done by pressing egg between throat and breast and dragging or rolling it over the matted vegetation, himself walking backwards. Eggs similarly floated across any intervening narrow channels of clear water or over partly submerged mat of *Hydrilla* (confirmed and photographed by Peter Jackson). Sometimes by holding pointed end in bill and dragging egg backwards (J. S. Serrao & P. B. Shekar, 1962, *Newsletter for Birdwatchers* Vol. 2(1)). Male tends the nidifugous chicks in early stages with great solicitude, performing ' broken-wing ' and ' rat-run ' distraction displays to mislead an intruder. Downy chicks lie doggo at command often fully submerged, hidden under a floating leaf, except for the bill sticking out at an angle. He rears two, and sometimes three families in a season. How many clutches a female lays in a season here unknown; in China 7–10 clutches recorded at intervals of 9–12 days between each (Hoffmann, A., 1949, *Zoologischer Jahrbücher*, Bd. 78, Heft 4, Jena).

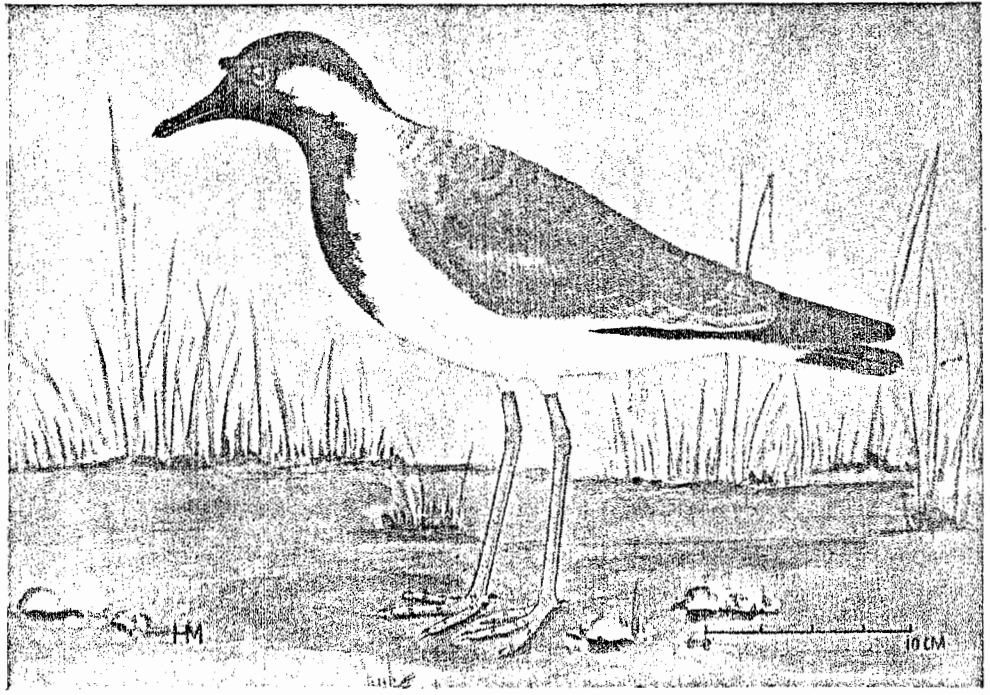
MUSEUM DIAGNOSIS. For details of plumage see Baker, loc. cit.

For description of chick just getting out of down plumage, see Whistler, H., 1940, JBNHS 41: 483.

MEASUREMENTS

	Wing	Bill (from feathers)	Tarsus	Tail
♂♀	182–242	25–29	54–59	145–325 mm. (generally over 200 mm.) (Baker)

COLOURS OF BARE PARTS. *Breeding*. Iris brown. Bill slaty blue, paler at tip. Legs and feet pale bluish plumbeous. *Non-breeding*. Iris pale yellow. Bill basal half yellow, terminal half brown. Legs and feet dull greenish to dull plumbeous (Baker).



37. REDWATTLED LAPWING

(Vanellus indicus)

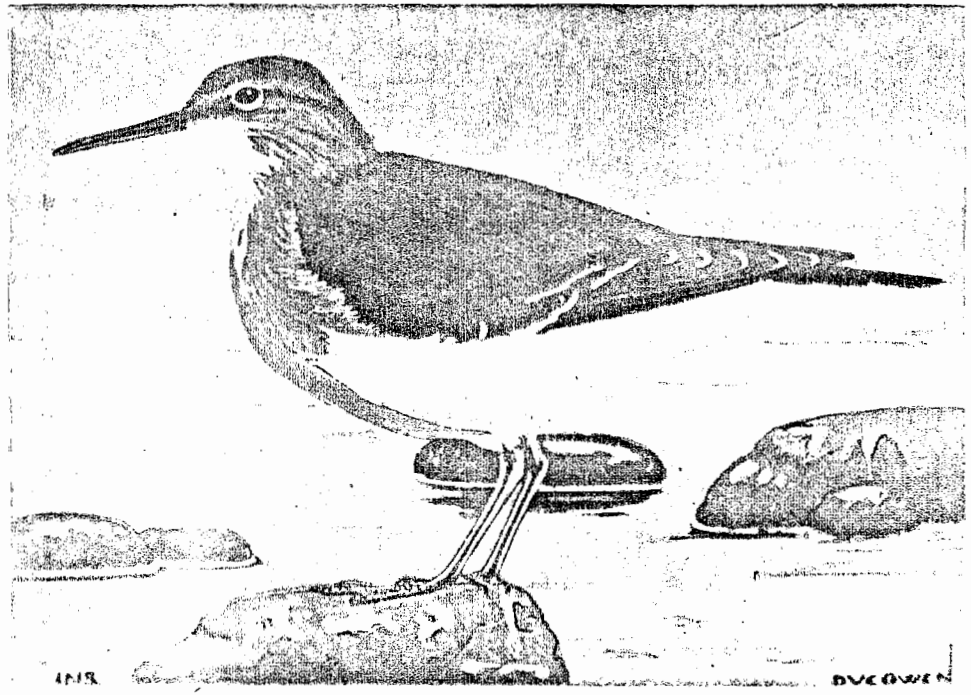
Hindi: *Titeeri*

A common and familiar plover, haunting open country and cultivated land, and the margins of tanks and jheels. Pairs, or parties of three or four may also be met with in forest glades and clearings. They spend their time running about in zigzag spurts with quick mincing steps, picking up insects, grubs, molluscs, etc. The bird is best known from its distinctive and familiar calls—a shrill *did-he-do-it* ? or *pity-to-do-it*, uttered both from the ground and on the wing, placidly or frantically as the occasion dictates.

38. COMMON SANDPIPER

(Tringa hypoleucos)

An unmistakeable sandpiper with slender pointed bill, found singly at ponds, tanks, tidal creeks and the rocky seashore. It is a winter visitor, but a few individuals sometimes stay behind in the plains when the rest have gone back to their northern homeland in April. It flies with characteristic stiff and rapid wing beats low over the water, uttering a shrill piping *tee-tee-tee*. The food of all sandpipers is insects, worms, molluscs, etc.



COLOURS OF BARE PARTS. Iris brown. Bill black or dark brown, yellowish or orangy at base. Legs and feet dull yellow to bright orange-yellow.

401. **Common Sandpiper.** *Tringa hypoleucos* Linnaeus

Tringa hypoleucos Linnaeus, 1758, Syst. Nat., ed. 10, 1: 149 (in Europa = Sweden)
Baker, FBI No. 2145, Vol. 6: 217
Plate 30, fig. 4, facing p. 272

LOCAL NAMES. *Polte ulanka* (Telugu); *Kōttān* (Tamil); *Sili watuwā* (Sinhala); *Neerkāta* (Malayalam); *Sāmānya tutvāri* (Gujarati); *Findon* (Maldive Is.).

SIZE. Grey Quail; length *c.* 21 cm. (8 in.).

FIELD CHARACTERS. A small-sized sandpiper.

Winter (non-breeding). *Above*, sides of head and neck ashy brown, streaked darker. A broad pale rather indistinct supercilium. Upperparts olive-brown. Rump and tail brown with only the outer tail-feathers white. *Below* white with a broad diffuse dusky band across breast. Sexes alike.

Tail, × *c.* ⅔

A narrow white wing-bar, conspicuous in the peculiar rapid, stiffly vibrating jerky flight low over water, and the shrill piping *tee-tee-tee* are diagnostic pointers.

Summer (breeding). *Above*, darker, less olive, with broader dark shaft-stripes and cross-barring. *Below*, foreneck and breast boldly striated with brown.

STATUS, DISTRIBUTION and HABITAT. Breeds in Kashmir, Ladakh and Garhwal to at least 3200 m. altitude, perhaps higher. Possibly also in N. Baluchistan. Winter visitor to all India (including Assam, NEFA, Nagaland, Manipur), both Pakistans, Nepal, Sikkim, Ceylon, Andaman, Nicobar, Maldive and Laccadive Is. Affects inland waters — streams, tanks, ditches, puddles — as well as rocky seashores, harbours and docks, coastal lagoons, tidal creeks and mangroves.

Extralimital. Breeds throughout Europe and Asia south of the tundra, south to N. Spain, N. Italy, S. Russia, Iran, Mongolia, Manchuria, Japan. Winters in Africa, India, Ceylon, SE. Asia north to S. China, Taiwan, the Philippines, Malay Archipelago to Australia.

MIGRATION. No ringing data. On passage through Chitral end April and May (Fulton, Perreau); Kohat and Kurram 'autumn and spring' (Whitehead); N. Baluchistan early April to end May and return in August (Ticehurst); Nepal Valley 'First 8 August, last 27 April' (Proud). Amongst our earliest 'winter' visitors. Scattered vanguard already arrives in northern as well as peninsular India by mid July or early August, but position rather confused by odd non-breeding examples commonly oversummering in their winter quarters.

GENERAL HABITS. Usually keeps solitary or in scattered twos and threes running about at the water's edge, picking up titbits cast up by the wavelets

COLOURS OF BARE PARTS. Iris dark brown. Bill black. Legs and feet horny brown or reddish black.

370. **Yellow-wattled Lapwing.** *Vanellus malabaricus* (Boddaert)

Charadrius malabaricus Boddaert, 1783, Table Pl. enlum.: 53
(Malabar Coast, *ex* Daubenton, pl. 880)
Baker, FBI No. 2128, Vol. 6: 190
Plate 27, fig. 6, facing p. 208

LOCAL NAMES. *Ẓirdi* (Hindi); *Jithiri* (W. Pakistan); *Laori* (Mhow, M.P.); *Chitawa* (Telugu); *Ālkātti* (Tamil); *Manjakkanni* (Malayalam); *Kiraluwā*, *Kiralā* (Sinhala).

SIZE. Grey Partridge —; *c.* 27 cm. (10½ in.).

FIELD CHARACTERS. A leggy sandy brown plover with white belly, black cap, bright yellow lappets of skin above and in front of eyes and bare yellow legs. In flight a white bar (secondaries and greater coverts) on the black wings conspicuous. *Above*, crown of head ('skull-cap') silky black, surrounded by a thin white line. Upperparts sandy brown; tail white, with a broad black terminal band. *Below*, chin and throat black; breast sandy brown; rest of underparts white separated from breast by a thin black line. Sexes alike.

Young (immature). *Above*, pale sandy brown narrowly barred with rather darker brown. *Below*, chin whitish; throat and upper breast with traces of darker brown marks.

STATUS, DISTRIBUTION and HABITAT. Resident, with some local migratory or nomadic movement away from wetter areas in monsoon; thus appearing in many parts only as a winter (dry-season) visitor. From cis-Indus lower Sind in West Pakistan eastward through N. India to W. Bengal and E. Pakistan. Nepal Valley (occasional). Southward throughout the Peninsula; Ceylon (low-country Dry zone). Affects barren waste land, stubbles, and fallow fields in drier biotope than Redwattled Lapwing. Much less dependent on proximity of water; even near jheels keeps to a higher zone away from muddy shores.

GENERAL HABITS. Very similar to those of the Redwattled Lapwing (366) except that it frequents drier facies and is less dependent on the proximity of water: sometimes the two species occur side by side. Usually met with in pairs, only occasionally in small parties of 5 or 6. On the whole much less noisy and demonstrative than Redwattled. Under excitement the black cap sometimes stands up on the crown like the long erect pile of a silken carpet, reminiscent of a miniature steep-sided tableland !

FOOD. Chiefly insects — grasshoppers, beetles, etc.

VOICE and CALLS. Not like Redwattled Lapwing's as stated by Baker but a plaintive long-drawn *ti-ee, ti-ee* punctuated by a high-pitched, quick-repeated *twit-twit-twit-twit*. Uttered chiefly when nest or chicks approached, the parents circling agitatedly overhead, diving at and making as if to strike the intruder.

BREEDING. *Season*, over most of its range March-April to July; occasionally (as in Ceylon) to August. *Nest*, an unlined shallow scrape on dry open sunbaked fallow- or waste land, sometimes encircled by a parapet of pebbles or *kankar* (mud pellets). *Eggs*, 4, of the normal peg-top shape of plovers' eggs, usually arranged in nest with pointed ends inward to occupy least space. Colour, buff to olive-stone, irregularly blotched with dark brown and purplish grey. Average size of 200 eggs 36·4×26·9 mm. (Baker). An erythristic type of egg often found which when laid on red laterite soil (as usual but not invariable), proves adaptively coloured in a high degree. Both eggs and downy chicks superbly camouflaged on the bare ground — the latter buffy or fawn-grey, disruptively stippled with black and rufous. A broad white collar on hindneck further disrupts the pattern in an astonishing way, but once spotted, this same feature becomes conspicuous enough thereafter to betray the chick 'freezing' in the open every time. Both sexes share in incubation; period not recorded. As in Redwattled Lapwing the birds regularly wet their belly feathers in very hot weather before taking turns on the eggs. Water carried thus even after hatching of the first chicks evidently for quenching their thirst; possibly also to small chicks after they wander away from the nest. (For observations on incubatory adaptations in this species see Jayakar, S. D. & Spurway, H., 1965, *Zool. Jahrb., Abt. allgemeine Zool. u. Physiol.*: 53–72.)

MUSEUM DIAGNOSIS. Bill slenderer than in *Vanellus indicus* (366). Tarsus long and slender with transverse shields in front instead of reticulations throughout. No hind toe. 2nd primary (as.) generally longest in both sexes; 1st and 3rd subequal.

MEASUREMENTS

	Wing	Bill (from skull)	Tarsus	Tail
♂♂	186–205	26–29	60–65	72–84 mm.
♀♀	181–205	28–30	57–62	71–80 mm. (SA, HW)

There is a clinal increase in size from south to north but no difference in coloration.

COLOURS OF BARE PARTS. Iris white to silver-grey or pale lemon-yellow. Bill black, yellow or greenish yellow at base and gape. Legs and feet bright yellow.

Genus PLUVIALIS Brisson

Pluvialis Brisson, 1760, Orn. 1: 46; 5: 42. Type, by tautonymy, *Pluvialis aurea* Brisson = *Charadrius pluvialis* Linnaeus

Squatarola Cuvier, 1817 (1816), Règne Anim. 1: 467. Type, by tautonymy, *Tringa squatarola* Linnaeus

Wings long and pointed: first primary (as.) longest. Tail short and rounded. Tarsus covered with hexagonal scales all round; outer and middle toes connected by a small web at their base. Sexes alike but with a distinct breeding plumage sometimes partially seen whilst the birds with us. A small hind toe present in *P. squatarola*; absent in *P. apricaria* and *P. dominica*.

Genus more or less Holarctic.

Key to the Species

SIZE. Grey Partridge —; length *c.* 27 cm. (10½ in.).

FIELD CHARACTERS. Similar to Grey Plover (371).

Winter (non-breeding). Like the commoner Eastern Golden Plover (373), q.v., also without a white wing-bar, but with brighter black and gold-spangled upperparts. In flight the *pure white* underwing and axillaries distinguish it from the above which has them greyish brown, and from Grey Plover (371) in which the underwing is white and axillaries black. Sexes alike in all plumages.

Summer (breeding). Brightly gold-spangled above, black below. More or less as Eastern Golden Plover (373) and doubtfully distinguishable from it except in flight, again by the pure white *v.* sooty grey underwing and axillaries.

STATUS, DISTRIBUTION and HABITAT. Winter vagrant. Singly or in small flocks mixed up with Eastern Golden Plover and other waders. Odd specimens identified from West Pakistan (Baluchistan and Sind — Gwadar on Makran coast, Karachi and Sehwan) and from Uttar Pradesh (Lucknow), and Assam (Dibrugarh). Doubtless sometimes overlooked in sportsmen's bags of Golden Plover. Affects muddy shores of jheels, wet pastures, and grassy maidans.

Extralimital. Breeds in Arctic Europe and Asia from Scandinavia to the Yenisey river, south to Latviya and W. Siberia. Winters chiefly in the Mediterranean countries, straggling widely.

GENERAL HABITS and FOOD. As in 373.

VOICE and CALLS. A mournful but not unpleasant musical disyllabic whistle *tloo-ee* constantly repeated, chiefly on the wing. Said to be shriller than of Eastern Golden Plover.

BREEDING. Extralimital. Similar to 373.

MUSEUM DIAGNOSIS. For description of plumage see Baker, loc. cit.; for details of plumage phases and morphology (also bionomics), Witherby, 1940, 4: 364–9.

MEASUREMENTS

	Wing	Bill (from feathers)	Tarsus	Tail
♂♂	188–192	22–25	38–41	60–76 mm.
♀♀	180–191	21–25	—	— (Witherby)

COLOURS OF BARE PARTS. Iris brown. Bill, legs, and feet black.

373. **Eastern Golden Plover.** *Pluvialis dominica fulva* (Gmelin)

Charadrius fulvus Gmelin, 1789, Syst. Nat., 1(2): 687 (Tahiti)
Baker, FBI No. 2120, Vol. 6: 178
Plate 29, fig. 3, facing p. 256

LOCAL NAMES. *Chhōta bātān* (Hindi); *Sona bātān* (Bengal); *Oléyiyā, Rana watuwā* (Sinhala); *Kōttān* (Tamil); *Manal kōzhi* (Malayalam); *Nong-gāng* (Manipuri).

SIZE. Grey Partridge —; length *c.* 24 cm. (9½ in.).

FIELD CHARACTERS. A typical plover with the thick rounded head and short pigeon-like bill, swollen at base.

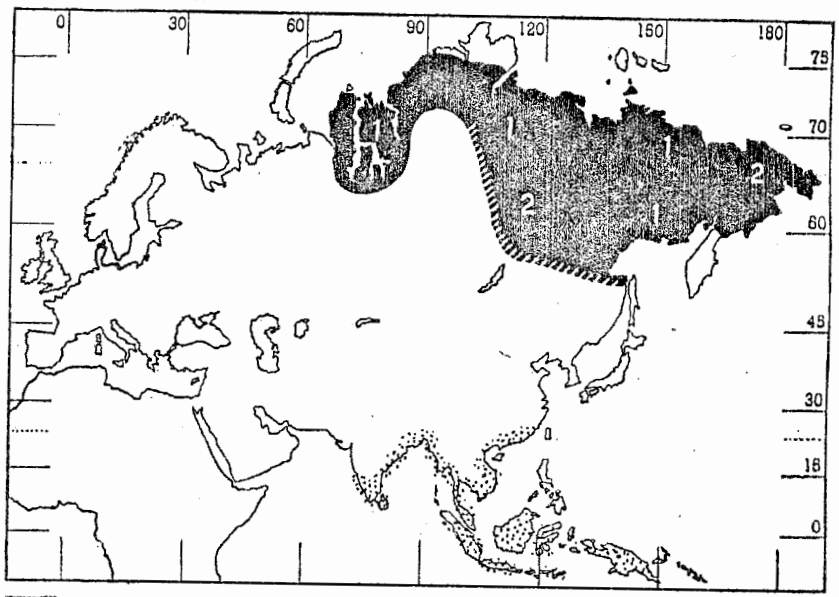
Winter (non-breeding). *Above*, mottled brown, white, and golden yellow. *Below*, whitish, the breast mottled with brown, grey, and yellow.

In flight the very narrow and pointed wings and fanned-out tail (as in a pigeon) are suggestive pointers. Smaller size, absence of white wing-bar, and *smoky grey* underwing and axillaries (*v.* white underwing and black axillaries) distinguish it from Grey Plover; from Golden Plover (372) by colour of underwing and axillaries, which in that species are pure white.

Summer (breeding). *Above*, forehead white running back in a broad band over the eyes and down sides of neck and breast. Rest of upperparts blackish brown spangled with white and golden yellow. *Below*, from throat to vent black.

STATUS, DISTRIBUTION and HABITAT. Winter visitor, chiefly September-October to April. Most abundant in Assam (N. Cachar), Manipur, East Pakistan and eastern India (West Bengal, N. Bihar), more thinly diffused westward to West Pakistan (Sind, N.W.F. Province) and southward through the Peninsula to Mysore, Madras, and Kerala. Nepal (passage migrant?); Ceylon (regular and abundant in the low-country Wet and Dry zones,

Pluvialis dominica



Breeding range Winter **1** *P. d. fulva* (373). **2** *P. d. dominica* (RE).

wandering up to *c.* 1300 m. in the hills); Andaman, Nicobar, Laccadive and Maldive islands. Affects muddy shores of jheels and coastal lagoons, ploughed, freshly sown and partially inundated fields, wet grazing grounds and maidans, tidal mudflats, etc.

Extralimital. Breeds in N. Siberia from the Yalmal Peninsula to the Yenisey river (overlapping the range of *P. a. apricaria*), east to W. Alaska, south in E. Siberia to the Stanovoy Mountains and Kamchatka. Winters in India, Burma, Thailand, Malaysia, Indochinese countries, S. China; also in Oceania, Australia, and Hawaii Is.; straggles west to E. Africa and east to the Pacific coast of N. America.

MIGRATION. No ringing data. Little known beyond that the vanguard already arrives in the first half of August at places as distant from one another as Assam, Ceylon, and the Nicobar islands; mostly young birds of the year accompanied by a few adults in remnants of the breeding plumage. The species is well established over most of its winter range by mid-September, though Ludlow found it still on migration passage on the marshy flats of the Tsangpo river in SE. Tibet and around Lhasa at the end of September (*Ibis* 1944: 386; 1950: 43), and Scully in the Nepal Valley in September-October (SF 1880, 8: 351). Thus autumn migration is apparently a long-drawn process. Return emigration commences by mid-April, but small numbers in partial summer dress commonly linger on till end May or later — a party of 4 in full breeding plumage observed in the Bombay neighbourhood on 17 July (Sálim Ali). Odd birds in non-breeding plumage stay behind all year. Known to be one of the world's longest distance non-stop migrants, flying continuously over more than 3200 km. of the open ocean between the Aleutian islands and Hawaii in an estimated period of 35 hours under favourable weather conditions.

GENERAL HABITS. Gregarious. Usually in flocks of 20 to 50 by itself or in association with other waders. Larger close-packed flocks of several hundred strong not uncommon in eastern India, especially in autumn and spring. Excessively wary and difficult to approach, a feeding flock usually posting sentries at its periphery who give the alarm long before the birds can be approached within gunshot. The flock rises *en masse* almost simultaneously, flying fairly low and at great speed, turning, twisting, and banking in the air in regimented unison. On touching down after a flight the bird suddenly closes its wings and comes to a dead stop, assuming an erect stance. Though so extremely cunning and wide awake on the ground the birds are curiously simple when on the wing. When driven by beaters will often fly past or over an unconcealed gunner with little suspicion till bitter experience has proved their folly. They are good eating and rank high as sporting birds.

FOOD. Grasshoppers, beetles and other insects, tiny molluscs, crustaceans, and worms. Possibly berries and seeds of marsh plants as on its breeding grounds.

VOICE and CALLS. The only calls commonly heard in winter are a clear single whistle *teeh*, or a high-pitched disyllabic *tu-ee* or *tee-tew*, much richer than the Greenshank's.

BREEDING. Extralimital. Similar to 373.

MUSEUM DIAGNOSIS. Axillaries greyish brown as against pure white in *P. apricaria*. For description of plumage see Baker, loc. cit.; for details of plumage phases and morphology (also bionomics), Witherby, 1940, 4: 374–6.

MEASUREMENTS

	Wing	Bill (from feathers)	Tarsus	Tail
♂♂	165–174	21–27	39–46	59–64 mm.
♀♀	158–175	22–26	—	— (Witherby)

COLOURS OF BARE PARTS. Iris dark brown. Bill black. Legs and feet slaty grey.

STATUS, DISTRIBUTION and HABITAT. Has been obtained as a vagrant and/or on migration in Assam (N. Cachar and Lakhimpur [Margherita]) in autumn or winter, and Manipur (August). Occurs in the Sunderbans (West Bengal and East Pakistan). Specimens from the Andamans and Nicobars have been identified as nominate *phaeopus*, but very probably both the races visit the islands in winter.

Extralimital. 'Breeds in E. Siberia west to the Lena River. Winters from E. China over the entire Indo-Australasian Archipelago to New Guinea, Solomon Is., Australia, Tasmania, New Caledonia, Caroline, Marianne and Pelew Is. In migration on the Commander Is. and Japan' (Peters).

GENERAL HABITS, FOOD, VOICE and CALLS. As in the nominate race (385).

BREEDING. Extralimital.

MUSEUM DIAGNOSIS. Differs from the nominate race in being much darker and browner. Lower back, rump, and upper tail-coverts much more heavily barred with brown; striations on underparts heavier; flanks and under tail-coverts broadly barred and streaked with dark brown. Axillaries and under wing-coverts white, profusely barred with dark brown. Bill more curved.

MEASUREMENTS

	Wing	Bill (from feathers)	Tarsus	Tail
♂♂	236–248	76–82	52–58	92–99 mm.
♀♀	239–243	68–83	58–61	91–97 mm. (La Touche)
♂♂	231–239	77–84	60–64	89–100 mm. (Baker)
♀♀	227–239	83–90		

In this race there is apparently no difference in size between the sexes.

COLOURS OF BARE PARTS. As in 385.

NUMENIUS ARQUATA (Linnaeus)

Key to the Subspecies

Lower parts broadly streaked; axillaries white with bold streaks of blackish ..... *N. a. arquata*

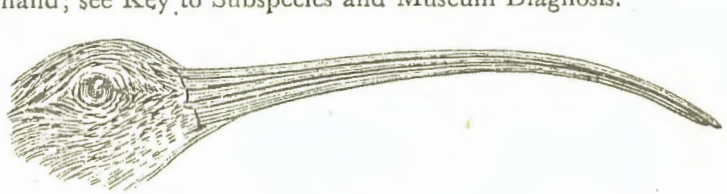
Lower parts finely streaked; axillaries pure white or thinly streaked with blackish ..... *N. a. orientalis*

387. **Curlew.** *Numenius arquata arquata* (Linnaeus)

Scolopax Arquata Linnaeus, 1758, Syst. Nat., ed. 10, 1: 145 (in Europa = Sweden)
Baker, FBI No. 2133, Vol. 6: 200

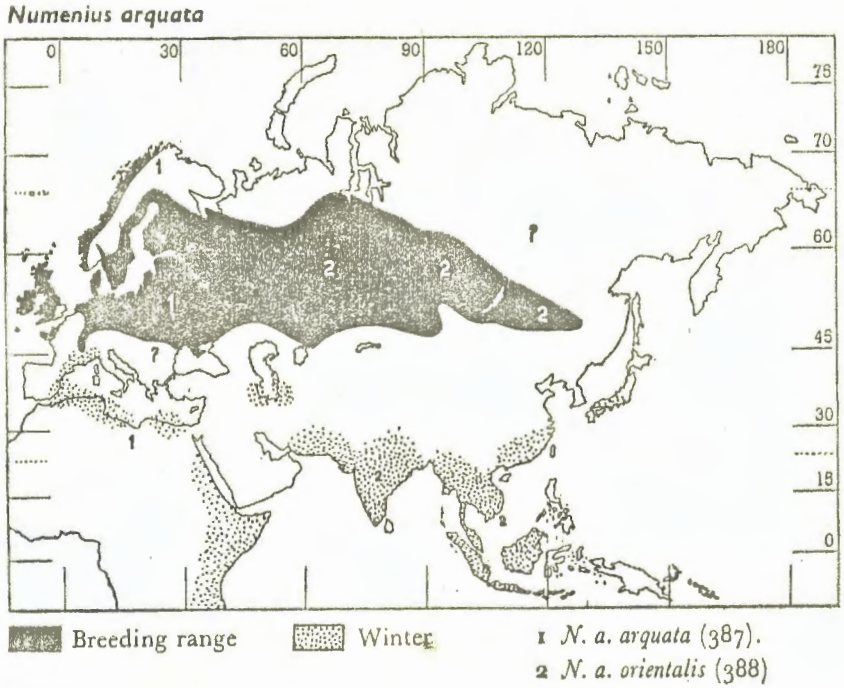
LOCAL NAMES. As under 388.

SIZE and FIELD CHARACTERS. As of 388. Indistinguishable from it except in the hand; see Key to Subspecies and Museum Diagnosis.



× *c.* ½

STATUS, DISTRIBUTION and HABITAT. Described by Baker, loc. cit., as winter visitor ' to north-west India as far east as Delhi and as far south as Ceylon '. All the specimens collected by Ticehurst and Whistler in Sind and NW. India, and by SA and others down the west coast and in Ceylon, and elsewhere within our limits, are referable to the race *orientalis* (388),



q.v. The nominate race, if it occurs at all, must be purely as a vagrant. D'Abreu's birds collected on Mahanadi river in Madhya Pradesh alleged to be of this race (JBNHS 38: 112) cannot be traced, and there are apparently no specimens of *N. a. arquata* from India in the British Museum collection.

MUSEUM DIAGNOSIS. Differs from the eastern race *orientalis* (388) in being darker, less fulvous more brown above; more broadly streaked below. The white lower back, rump, and axillaries are streaked with blackish, the first two sometimes being also barred.

MEASUREMENTS and COLOURS OF BARE PARTS as in 388.

MISCELLANEOUS. Longevity (from ringing records) 31½ years — *Ring* 33: 149, 1962.

388. **Eastern Curlew.** *Numenius arquata orientalis* C. L. Brehm

Numenius orientalis C. L. Brehm, 1831, Handb. Naturg. Vög. Deutschl.: 610 (East Indies)

Baker, FBI No. 2134, Vol. 6: 202

Plate 29, fig. 8, facing p. 256

LOCAL NAMES. *Goār, Goungh, Bādā gūlindā* (Hindi); *Choppa, Sādā kāstachūra* (Bengal); *Gūinyār* (Bihar); *Borindo* (Sind); *Māhā watuwā* (Sinhala); *Khalili* (Gujarat); *Kuthirai mālai kōttān* (Tamil); *Vāikokku* (Malayalam).

September 1933 in K ayam district, Kerala (*c.* 9°N., 76°E.)— a straight-line map distance of *c.* 5600 km. (*c.* 3500 miles).

GENERAL HABITS. Typical of the sandpipers, but is less gregarious than most species. Keeps singly or in twos and threes, and seldom in voluntary association with other species; small flocks of usually not more than 15 or 20 even on migration. Runs about and feeds at edge of water, sometimes wading into the shallows, probing into the soft mud with its bill. When perturbed, bobs violently up and down before taking wing, this almost invariably accompanied by the distinctive flushing notes.

FOOD. Molluscs, crustaceans, aquatic insects, worms. Mosquito larvae (Husain & Bhalla).

VOICE and CALLS. A shrill piping *ti-tui* or *twee-twee-twee* as it flushes and is flying off. A beautiful nuptial song in the breeding season.

BREEDING. Extralimital and peculiar. As a rule lays its 3 or 4 eggs in the deserted nests of thrushes and other birds fairly high up in trees; only rarely on the ground like most other sandpipers, e.g. Redshank.

MUSEUM DIAGNOSIS. For description of plumage see Baker, loc. cit.; for details of plumages and morphology (also bionomics), Witherby, 1940, 4: 310–14.

MEASUREMENTS

	Wing	Bill (from feathers)	Tarsus	Tail
♂♂	136–148	33–35	32–34	52–61 mm.
♀♀	142–153	33–36	—	— (Witherby)

COLOURS OF BARE PARTS. Iris brown. Bill dull greenish, black at tip. Legs and feet dull greenish brown or olive-green.

398. **Wood** or **Spotted Sandpiper.** *Tringa glareola* Linnaeus

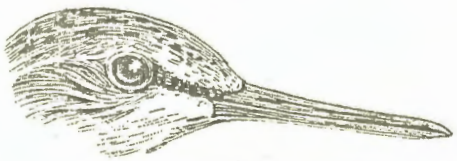
Tringa Glareola Linnaeus, 1758, Syst. Nat., ed. 10, 1: 149 (in Europa = Sweden)
Baker, FBI No. 2146, Vol. 6: 219
Plate 30, fig. 3, facing p. 272

LOCAL NAMES. *Chūpka, Chobāha, Titvāri* (Hindi); *Bālu bătān* (Bengal); *Chinna ulanka* (Telugu); *Kāta kokku* (Malayalam); *Sili watuwā* (Sinhala); *Kōttān* (Tamil).

SIZE. Grey Quail ±; length *c.* 21 cm. (8½ in.).

FIELD CHARACTERS. A small snipe-like, rather gregarious wader.

Winter (non-breeding). *Above*, greyish brown and sepia-brown indistinctly spotted and marked with white. A whitish supercilium. Lower



× *c.* 1

back, rump and tail white, the last barred with blackish. *Below*, breast pale dusky; rest of underparts white. Sexes alike.

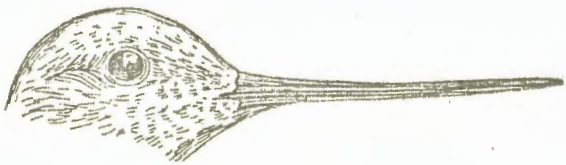
430. **Indian Blackwinged Stilt.** *Himantopus himantopus himantopus* (Linnaeus)

Charadrius Himantopus Linnaeus, 1758, Syst. Nat., ed. 10, 1: 151 (Southern Europe)
Baker, FBI No. 2130, Vol. 6: 193
Plate 29, fig. 7, facing p. 256

LOCAL NAMES. *Găz pāon, Tinghūr* (Hindi); *Sărgāin* or *Sărgyne* (Bihari mirshikars); *Lāl gon, Lāl thengi, Lām gōra* (Bengal); *Gusling* (Sind).

SIZE. Grey Partridge ±, with bare slender legs *c.* 25 cm. (10 in.) long.

FIELD CHARACTERS. A lanky pied black and white marsh bird with straight slender black bill, pointed black wings, and enormously long, thin reddish legs which trail behind comically in flight, making its identity unmistakable even in the distance.



× *c.* ⅓

Male (adult). Mantle and wings glossy metallic black; rest of plumage above and below largely glistening white. A few black spots on head, and pale grey-brown in tail. Undersurface of wings black.

Female (adult) has black portions of male replaced by brown, and the white head and hindneck sullied with brownish grey. Summer and winter plumages differ in details.

For downy chick see Museum Diagnosis.

STATUS, DISTRIBUTION and HABITAT. Resident — breeding in suitable localities, migrating locally under stress of water conditions — throughout the Indian Union, both Pakistans and Nepal. Normally to *c.* 1500 m. in Kashmir Valley (uncommon); one at *c.* 3600 m. (Vishan Sar, July — on migration?). Not recorded in Kerala, and only as ' winter visitor ' in Mysore. Not in the Andamans or Nicobars. Observed once in the Maldives where race and status unknown but presumed a vagrant (Phillips). Ceylon has an endemic race (431). Affects marshes both freshwater and tidal, jheels, village tanks, irrigation reservoirs, lagoons, salt-pans, etc. Sometimes inundated ploughed fields, but hardly ever the seashore.

Extralimital. ' Breeds locally in the Mediterranean region; about the mouth on the Danube; steppes of S. Russia; S. Asia east to China and S. Arabia, India, Ceylon [now race *ceylonensis*], and the Malay States; Egypt; Africa south of the Sahara; Madagascar. Migratory only in the northern part of its range ' (Peters).

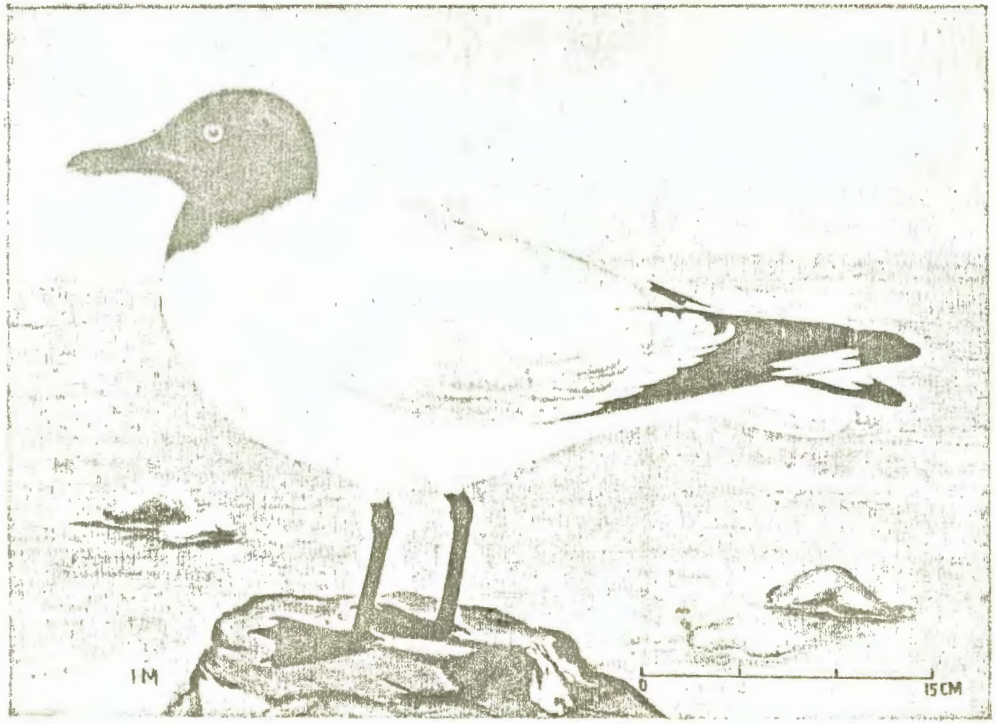
MIGRATION. No concrete data, but circumstantial evidence suggests considerable trans-limital influx in winter. Recorded by Ticehurst as mainly winter visitor (locally abundant) in Sind, appearing in the Karachi neighbourhood early in August, its numbers increasing during the month but soon dwindling again.

41. BROWNHEADED GULL

(Larus brunnicephalus)

Hindi: *Dhōmrā*

A winter visitor to India from August to April. These gulls are found abundantly along the seaboard, and less often on inland jheels and rivers. They keep round harbours and ports, and make their living off the floating refuse or garbage cast overboard. In the breeding season, inland from the seacoast, they also eat insects, molluses, and the shoots of various crops. The call is a loud querulous *keeah*, rather like the hoarse call of a raven.



42. INDIAN WHISKERED TERN

(Chlidonias hybrida)

Hindi: *Tehāri, Koorri* (for all terns)

This bird is a close relation of the gull. It is fairly common at marshes and jheels, especially in northern India. They also patronize flooded paddyfields to procure grasshoppers, dragonfly larvae or tadpoles which are as much part of their food as small fishes. Though capable of swimming, terns very rarely alight on water as gulls do. This species is found in winter throughout India and Ceylon, but nests chiefly in Kashmir and northern India in the spring and summer.

47. ROSERINGED PARAKEET

(Psittacula krameri)

Hindi: *Lybār tōtā*

One of our commonest birds, at home in the bustling precincts of a city as much as in the countryside. It goes about in large flocks and is responsible for considerable damage to ripening grain crops and orchard fruit. The call is the well-known sharp, screaming *kee-ak, kee-ak, kee-ak*. The birds have common roosts in groves of trees and coconut palms. They are popular cage birds and can be taught to repeat a few words and perform simple tricks.

48. KOEL

(Eudynamys scolopacea)

Hindi: *Koel*

One of our most familiar cuckoos with the well-known loudly repeated *kū-oo* calls. It frequents gardens, groves and open country where there are large leafy trees. It eats mainly banyan and peepul figs and berries, but also caterpillars and other insects. Its flight is swift and straight. The bird's habit of laying its eggs in the nests of crows and foisting on them the responsibility for raising its young is well-known from ancient times.

band together in enormous swarms to raid ripening crops of jowar, maize, and other cereals, and orchard fruit. The birds clamber about among the twigs and gnaw into the half-ripe fruits, one after another, wasting far more than they actually eat. Or they descend in swarms upon ripening fields of food crops, biting into the ears of grain or cutting off the head completely and flying with it to a nearby tree where it is raised up to the bill with one foot and after a nibble or two wastefully discarded, the bird soon returning to the field to renew its ravages. Frantic shouts and stones hurled from slings by the ryot from his machan amidfield only serve to move the destructive horde to a different corner of the field where the depredation complacently continues. Rabbles of these parakeets commonly gather at wayside railway stations and goods sheds, clambering amongst the sacks of grain and groundnuts awaiting entrainment, biting through the fabric and helping themselves to the contents; or they waddle about comically on the ground with partly raised tail to pick up the spillage. Has communal roosts, often shared with crows and mynas, among groves of trees in sprawling urban gardens and outskirts of habitation where enormous numbers collect at sunset, flying in, battalion after battalion, from all points of the compass. The birds are extraordinarily abundant in and around some of the larger northern cities like Lahore, New Delhi and Kanpur. Flight swift and direct with rapid wing-beats.

A large noisy swearing mob of parakeets soon musters at the summons of a pair whose nest is threatened, e.g. by mynas or a snake, the birds flying at and around the intruder, flitting angrily about him in a sort of hypnotized frenzy, all screeching and screaming wildly together. The male has a very ludicrous courtship display, sidling up to his mate, stretching himself up to his full height, feeding her on regurgitated pap and caressing her, often with the bills interlocked. He suddenly backs away stiffly, eying her from a foot's distance with his head pulled well back (as if in rapt admiration), strutting and posturing, wings partially open at the shoulders, and the foot on her side lifted and ridiculously 'clawing the air' towards her. He then crosses over to the other side of the hen to repeat the antics, and thus back and forth several times. (For further details of courtship and mating see Sálim Ali, 1927, JBNHS 32: 218-19; also Malcolm Macdonald, 1960, *Birds in my Indian Garden*: 48-60.)

FOOD. Fruits, cereal, grain, and seeds of all kinds, wild as well as cultivated. Among items specifically identified are chillies (*Capsicum*), groundnuts (*Arachis hypogaea*), gram (*Cicer arietinum*); flower-petals and nectar of *Salmalia malabarica*, *Erythrina indica*, *Butea monosperma*, *Bassia latifolia* and other species; seeds of *Prosopis spicigera*, *Acacia arabica*, *Casuarina equisetifolia*, green spiny fruit of the common wasteland weed *Xanthium*, and flowers and fruits of *Capparis aphylla*.

VOICE and CALLS. A loud, shrill screaming *kee-āk*, sometimes quickly repeated several times, varying in tempo with the occasion, and uttered at rest as well as on the wing.

BREEDING. *Season*, chiefly January to April but may go on till July. *Nest*, an unlined hollow in a tree-trunk, usually some small natural hole cut and enlarged by the birds to size; or preferably a readymade nest-hole of barbet or woodpecker, at any height between *c.* 3 and 10 metres. Holes

in rock scarps and walls of ruined buildings and ancient forts are freely occupied, many pairs often nesting close to each other in a loose colony. Frequently holes in the outside walls of buildings in towns are appropriated, often in the heart of noisy congested bazaars. *Eggs*, 3 or 4, sometimes 5, rarely 6; pure white roundish ovals. Average size of 20 eggs 29·3 × 24·0 mm. (Baker). Cutting of nest-hole by both sexes; incubation entirely by female. Period of incubation undetermined. Both parents feed the nestlings by regurgitation. According to Malcolm Macdonald, young leave nest about four weeks from laying of the egg by parent.

MUSEUM DIAGNOSIS. For details of plumage see Baker, loc. cit. *P. k. borealis* differs from the peninsular and Ceylon race *manillensis* in being clinally larger and slightly paler and yellower; also in having — in the majority of cases — *both* mandibles red;[1] in *manillensis* the lower mandible is black.

MEASUREMENTS

	Wing	Bill (from cere)	Tarsus	Tail
10 ad. ♂♂ (Punjab)	175–187 (once 191)	24–27	—	225–263 mm. (once 189) (HW)
5 ad. ♂♂ (Gujarat)	170–180	26–29	18–19	157–245 mm. (SA)
Baker gives ♂♂	164–183	24–26	16–17	240–282 mm.
♀♀	162–170			190–240 mm.

Weight 5 ♂♂ (104) 116–139 gm. (SA).

COLOURS OF BARE PARTS. Iris yellowish white. Bill, both mandibles coral-red. Legs and feet greenish slate.

550. **Roseringed Parakeet.** *Psittacula krameri manillensis* (Bechstein)

Psittacus Manillensis Bechstein, 1800, Stubenvögel, 2nd Gotha ed.: 612 (Philippines, *errore* = Ceylon)
Baker, FBI No. 1500, Vol. 4: 202

LOCAL NAMES. *Tōtā*, *Lybār tōtā* (Hindi); *Swā*, *Sūvā* (E. Madhya Pradesh); *Pōpăt*, *Sūdo* (Gujarat); *Pōpăt*, *Keerā* (Marathi); *Chilukā* (Telugu); *Kili* (Tamil); *Rannā girawā* (Sinhala); *Tattā*, *Modirattattā* (Malayalam).

SIZE. Myna +; with long pointed tail. Length overall *c.* 42 cm. (16½ in.).

FIELD CHARACTERS. A slim, grass-green parakeet with the typical short heavy, deeply hooked red bill. Indistinguishable in the field from 549 q.v. except by black (*v.* red) lower mandible.

× *c.* 1

STATUS, DISTRIBUTION and HABITAT. Resident. Peninsular India south of lat. 20°N. — the arbitrarily fixed boundary with the northern race — and Ceylon (low-country Wet and Dry zones). Affects moist- and dry-deciduous biotope: lightly wooded country and cultivation in the neighbourhood of human habitations.

[1] In some cases lower mandible partly red partly black.

EUDYNAMYS SCOLOPACEA (Linnaeus)

Key to the Indian Subspecies

		Page
A	Smaller: wing *c.* 185–198 mm. ..... *E. s. scolopacea*	227
B	Larger: wing *c.* 199–235 mm. 1	
1	Wing-tail index[1] smaller: Male, wing *c.* 203–235 mm.; tail 189–221 mm.; female, wing *c.* 201–216 mm.; tail 184–197 mm. Plumage of female darker, more buffy spotted above and below ..... *E. s. dolosa*	230
	Wing-tail index larger: Male, wing *c.* 203–218 mm.; tail 194–208 mm.; female, wing *c.* 199–221 mm.; tail 190–210 mm. Plumage of females paler above and below ..... *E. s. malayana*	229

590. **Indian Koel.** *Eudynamys scolopacea scolopacea* (Linnaeus)

Cuculus scolopaceus Linnaeus, 1758, Syst. Nat., ed. 10, 1: 111 (Malabar)
Baker, FBI No. 1475, Vol. 4: 172

LOCAL NAMES. *Koel* (Hindi); *Kōkil, Kōkīla* (Bengal, Marathi); *Nalla kovēla* ♂, *Poda kovēla* ♀ (Telugu); *Kūyil, Pūllikūyil, Kākkākūyil* (Malayalam); *Kōhā, Gomerā kōhā* (Sinhala); *Kūyil* (Tamil); *Karlu koel* ♂, *Dindin koel* ♀ (Maldive Is.).

SIZE. House Crow±; slimmer and with longer tail. Length *c.* 43 cm. (17 in.).

FIELD CHARACTERS. Male (adult) glistening metallic black all over, with yellowish green bill and crimson eyes. Distinctive shrieking crescendo calls: *kūoo, kūoo*, etc.

♂, × *c.* 1

Female. *Above*, dark brown, profusely white-spotted and barred. Tail-feathers and wing-quills barred with white. *Below*, white; spotted on chin, throat and foreneck, barred on rest of underparts with blackish.

Fledgeling (in nest). More or less like adult, sex for sex, but female far darker and more sooty above with blackish head, throat and breast; thus closer in the character of its plumage, especially upperparts, to male rather than to adult female as is the norm in birds. This adaptation is presumably of some survival value amidst the black nestlings of its normal fosterers, the House and Jungle crows. Bill black not green as in adult.

[1] A figure derived by dividing the smaller (tail) measurement by the larger (wing) measurement.

STATUS, DISTRIBUTION and HABITAT. Resident, nomad, and local migrant throughout the subcontinent excepting Assam and East Pakistan (see under 591). Described as summer visitor in many localities in north and peninsular India, and as winter visitor in the south. However, its silence and retiring behaviour during the non-breeding period is apt to convey a misleading impression regarding its local status, and these dicta must be treated with reserve. Rare or absent in the more arid tracts of W. Pakistan, western Rajasthan and northern Gujarat, but spreading gradually in the wake of advancing colonization and its inseparable concomitant the House Crow. Common resident in Ceylon, and the Maldive and Laccadive Is. (status?). Occurs locally up to *c.* 1000 m. in the peninsular hills, and to *c.* 1800 m. in the outer Himalayas from Punjab and Kashmir across to NEFA, including Nepal, Sikkim, and Bhutan. Occurrence and local abundance everywhere closely linked with its principal fosterers the House and Jungle crows (*Corvus splendens* and *C. macrorhynchos*). Affects lightly wooded country — gardens, mango orchards, and groves of trees in and around cultivation and towns and villages.

GENERAL HABITS. Arboreal, the bird usually keeping to the seclusion of leafy trees and shrubs, thus apt to be easily overlooked. Normally silent and unobtrusive, seldom showing itself except while it dashes across, almost fugitively, from one tree to another in short hurried flight. However, with the approach of the hot weather and its breeding season, coincident with that of its principal hosts the House and Jungle crows, waxes aggravatingly vociferous, shrieking its shrill crescendo calls chiefly in the morning and late afternoon, but often all through the day and far into the night. It is then one of the first bird voices of the dawn, commonly heard while still quite dark, and long before its early-rising dupes, the crows, are up and astir. Flight swift and direct with rapid wing-beats — rather hawk-like.

FOOD. Largely fruits and berries, some commonly recorded species being banyan and peepul figs (*Ficus bengalensis* and *F. religiosa*), ber (*Zizyphus*), mulberry (*Morus*), sandalwood (*Santalum album*), *Cinnamomum camphora*, *Cephalandra indica*, and nuts of the Fishtail palm (*Caryota urens*). Poisonous fruits of *Thevetia neriifolia* also freely eaten. Other items: hairy caterpillars, bugs (Hemiptera) and various insects, terrestrial snails, eggs of small birds, e.g. oriole and bulbul, filched from nests, and flower nectar, e.g. of *Erythrina indica*.

VOICE and CALLS. The calls commonly heard are:

1. A loud, continuous, rollicking *Urūk-keookeookeookeookeookeookeoo* (6 or 7 times repeated) without change of pitch but varying in insistence and shrillness, uttered by the male at earliest dawn as the first call of the day evidently to announce himself or as a challenge to other cocks in the neighbourhood. These soon answered similarly by another male (or males) in the distance and repeated by each at intervals of a minute or so, sometimes assuming the form of an uneven duet. Later in the morning the calls usually settle down to the characteristic 'song'.

2. Song, a loud shrill shrieking *kūoo, kūoo,* etc. rising in scale with each repetition to frantic pitch at the 7th or 8th, then breaking off abruptly. The bird soon commences it all over again, and so on and on *ad nauseam*.

3. Normal call of female a shrill, quick-repeated *kik-kik-kik-kik* etc. as she dashes from tree to tree in courtship chase by male, or hops amongst the branches ostensibly to escape his ardour.

In addition various croaks, gurgles, and chuckles uttered by both sexes under different provocations. Flying fledgeling emits a loud harsh *kaaa* — a passable imitation of young crow.

BREEDING. Brood-parasitic almost exclusively on House and Jungle crows (*Corvus splendens* and *C. macrorhynchos*) combining strategem, cunning, and opportunism to lay in their nests. (For details of the process, and breeding biology, see D. Dewar, 1907, JBNHS 17: 765 et seq.; B. S. Lamba, 1963, JBNHS 60: 130-3; 1966, ibid. 63: 750-1.) Exceptionally, eggs have been found in nests of *Oriolus o. kundoo* (D'Abreu, JBNHS 31: 1032) and *Acridotheres tristis* (Inglis, ibid. 18: 682). *Season* everywhere synchronous with that of its hosts, overall March to August, chiefly May to July but varying locally. *Eggs* very similar in appearance to crows' only smaller — greenish grey in ground colour, profusely blotched and speckled with reddish brown. Average size of 100 eggs 31·0 × 23·6 mm. (Baker). As many as 11 eggs once found in a single crow's nest, evidently the product of several females. Eggs of host and parasite frequently found together in the same nest, and also young of both. Unlike cuckoo (*C. canorus*) koel hatchling does not eject contents of fosterer's nest, but in this case the shorter incubation period (13–14 days *v.* 16–17 in House Crow and 18–20 in Jungle Crow) gives it sufficient advantage to monopolize the food brought by the fosterers and gradually to starve out its lawful nest companions. Thus koel and crow fledgelings from the same nest seldom seen together though not unknown. Feeding of koel fledgeling outside the nest by adult female koel has been frequently observed.

MUSEUM DIAGNOSIS. See Key.

MEASUREMENTS

	Wing	Bill (from skull)	Tarsus	Tail
♂♂	182–205	29–34	32–35	186–205 mm.
♀♀	179–203	30–34	31–35	171–189 mm.

(SA, HW, SDR, BB)

Weight 1 ♀ 229 gm. (GD).

COLOURS OF BARE PARTS. Iris crimson. Bill apple green or yellowish green, blackish at base and dusky round nostrils. Legs and feet plumbeous; claws horny; pads of sole whitish.

591. **Malay Koel.** *Eudynamys scolopacea malayana* Cabanis & Heine

Eudynamys malayana Cabanis & Heine, 1863 (1862–63), Mus. Hein., Th. 4 (1): 52 (Sunda Islands and Sumatra)

Baker, FBI No. 1476, Vol. 4: 174

Plate 41, fig. 8, facing p. 256

LOCAL NAMES. *Kōkil* (Bengal); *Kōkil sŏrāi* (Assam); *Kūli* (Nowgong dist., Assam).

SIZE. House Crow ±; slimmer and with longer tail. Length *c.* 43 cm. (17 in.).

FIELD CHARACTERS. As for the Indian Koel (590), q.v. See Museum Diagnosis.

STATUS, DISTRIBUTION and HABITAT. Assam, southern NEFA, Nagaland, Manipur, Mizo (?), Tripura, East Pakistan.

Extralimital. Burma, Thailand, Malaysia, Indonesia.

GENERAL HABITS, FOOD, VOICE and CALLS. As in 590.

BREEDING. Nothing recorded as specifically different from the Indian bird.

MUSEUM DIAGNOSIS. Slightly larger than the nominate race and with a larger bill. Male often indistinguishable from the Indian bird; female much more rufescent above and below.

MEASUREMENTS

	Wing	Bill (from feathers)	Tarsus	Tail
♂♀	190–221	32–34	*c.* 35–37	181–203 mm. (Baker)

COLOURS OF BARE PARTS. As in 590.

592. **Andaman Koel.** *Eudynamys scolopacea dolosa* Ripley

Eudynamys scolopacea dolosa Ripley, 1946, Auk 63: 241 (Barren Island, Andamans)
Not in Baker, FBI

LOCAL NAME. *Koel* (Hindi).

SIZE. House Crow ±; slimmer and with a longer tail. Length *c.* 43 cm. (17 in.).

FIELD CHARACTERS. As for the Indian Koel (590), q.v. See Museum Diagnosis.

STATUS, DISTRIBUTION and HABITAT. Andaman and Nicobar Islands.

Formerly recorded (Osmaston, 1905, 1906, JBNHS 16: 621; 17: 487) only as a common winter visitor September-April, as it apparently still is to Narcondam and the Nicobars; but present status needs checking.

Frequents jungle and trees around the settlements.

GENERAL HABITS, FOOD, VOICE and CALLS. As in the Indian bird (590), q.v.

BREEDING. Unrecorded.

MUSEUM DIAGNOSIS. Larger than nominate *scolopacea*. Upperparts of female more blackish, and conspicuously spotted with rufous-buff. Rufous wash extends over all the white parts including chin, lower abdomen, and under tail-coverts. Wing/tail index smaller than in *E. s. malayana*. See Key.

MEASUREMENTS

	Wing	Tail
♂♂	203–235	189–221 mm.
♀♀	201–216	184–197 mm. (SDR)

Bill (from skull) ♂♀ 27–34 mm. (HA).

COLOURS OF BARE PARTS. As in 590.

Genus RHOPODYTES Cabanis & Heine

Rhopodytes Cabanis & Heine, 1863 (1862–63), Mus. Hein., Th. 4(1): 61. Type, by subsequent designation, *R. diardi* = *Melias diardi* Lesson

Bill deep, compressed, pale green or apple-green in colour; nostril small, round or oval, and oblique. A large naked space round orbit, blue or crimson, separated from bill by a narrow band of feathers. No bristly eyelashes as in *Taccocua*, q.v.

49. CROW-PHEASANT or COUCAL

(Centropus sinensis)

Hindi: *Māhōkā, Kūkā*

A dweller of thinly wooded country, interspersed with cultivation, gardens and shrubbery. It is essentially a ground loving species with a weak flight. The call is a deep resonant *Oōk* repeated at slow but regular runs. Its food consists of grasshoppers, beetles, caterpillars, field mice, lizards and snakes. Although belonging to the cuckoo family it is respectable enough to build a nest and raise its own young.

50. SPOTTED OWLET

(Athene brama)

Hindi: *Khākūsāt, Khūsāttiā, Choghād*

The most familiar of our owls, affecting every type of country in the plains and foothills except heavy forest, especially near human habitation. It spends the day hidden in a tree-hollow or secluded leafy branch, and becomes active after sunset and all through the night. Its food consists mainly of insects; small birds, mice and lizards are sometimes also taken. It is a noisy bird with a large variety of harsh chattering, squabbling and chuckling notes chiefly heard at dusk.

second. Usually in duets: as soon as one bird begins calling another within earshot (its mate?) almost invariably joins in. Single calls or short runs reminiscent of langur monkey's *whoop* in distance. Calling most persistent during the breeding season, often commencing at early dawn and sometimes kept up at night. An occasional quick repeated *kūt-kūt-kūt-kūt*, of about half-minute's duration sounding like the oil engine of a village flour mill has been heard, the significance of or provocation for which is not known. During courtship (also when annoyed) utters a medley of harsh, weird croaks and chuckles.

BREEDING. A non-parasitic cuckoo. *Season*, chiefly June to September. *Nest*, a large untidy globular structure like a Rugby football, *c.* 45 × 35 cm., of twigs and leaves, or mainly leaves of elephant grass or bamboo, with a lateral entrance; sometimes a deep cup with the dome formed by intertwining the surrounding living foliage and creeper stems. Placed within a thick bush or bamboo clump or among the branches of a thorny tree, at moderate heights, usually well concealed amongst tangled vines. *Eggs*, 3 or 4 (exceptionally 5 and even 6 recorded), broad ellipses, chalky white, becoming yellow-stained as incubation proceeds. Average size of 50 eggs 35·9 × 28·0 mm. (Baker). Nest-building and incubation by both sexes; incubation period and other details of breeding biology unknown.

MUSEUM DIAGNOSIS. For details of plumage see Baker, loc. cit.; for subspecies, Key.

MEASUREMENTS

	Wing	Bill (from feathers)	Tarsus	Tail
♂♀	205–232 (one 195, one 239, one 242)	33–37	58–66	220–262 mm. (Baker)
		(from skull)		
5 ♂♀	from Nepal 193–210	38–41	—	222–254 mm. (BB)

5 ♂♀ from Sindh (in British Museum) Wing 225–239 mm. (Ticehurst). Weight 1 o? 362 gm. (SA).

There is considerable individual variation in size, but in most cases females are larger than males. The significance of this disparity needs to be studied.

COLOURS OF BARE PARTS. Iris bright crimson. Bill, legs and feet black.

MISCELLANEOUS. Flesh of the coucal is relished as an epicurean delicacy in many parts of the country, and widely believed to be a panacea for consumption, asthma and other pulmonary ailments.

601. **East Pakistan Crow-Pheasant.** *Centropus sinensis intermedius* (Hume)

Centrococcyx intermedius A. O. H. (= Hume), 1873, Stray Feathers 1: 454, in text (Dhoon, Dacca, and Thayetmyo)
Baker, FBI No. 1491, Vol. 4: 192
Plate 41, fig. 10, facing p. 256

LOCAL NAMES. *Dao di dai* (Cachar); *Kūkā* (Bengal, E. Pakistan); *Kūkū sorāi* Assam); *Nongkoubi* (Manipur).

SIZE. Jungle Crow ± with long broad graduated tail. Overall length *c.* 48 cm. (19 in.).

FIELD CHARACTERS. As of 600, q.v. See Key to the Subspecies and Museum Diagnosis.

STATUS, DISTRIBUTION and HABITAT. Resident. Assam south of Brahmaputra river, Cachar, Nagaland, Manipur, Mizo (?), Tripura; East Pakistan (Sylhet, Tippera, Chittagong Hill Tracts); up to *c.* 1200 m. altitude. Affects scrub-and-bush jungle and tall grassland.

Extralimital. Burma north to the Chin Hills, and S. Yunnan south to peninsular Thailand and the Indochinese countries; Hainan I.

GENERAL HABITS, FOOD, VOICE and CALLS. Not significantly different from 600, q.v.

BREEDING. *Season*, principally mid June to end August. *Nest*, as of 600, globular, of twigs and grass. *Eggs*, 3 or 4, chalky white, elliptical. Average size of 50 eggs 35·7 × 28·6 mm. (Baker). Fledgelings said to leave nest when about a month old.

MUSEUM DIAGNOSIS. Differs from the nominate race (600) only in being smaller.

MEASUREMENTS

	Wing	Bill (from feathers)	Tarsus	Tail
♂♀	183–204	30–34	*c.* 56–60	215–265 mm. (Baker)

COLOURS OF BARE PARTS. As in 600.

602. **Southern Crow-Pheasant.** *Centropus sinensis parroti* Stresemann

Centropus sinensis parroti Stresemann, 1913, Nov. Zool. 20: 323 (Ceylon)
Baker, FBI No. 1492, Vol. 4: 192

LOCAL NAMES. *Māhōkā* (Hindi); *Jemudu kāki, Chemara kāki* (Telugu); *Kalli kāka, Chempakam* (Tamil); *Atti kukkulā, Bū kukkulā* (Sinhala); *Ūppan, Chemboth* (Malayalam); *Kūmbhār kāola* (Marathi); *Hokko, Ghōyāro* (Gujarati); *Hooka* (Gulf of Kutch).

SIZE. Jungle Crow ± with long broad graduated tail. Overall length *c.* 48 cm. (19 in.).

FIELD CHARACTERS. As of 600, q.v. See Key to the Subspecies and Museum Diagnosis.

STATUS, DISTRIBUTION and HABITAT. Resident. Peninsular India south of the range of *C. s. sinensis* (south of the Gangetic Plain) from N. Gujarat, Kutch, and Saurashtra east through Madhya Pradesh, Andhra and Orissa, south through Maharashtra, Mysore, Tamil Nadu and Kerala. Plains and hills, locally to *c.* 2220 m. altitude. Ceylon (all zones). Affects light forest, scrub-and-bush jungle, grassland, plantations, cultivation and the neighbourhood of habitations.

GENERAL HABITS and FOOD. As in 600, q.v. In addition, recorded feeding on fruits of Yellow Oleander, *Thevetia neriifolia* (Sanjeeva Raj, JBNHS 60: 457).

BREEDING. *Season*, in peninsular India practically all year, chiefly November to May; in Ceylon chiefly February to April and August–September. *Nest* and *eggs* (2 to 4) similar to the northern race (600), but in

Ceylon the normal clutch is of 2 or 3 eggs only. Average size of 30 eggs 36·2 × 26·3 mm. (Baker).

VOICE and CALLS. 'The scold-note used when the bird mobs a lurking snake or owl etc., is an explosive *k'wisss*; and, in courtship, a curious sound is produced — *djoonk* — like a stone dropped into deep water, or a tight cork drawn from an empty bottle' (Henry).

MUSEUM DIAGNOSIS. Differs from 600 and 601 in having the interscapulars black instead of chestnut (but see Whistler, 1934, JBNHS 37: 528). Forehead and forecrown paler and brownish with little or no gloss; sheen of head, back, and underparts more blue or blue-green than rich purple-blue as in the other two. These characters however show considerable individual variation.

MEASUREMENTS

	Wing	Bill (from skull)	Tarsus	Tail
♂♂	173–195	37–45	42–57	197–265 mm.
♀♀	178–210	38–45	46–58	223–310 mm. (SA, HW)

Weight 1 ♂ 230 gm. (Rensch).

COLOURS OF BARE PARTS. As in 600.

MISCELLANEOUS. There is a curious folk-belief common to such far-flung parts of the country as Saurashtra and South Kanara (possibly more general) that the crow-pheasant's nest is lined with some particularly valuable (and magical!) kind of 'grass' known in Kanara as *sānjivānā kāddi* ('life-giving herb')— which can be separated from the rest of the material by throwing it into a stream, whereupon the former will flow *against* the current!

603. **Andaman Crow-Pheasant.** *Centropus* (*sinensis*) *andamanensis* Beavan

Centropus andamanensis 'Tytler' = Beavan, 1867, Ibis: 321 (Andaman Islands)
Baker, FBI No. 1494, Vol. 4: 194

LOCAL NAMES. None recorded.

SIZE. Jungle Crow ±, with long broad graduated tail. Overall length *c.* 48 cm. (19 in.).

FIELD CHARACTERS. Like Common Crow-Pheasant (600) with chestnut wings, but whole head, body and tail brown instead of glistening black. Sexes alike. See Museum Diagnosis.

Young (immature). *Above*, traces of barring on head, neck, and upper back. *Below*, barred from chin to vent with pale brown and pale dusky ochre.

STATUS, DISTRIBUTION and HABITAT. Andamans (North, Middle, and South), Great and Little Coco, and Table islands. Nicobars?. To what extent, if at all, moving from island to island not known. Affects outskirts of forest, gardens, and cultivated tracts especially sugarcane. Partial to newly ploughed paddyfields and mangrove swamps.

GENERAL HABITS. As of Common Crow-Pheasant (600), q.v. Commonly walks about on the ooze of mangrove swamps in search of food (A. L. Butler, JBNHS 12: 566).

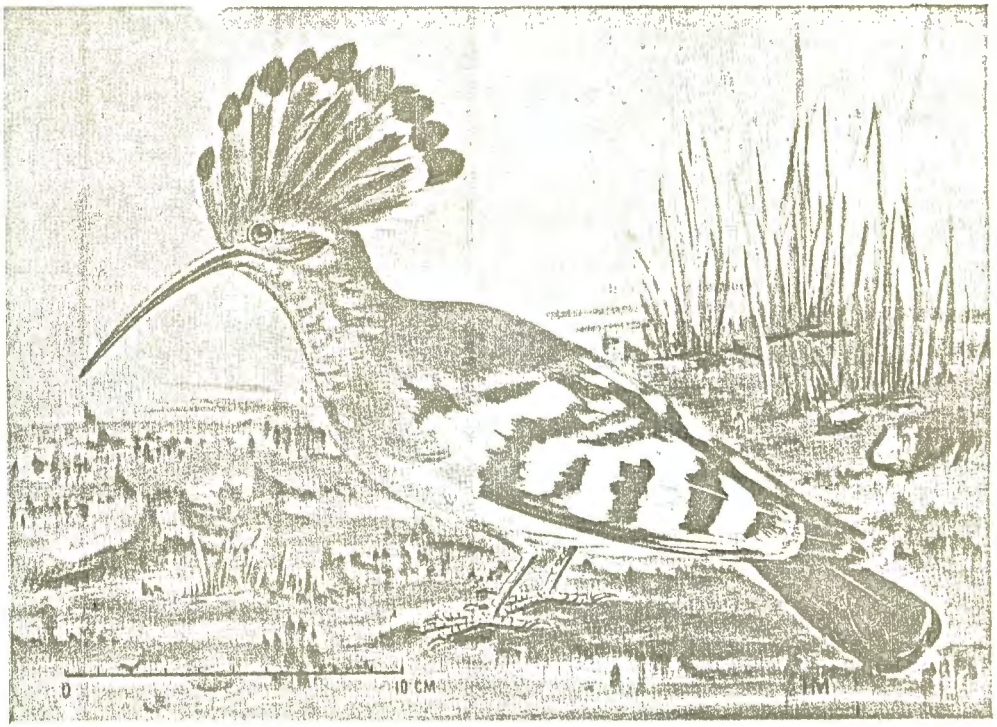
FOOD, VOICE and CALLS. Presumably as in 600; nothing recorded as specifically different.

57. ROLLER or BLUE JAY

(Coracias benghalensis)

Hindi: *Neelkănt, Săbzăk*

Essentially a bird of open cultivated country and light forest, although it does occasionally enter areas of human habitation. It is highly beneficial to the cultivator as its food consists mainly of locusts, crickets and other insect pests of crops. Mice, lizards and frogs are also taken. The birds indulge in fantastic aerobatics during the breeding season, nose-diving and rolling from side to side, to the accompaniment of harsh grating screams.



58. HOOPOE

(Upupa epops)

Hindi: *Hūdhūd*

Hoopoes are fond of lawns, gardens and groves in the neighbourhood of villages and cultivation, in the hills and plains alike. They keep in pairs or small groups, feeding on the ground, running about with a quail-like, waddling gait, and probing the soil with their slender bills for worms etc. On alarm or excitement the conspicuous crest is jerked open fanwise. The call is a soft and musical, penetrating *hoo-po-po* from which the bird gets its name in many languages including Hindi. The food consists of insects, grubs, and pupae, many of which are serious agricultural pests.

59. MALABAR PIED HORNBILL

(Anthracoceros coronatus)

Hindi: *Dhăn chiri, Dhănēsh* (all hornbills)

A heavy-billed arboreal bird, sociable, and found in noisy flocks on fruit-laden trees in wooded country. It is found in south and central India and parts of Bihar, U.P. and Orissa. Although mainly a fruit-eater, it also takes lizards, mice, and baby birds. The flight consists of a few rapid and noisy flaps followed by a glide with wing-tips upturned. The birds follow one another from tree to tree in follow-my-leader style. The call notes are a series of harsh screams.

60. CRIMSONBREASTED BARBET or COPPERSMITH

(Megalaima haemacephala)

Hindi: *Chhōtā băsăntha*

The call of this bird—a monotonous *tūk . . tūk . . tūk*, from which it gets its nickname Coppersmith, is one of our most familiar bird sounds on the countryside. The caller itself is seldom seen as its coloration hides it effectively among the green leaves. The bird is found wherever there are trees, especially banyan and peepul, on the figs of which it largely feeds. This diet is occasionally varied with moths and winged termites.

63. CRESTED LARK

(Galerida cristata)

Hindi: *Chāndūl*

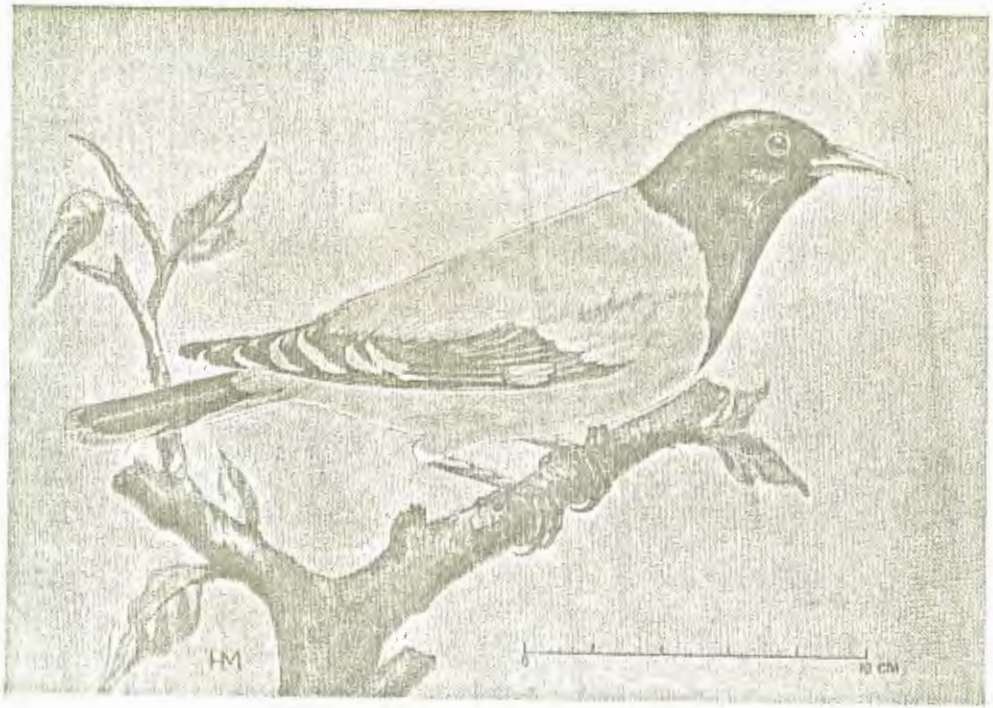
This is an inhabitant of sandy or stony semi-desert or dry light scrub country. Pairs or small parties are met with, running about on the ground, searching for grain, grass seeds, and insects, which comprise its food. The call note is a pleasing, liquid whistle *tee-ūr*. It is a favourite cage bird and does well in captivity, but as a songster is much inferior to the similar but smaller and crestless Skylark.

64. BLACKBELLIED FINCH-LARK

(Eremopterix grisea)

Hindi: *Diyōrā, Dūri, Jothauli, Deoli* (Bareilly)

This little lark affects flat cultivated country and semi-desert waste land, and is usually met in scattered pairs or parties. The flight is a series of rapid wing beats followed by short pauses, and the call note is a sweet warbling *wheech-wheech*. It is uttered by the male during his spectacular aerobatics and nose-diving display in the breeding season. The food consists of seeds and grain, and to a lesser extent insects.



67. BLACKHEADED ORIOLE

(Oriolus xanthornus)

Hindi: *Peelāk*

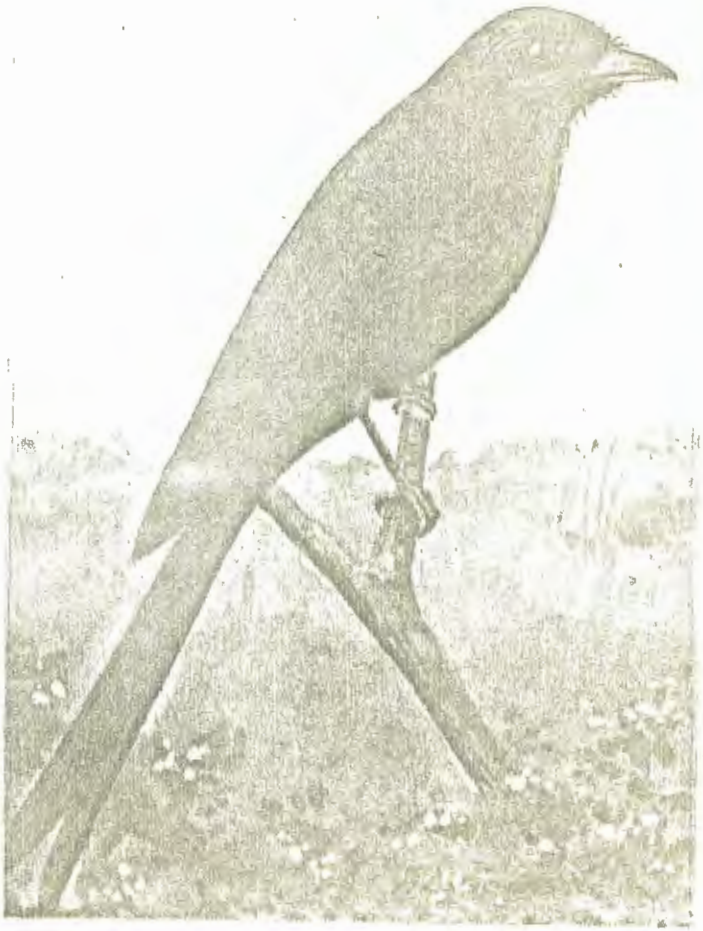
This oriole, like its near relation the Golden Oriole, is a bird of well-wooded country and groves of large trees, often near human habitation. It is entirely arboreal, feeding mainly on fruits and berries. It has a variety of loud melodious calls.

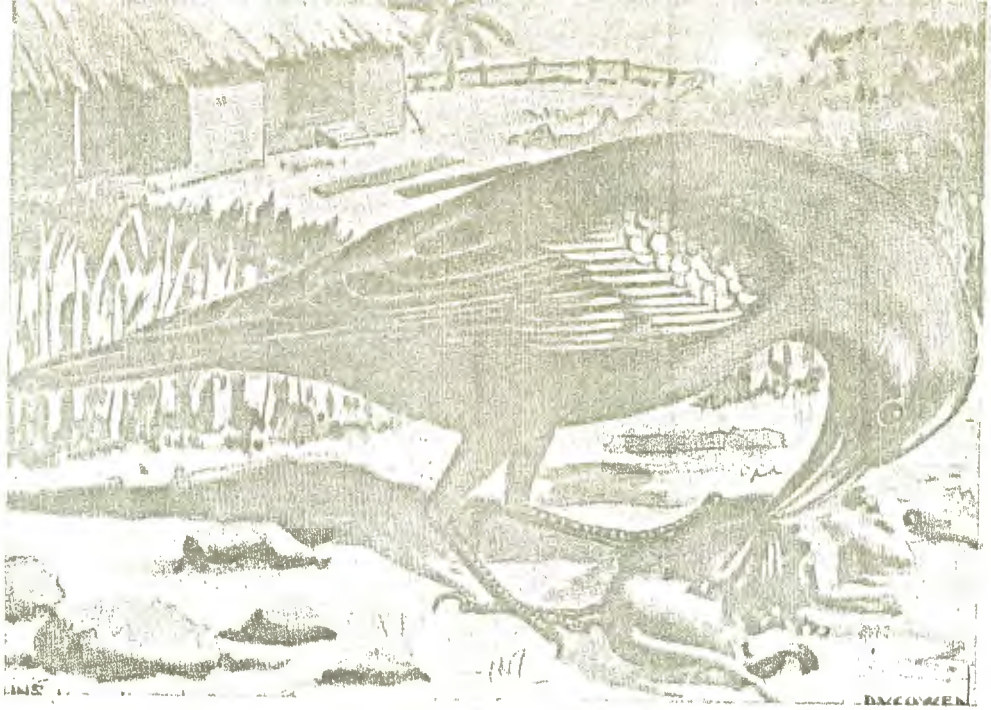
68. BLACK DRONGO or KING CROW

(Dicrurus adsimilis)

Hindi: *Bŭjăngā, Kōtwāl, Kālkălāchi*

One of our most familiar birds, found in every type of country except dense forest and actual desert, especially in intensely cultivated areas. It sits on an exposed perch like a telegraph wire or pole, from where it makes sallies to capture moths and winged insects in the air. It has a variety of harsh, scolding calls. The species is highly beneficial to agriculture because of its destruction of insect pests.





71. HOUSE CROW

(Corvus splendens)

Hindi: *Dēsi kowwā*

The commonest and most familiar of our birds, also perhaps the boldest and most intelligent. His thieving propensities are in some measure redeemed by his efficient service as a municipal scavenger, as well as by his wholesale destruction of locusts and other injurious insects. On the other hand crows also filch grain from newly sown fields and ripening crops; and they are a menace to the eggs and young of other birds. They roost communally in large flocks.

72. TREE PIE

(Dendrocitta vagabunda)

Hindi: *Māhālāt*

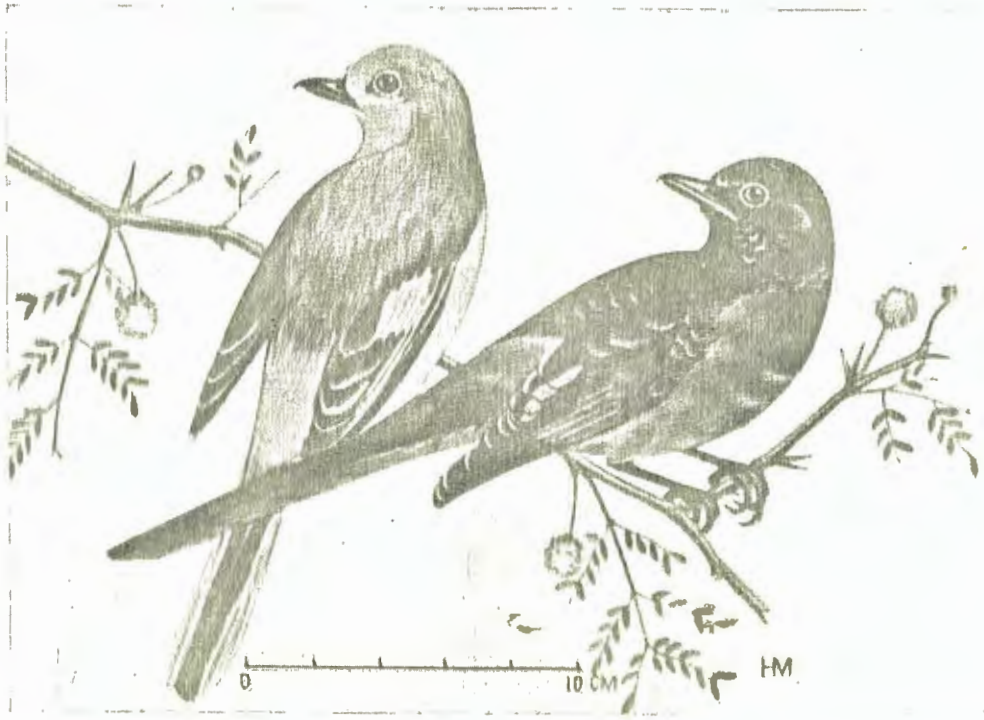
A bird of light forest, frequenting open country and scrub jungle, often entering compounds and gardens. Found in pairs or family parties which keep up a harsh, grating conversation —*ke-ke-ke-ke* etc. varied by more melodious calls—*kokila* and others. They are quite omnivorous, and take anything from carrion to insects and banyan and peepul figs.

73. SCARLET MINIVET

(Pericrocotus flammeus)

Hindi: *Pāhāri būlāl chāshm*

This gorgeous, exclusively aboreal minivet is a resident of well-wooded country. It keeps in small parties and sometimes in flocks of twenty or more birds. They flit restlessly among the trees, in search of insects and larvae, looking exquisite against the dark green leaves. The frequently-uttered call notes are a pleasant musical whistle, *wheetweet* or *whi-ri-ri, whi-ri-ri*, etc.



74. IORA

(Aegithina tiphia)

Hindi: *Shoubeegi*

A bird of gardens, groves of trees around villages, and light secondary jungle. It is usually seen in pairs hunting for caterpillars and insects among the foliage. The pair keep in touch with each other by mellow whistles and short musical chirrups. In the breeding season the male gives a very pretty nuptial display, fluffing his feathers, springing up in the air and floating down again looking like a ball of fluff.

75. JERDON'S CHLOROPSIS

(*Chloropsis cochinchinensis jerdoni*)

Hindi: *Hărēwā*

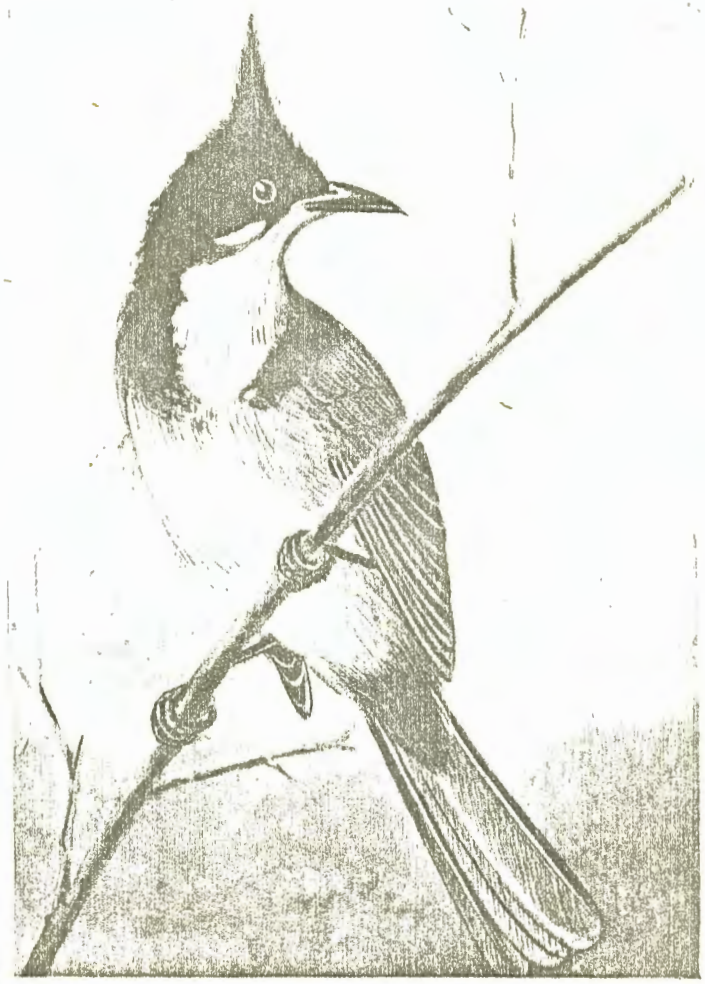
A spruce and active grass-green bird about the size of a bulbul, with bright purple-blue and black cheeks and throat. In the female the throat is pale bluish green. It keeps in pairs to wooded country where the green plumage conceals it admirably in the leafy trees. Its food consists largely of flower-nectar, insects and spiders. It is a very accomplished mimic of the calls of other birds and seems to delight in fooling humans by its clever imitations, leading them to imagine a mixed concert of bird music in progress when in fact a hidden harewa is the sole performer !

76. REDWHISKERED BULBUL

(*Pycnonotus jocosus*)

Hindi: *Pāhāri būlbūl*

A sprightly, well-groomed bird of gardens and shrubbery with a jaunty, erect and forwardly-curving crest, crimson 'whiskers' and a crimson patch under the tail. It is tame and confiding and commonly found in the neighbourhood of habitations, especially in the peninsular hill-stations. It lives on berries and insects and spiders, and though it has no song as such, its joyous musical notes contribute largely to the charm of gardens even within the limits of noisy towns and cities.



77. REDVENTED BULBUL

(Pycnonotus cafer)

Hindi: *Būlbūl, Gūldūm*

This is another familiar and friendly bird of urban gardens and the shrubby countryside, chiefly in the plains. A close relation of the Redwhiskered Bulbul, it is easily differentiated from it by the lack of the pointed crest and red whiskers, and by the underside being brown instead of white. But its sobre attire in no way makes it less welcome around human habitations. Its greatest charm lies in its friendly and confiding disposition, sprightly behaviour and cheery call notes. In addition to fruit and insects it loves peas, and this sometimes makes it less loveable to kitchen gardeners !

78. WHITESPOTTED FANTAIL FLYCATCHER

(Rhipidura albogularis)

Hindi: *Nāchān, Chākdil*

A cheery, restless bird of sparse bushy jungle and gardens and shrubbery, often surprisingly tame. Usually seen in pairs which keep more or less to the same neighbourhood, flitting tirelessly from branch to branch, waltzing and pirouetting with tail erect and spread like a fan. The normal notes are a harsh *chuck-chuck*, but it also has a delightful warbling song. It lives on mosquitoes and flies captured in the air by agile sallies.

79. PARADISE FLYCATCHER

(Terpsiphone paradisi)

Hindi: *Shāh būlbūl, Doodhrāj*

This delightful creature frequents groves and gardens and light deciduous jungle. It usually keeps singly or in pairs, and often amongst the mixed hunting parties of small insect-eating birds. Its normal call is a harsh and grating *che-chwe*, which becomes pleasant and musical in the breeding season. The tail ribbons of the snow-white male, lightly trailing behind as he flies through the trees present a fairy-like spectacle.

80. JUNGLE BABBLER

(Turdoides striatus)

Hindi: *Sāt bhāi, Ghonghāi*

This babbler, aptly known as *sat bhai* in Hindi and 'Seven Sisters' in English, inhabits gardens, and thin jungle. Most of its time is spent in hunting for insects and spiders on the ground, hopping and rummaging among the leaves in parties that quite often literally number 7 birds though larger flocks also occur. Banyan and peepul figs and flower nectar are favourite food items. The flock keeps up a constant chatter and the birds are bold in putting up a united defence against an aggressor.

83. ASHY WREN-WARBLER

(Prinia socialis)

Hindi: *Phūtki* (all small warblers)

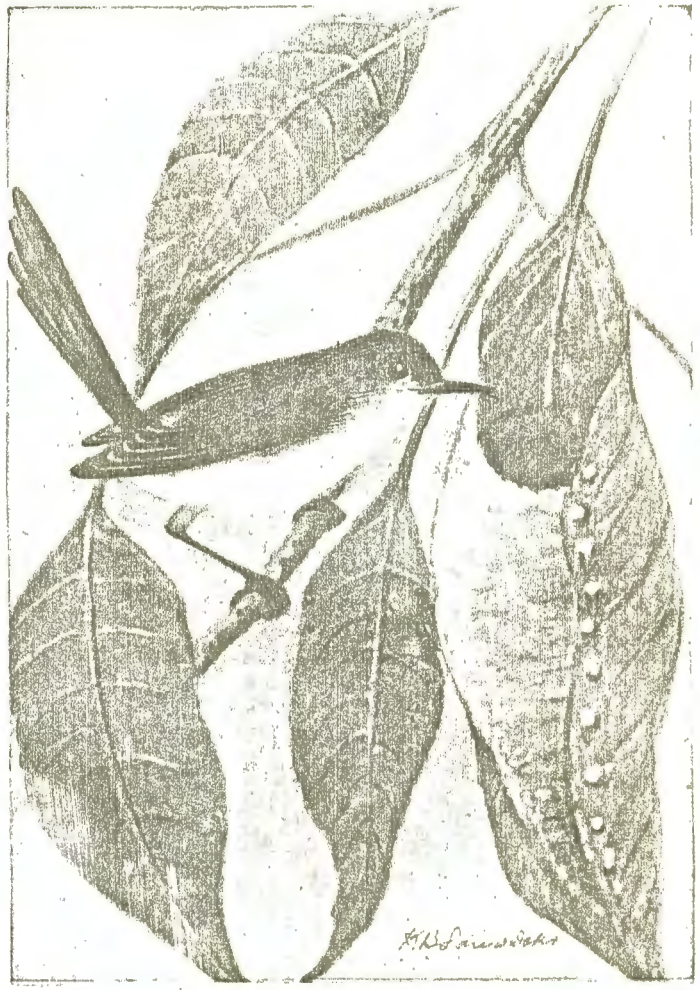
A pair of these charming little birds is found in most shrubby gardens, and they are common in wet grassland. Reticent rather than shy, it hops quietly among the bushes in search of [illegible] and caterpillars, uttering a sharp *tee-tee* from time to time. [illegible] the breeding season, however, the male often climbs to an exposed bush-top and pours forth a torrent of cheerish warbling.

84. TAILOR BIRD

(Orthotomus sutorius)

Hindi: *Phūtki, Dārzi*

The friendly little bird immortalized as Kipling's 'Darzi'. It keeps in pairs and is found everywhere in scrub jungle and gardens, even in the heart of noisy cities, freely entering verandahs of occupied bungalows and building its cleverly stitched nest among the potted plants. The loud cheerful calls *towit-towit-towit*, or *pretty-pretty-pretty*, etc. are familiar to [illegible] bird lovers. It eats insects and spiders and is fond of flower nectar.



9. PAINTED STORK

(Ibis leucocephalus)

Hindi: *Jănghil, Dōkh, Kānkāri* (Bihar), *Jhingri* (Bareilly)

A common frequenter of jheels and tanks, sometimes also seen at rivers. It gets its name from the prominent daubs of soft pink on its wings. Though a resident species it moves about locally under stress of natural conditions such as drought and flood. The predominant food is fish obtained by wading in water on its long legs, but frogs, aquatic insects, crabs and snails are also eaten.

10. OPENBILLED STORK

(Anastomus oscitans)

Hindi: *Gūnglā, Ghūngil* (Bihar)

A small greyish white-and-black stork with a very wide and general distribution. Its special feature is the peculiar bill adapted for extracting large snails from their shells. These are its chief food. Like others of the family it indulges in the typical soaring and circling flights high up in the air. The only sound it makes is an occasional clattering of the mandibles.

PAINTED STORK, *Ibis leucocephalus*

(app. 100 cm - 40 in)

Painted Storks are found in India south of the Himalayas and eastwards through Burma to Indo-China and southern China. They are usually found in areas with shallow water and swamps where they wade about searching in the mud for small crabs, larvae, fish and frogs. They usually crush spiny fish with the powerful mandibles before swallowing them head first. In the middle of the day they stand motionless in the water with the bill pointing downwards. They have the typical stork habit of clattering the mandibles and shaking the head.

During the breeding season, which is from September until April, they form large colonies of several hundred birds. The nests are built in the upper branches of trees, such as banyan and tamarind, often 70 feet from the ground and there may be as many as 80-100 nests in a single tree. Each nest is a loose, flat structure of dry sticks and twigs with a depression for the 2-4 dull-white eggs. In most places they nest in the company of other birds such as herons, egrets, cormorants and spoonbills.

61. YELLOWFRONTED PIED, or MAHRATTA WOODPECKER

(Dendrocopos mahrattensis)

Hindi: *Kătphōrā* (all woodpeckers)

This small woodpecker inhabits light scrub country and thin forest, mango orchards and groves of trees, usually keeping in pairs. It scuttles up tree trunks and branches, stopping every now and again to tap on the bark and peer into the cracks for ants and grubs which are extracted with the help of the long worm-like tongue. The call is a sharp *click, click* or *click-r-r-r*. The swift undulating flight is a series of rapid wing beats followed by a short dip.

62. INDIAN PITTA

(Pitta brachyura)

Hindi: *Naorăng*

A bird of well-wooded and scrubby country, fond of nullahs and ravines with plenty of undergrowth, and often found near habitation. It is mainly terrestrial in its habits, and feeds on insects and grubs dug up from the soil. The call note is a loud clear double whistle *wheet-tew*. The bird moves about the country a great deal seasonally between northern India and Ceylon, but its local migrations are not yet properly studied.

INDIAN PITTA, *Pitta brachyura*

(app. 18 cm - 7 in)

The Indian Pitta is widely distributed throughout India. It breeds in the foothills of the Himalayas and in western and central India; the more northerly breeders spend the winter in Ceylon and southern India. They are essentially forest birds but can also be seen in open country and in gardens.

Pittas spend most of their time on the ground where they hop and run about in search of food. They spend little time up in the trees or on the wing. They have a sweet, clear call which is uttered with the head and shoulders thrown back, the chest out and the bill pointing upwards. They feed mainly on worms, ants, beetles and other insects.

Pittas breed from June to August. The nests are sometimes built on the ground or in low branches, but most are found in the forks of trees 20 to 30 feet above the ground. Each nest is large and globular with a circular entrance hole at one side; it is made of grass and leaves strengthened with strips of bark and fine plant-fibre. The female lays 4-5 pure white eggs which are marked with shiny dark brown or purplish-brown spots and speckles.

HANDBOOK OF THE BIRDS OF INDIA AND PAKISTAN

TOGETHER WITH THOSE OF NEPAL, SIKKIM, BHUTAN AND CEYLON

SÁLIM ALI
AND
S. DILLON RIPLEY

Volume 1

DIVERS TO HAWKS

Synopsis Nos. 1–224

Colour Plates 1–18

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MIGRATION

THE 2100 odd species and subspecies of birds that comprise the avifauna of the Indian subcontinent and Ceylon include land birds as well as pelagic forms such as petrels, shearwaters, frigate birds, boobies, and skuas normally found only out at sea but which get blown in sporadically on our seaboard during heavy monsoon gales. Roughly about 350 forms are extralimital seasonal immigrants, meaning that they breed outside our territory, mostly in the Palaearctic Region beyond the Himalayas — in central and northern Asia, and eastern and northern Europe. The most abundant and regular winter migrants are the ducks and geese (Anatidae), Wading or Shore birds (Charadriidae) especially of the subfamilies Charadriinae and Scolopacinae, Cranes (Gruidae), and the passerine families Hirundinidae (Swallows), Muscicapidae especially Muscicapinae (Flycatchers), Sylviinae (Warblers), Turdinae (Thrushes and Chats), Motacillidae (Pipits and Wagtails), Fringillidae (Finches), and Emberizidae (Buntings). But many other families are represented among the migrants as well. Moreover, every gradation of migration is met with, from local movements of no more than a few kilometres, or a few hundred metres altitudinally in the Himalayas or peninsular mountains, to enormous trans-Himalayan journeys involving several thousand kilometres each way.

Besides the large number of extralimital migrants, there are numerous others whose palaearctic breeding range just encroaches our boundaries on the Afghanistan-West Pakistan border, and also into Gilgit, Ladakh, Garhwal, Nepal, Sikkim, Bhutan, and NE. Assam. Many of these species spread over northern India in winter, and many over the rest of the Peninsula as well. In all respects they behave like the true migrants from beyond, arriving with them and spreading out over the country in autumn, chiefly between September and November, and leaving again for their northern breeding grounds before our hot weather commences in March/April. Considering the hundreds of species and the millions of individuals involved in these biannual journeys, year after year, it is amazing how little precise information we possess concerning the provenance, routes and goals, and other factual details of the migrants. Practically all that is known is based on somewhat scrappy and haphazard observations, chiefly of British army and civil service personnel who happened to be stationed along the strategic Indo-Afghan border within the last 100 years. Some of these men were excellent field naturalists and have contributed vastly to our basic knowledge of Indian ornithology. The names of Scully, Biddulph, the two Marshall brothers, Magrath, Whitehead

and Donald stand out from amongst the many others in this connexion. Their observational data, though primarily relating to sporting birds such as ducks, geese, and cranes, form the hard core of practically all that is known of trans-Himalayan bird migration. They outlined the broad pattern of the seasonal movements and indicated that the main migration route between Siberia and central Asia on the one hand and the Indian peninsula on the other was the Indus Valley in the northwest. Similar though even more fragmentary bits of information from the northeastern outposts of India suggest that from NE. Asia the Tsangpo or Brahmaputra river and its affluents constitute the principal flyway. The two migrational streams enter from either end of the Himalayan mountain chain in a pincer movement and converge on the tip of the Peninsula, weakening as they advance southward and trickle over into Ceylon which virtually forms the terminus. However, increasing evidence is being procured by mountaineers in recent years that migrants also fly directly across the Himalayas, even over some of the highest sections of the mountain barrier, thereby in effect shortening their journeys very considerably. Not only have many migrating geese, waders and passerine birds been visually recorded during daytime[1] and heard passing over the high altitude camps at night, but climbers have also come across remains of migratory birds such as ducks, cranes, waders, and eagles[2] strewn on high glaciers in the Himalayas and Karakorams which had evidently perished in storms and blizzards. At Dehra Dun geese have been observed through a telescope flying northward in spring at a height of *c.* 29,500 feet (8830 m.) across the face of the moon. Indeed there is now sufficient evidence of this kind to suggest that a far greater amount of passage must take place directly over the High Himalayas than had hitherto been credited. Recent migration studies by radar in Europe and America have shown that, contrary to older beliefs, even small passerine birds may travel at unsuspected heights of 6000 metres or more, which lends colour to this probability. Nevertheless it is true that a large proportion of the migratory birds, especially ducks and geese, that enter the subcontinent from the northwest in autumn — when the journey is more leisurely performed — sweep down the valley of the Indus river. One arm of the migrational tide branches off early in a SE. direction and debouches into the north Indian plains through Hazara, Kashmir, and the Punjab. The Kagan and Kurram Valleys on the northwest frontier of Pakistan have been specifically named in this connexion (Whitehead, Magrath). The other arm continues southward down the Indus and, avoiding the inhospitable expanse

[1] Biswas reports seeing a stray hoopoe (*Upupa epops*) on Pumori Glacier, *c.* 5790 m., in May.

[2] Blacktailed Godwit (*Limosa limosa*) and Pintail Duck (*Anas acuta*) on Khumbu Glacier *c.* 16,000 ft. (4875 m.) at the foot of Mt Everest, and Steppe Eagles (*Aquila nipalensis*) on South Col, *c.* 26,000 ft. (7925 m.).

of the Thar or Indian Desert to the east, veers further south in a southeasterly direction to cross the Great Rann of Kutch, northern Gujarat and Saurashtra and enter the Indian peninsula. This stream is augmented in its course by migrants travelling SSE. from W. Asia —from the Caspian-Aral region through Iran, Afghanistan, Baluchistan, and Lower Sind. This, in broad outline, is the general picture that emerges from a consideration of the data available. But it is largely conjectural and hypothetical and needs verifying by more intensive studies. There is reason to believe that for many species the pattern of the spring migration, which is usually more hurried and direct, with fewer stopovers and also at higher altitudes, is very different. Kutch also lies on the extreme eastern fringe of a broad stream of through migration that sweeps down from central and northern Asia in a southwesterly direction in autumn. This current passes over Afghanistan and the former NW. Frontier Province, down through Baluchistan and Sind, then across the Arabian Sea and the tip of southern Arabia into Somalia, Abyssinia, and further south in the African continent. Such species as the Kashmir Roller (*Coracias garrulus semenowi*), European Nightjar (*Caprimulgus europaeus unwini*), European and Bluecheeked Bee-eaters (*Merops apiaster* and *M. s. persicus*), Redbacked Shrike (*Lanius collurio*), Rock Thrush (*Monticola saxatilis*), Greybacked Chat (*Erythropygia galactotes familiaris*), Indian Whitethroat (*Sylvia communis icterops*), Spotted Flycatcher (*Muscicapa striata neumanni*), and others, travel regularly by this route. From the absence of Indian records on spring passage it is evident that most of them, at any rate, take a different route for the return journey north.

Far less is known about bird migration across our northeastern frontiers. This is largely due to the uninhabited, rugged and mostly inaccessible nature of the terrain in the eastern Himalayas, and to the fact of this frontier having been considered of too little strategic importance in the past to necessitate the stationing of British military personnel such as have provided most of our data for the northwest. The recent Chinese incursions in that quarter have dictated greater vigilance and logistic developments, and with the opening up of the North-east Frontier Agency tracts (NEFA) to 'civilizing' influences it is to be hoped that our knowledge of bird migration in that area will profit.

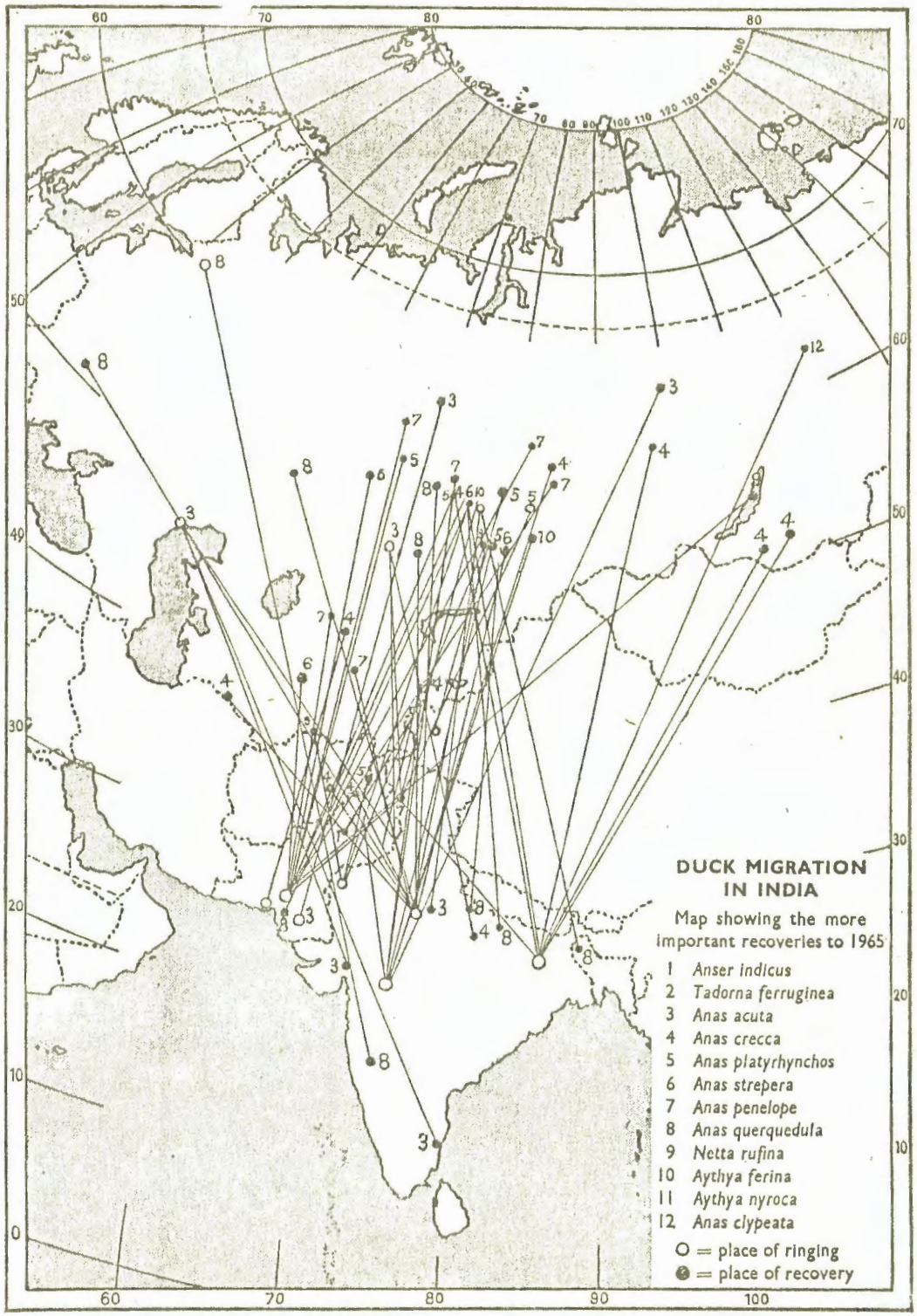
In so far as Ceylon is concerned there is some evidence for the presumption that not only do both the western and eastern arms of the palaearctic migration into the Indian peninsula cross over into the island, but also of a third route that brings NE. Asiatic migrants through Indochina and Thailand via the Andamans. So far, however, no direct proof of this has been provided by ring recoveries (Phillips 1956).

Our knowledge of Indian bird migration has so far consisted largely of fragmentary records, often of a subjective and conjectural nature.

The first attempt to rectify this deficiency was a modest scheme of bird-ringing initiated in 1926 by the Bombay Natural History Society with the active cooperation of the then Maharaja of Dhar (Sir Udajirao Puar) and the rulers of a few other Indian States, as well as some of the larger zamindars of Sind. Considering the meagreness and haphazard nature of that experiment, which virtually petered out by 1934 through lack of funds, the results proved unexpectedly gratifying. Those early ring recoveries constituted our first positive confirmation that most of our migratory ducks are in fact derived from Siberia and from central and northeastern Asia, often over distances of 3000 to 5000 km. and more. In addition to Indian-ringed birds recovered in the U.S.S.R., some highly significant recoveries of European-ringed birds in India were also obtained during the same period: a Green Sandpiper (*Tringa ochropus*) ringed near Moscow, in Kerala; a White Stork (*Ciconia ciconia*) ringed in western Germany, in Rajasthan; and a Rosy Pastor (*Sturnus roseus*) ringed in Hungary, in the Punjab.

It was not till the year 1960 that a more comprehensive project for bird-ringing in India became possible through the cooperation of various scientific organizations interested in the problem of possible dissemination of arthropod-borne viruses by migrating birds. During the seven years of operation of this scheme nearly a hundred thousand migratory birds have been ringed, chiefly wagtails (Motacillidae) and of several other passerine families, in addition to ducks (Anatidae) and waders (Charadriidae). So far all the work has been done departmentally by the Bombay Natural History Society in a few selected localities, but it is proposed to expand the programme with the cooperation of individual ornithologists and naturalists' associations into a coordinated network of ringing field stations giving the widest possible coverage over the subcontinent. The intensive ringing of migratory birds, combined with visual records and other data regularly maintained by competent observers and over prolonged periods of time, and supplemented by modern migration study techniques and mechanical devices such as radar, can alone provide an unequivocal picture of the situation in our area. Of all these, perhaps large-scale bird-ringing is the most immediately important.

The aluminium rings used by the Society are of several appropriate sizes. They bear the inscription INFORM BOMBAY NAT. HIST. SOCIETY together with a serial number prefixed by a letter of the alphabet denoting size. In order to coordinate all ringing activities in the subcontinent and minimize dissipation of effort and data, it is desirable that only the Bombay Natural History Society's rings should be used, as is being done in Ceylon. All recoveries, whether of these rings or foreign ones in India, should be reported (preferably accompanied by the actual ring) to the Society as the central organization



in this part of the world for ringing and maintaining records and furnishing up-to-date information.

Very little has been published on Indian bird migration, and that largely as haphazard parochial arrival and departure dates of random species in random parts of the country. Most of these records are scanty and irregular. They are, moreover, buried away among regional bird papers published from time to time chiefly in the *Journal of the Bombay Natural History Society* or *The Ibis*, and difficult to unearth and collate.

The map indicates the pattern of Anatid migration as revealed by the recoveries of ringed ducks in and from the subcontinent to date. This, in general, is the pattern gradually developing in the case of other palaearctic migrants as well, but it may be a long time before we have sufficient authentic data to deduce satisfactory specific conclusions. Details of a few significant recoveries will be found under the species concerned.

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ZOOGEOGRAPHY OF THE INDIAN SUBREGION.

THE 'Oriental Region' (or Indian Region as he called it) was first proposed as one of the six zoogeographic regions of the world by Philip Lutley Sclater in 1858. His subdivisions were based on the study of birds for he was an ornithologist. In spite of the century of discussion and research that has ensued, his arrangement is still followed today. A more specific discussion of the zoogeography of India followed in the paper of Blanford (1901).

Broadly speaking the Oriental Region encompasses most of what is today known politically as India, excluding the higher reaches of the Himalayan mountains although the Oriental fauna and flora extend up to 11,000 feet in some cases (Ripley, 1961). Nepal, Ceylon and adjacent islands, East Pakistan, and large areas of southeast Asia are included in the Oriental Region.[1] West Pakistan is a much drier area and belongs to a transition zone of southern Eurasia, partly the Palaearctic Region so-called, with drier, more temperate climate, partly trending towards the hot dry Somali arid zone of Chapin (1932), as described for Arabia (Ripley, 1954).

In his excellent general book on zoogeography, Darlington (1957) has pointed out that the interpretation and study of the patterns of distribution of animals which makes the subject of zoogeography consists of a number of subpatterns. The first and broadest of these is *limitation*, the final limits of a species or a larger grouping—a genus or family or class of animal. Within geographical limits certain classes of animals exhibit roughly parallel distributions. The assembling and considering of the *limits* then to which cold-adapted or warm-adapted animals proceed, tends to bring into rough focus the concept of zoogeographical regions of the world. Thus the Oriental Region besides being a geographic part of the land and fresh waters of the world, has a certain limit imposed on it by climate and temperature within which groupings of animals find their preferred home.

A second subpattern is *zonation*, implying climate, and it is fundamental to the land divisions of the Oriental Region that it falls primarily within the tropical zone with fingers extending up into the mountains. Mountains of course in tropical latitudes serve as islands. By proceeding upwards and gaining altitude the tropical zone is lost gradually and at a steady rate. Gradually the subtropical, then the temperate zones are encountered, and finally at the greatest heights, the alpine zone may be reproduced as it were, duplicating conditions found in the tundras of the far north or the subantarctic.

[1] For a fuller account see Sálim Ali 1964, Article 'Oriental Region' in Thomson, A. L. (ed.), *New Dict. Birds* (London & New York).

A third pattern is that of *geographical radiation*, of spreading outwards of a particular group of animals from some geographic centre. A powerful world centre for animal evolution has apparently been the old-world tropics so-called, the heartland of which is the Oriental Region. Thus in the case of birds, the dominant families of birds in India belong to what is sometimes called the 'Indochinese' fauna, the birds adapted to life in warm, moist tropical southeast Asia, birds primarily of jungle or heavy forest. The geographical ramifications of southeast Asia, the tangled patterns of mountain chains, river drainage systems and a long period of stable climate seem to have been ideal for the evolution of a wide array of species of birds.

A fourth subpattern is that of *differentiation of faunas*. Here in the tropics of the Oriental Region this is well illustrated in birds where there is great diversity. Over sixty per cent of all the endemic species of Indian birds (endemic meaning restricted to a particular place) are of the 'Indochinese' subregion so-called, confined to the Oriental Region.

Darlington's fifth subpattern is that of *concentration in the largest, most favourable areas*. Here again this phenomenon is well-illustrated in the response of the bird fauna of India which, being predominantly tropical, occurs in greatest concentration in the largest areas of rainfall in eastern India, East Pakistan, along the mountain chains wherever the monsoon shadow occurs, especially in southwest India, in parts of Ceylon and in the Andaman and Nicobar Islands.

Of all the zoogeographical regions of the world, perhaps the Oriental is the least limited by barriers, but at the same time it is one of the principal if not the principal one from the point of view of evolution and of having acted as a centre of dispersal. Only northern South America has a richer fauna, only tropical America, and some of the most isolated areas like New Zealand, have a higher rate in proportion of species formation and evolutionary response.

A brief review of geological origins may be appropriate here. In Permian times, more than two hundred million years ago, the peninsula of India and an inter-connected Ceylon, all the area south of the Ganges river basin, was part of a continental region. This massif is composed of ancient rocks which to the geologist are representative of a continent. These rocks are known as the Gondwana formation and the outlines of this ancient continent can be traced up to northwestern India on the west, towards Calcutta on the east, with the edges of marine sediments marking old coastlines, and old river beds emptying into areas of former seas. The special fossil shells of this rock show that the continent was rimmed by far cooler seas than today. What the continent of Gondwanaland consisted of may never be known, but there are clues from the presence of similar rock formations. It may have spread south as far as the Seychelles Islands to Madagascar, east to western Australia, and perhaps even farther south and west. Whatever

the connexions of this ancient past, we do know that the continents were presumably closer together many aeons ago. Recent studies of oceanographers and geophysicists show systems of ridges deep in the oceans which parallel the continental masses and may well indicate a gradual expansion of the earth's exterior surface by the process of internal connexion or the transfer of rock materials under great heat and pressure. The continents thus may be drifting apart under the slow convection of the earth's interior at a rate of perhaps one centimetre a year. But from the point of view of the distribution of warm-blooded vertebrates these ancient connexions have little if any influence.

Between Palaeozoic times (including the Permian) and Recent time comes the vast stretch of the Mesozoic or Age of Reptiles, occupying more than one hundred thirty million years. Birds probably had their origin during the middle of this Era but it is the Cenozoic or Recent Era of the last seventy million years which has seen the evolution of birds as we know them today, warm-blooded, with feathers, untoothed bills and the other physical features of their class.

Large parts of the northern Oriental Region were under water until well on in the Recent, the Cenozoic Era. The northern fringes of the Himalayas were under the water of the great central Eurasian sea, the Sea of Tethys which continued into Pliocene times, less than twenty million years ago, gradually drying and retreating to leave behind the Mediterranean, the Black, Caspian and Aral seas. The former boundaries of the Tethys Sea extend south to West Pakistan and central India and included the drainage basin lowlands of the Indus and Ganges river systems. As the seas gradually disappeared and land rose, violent stresses in the outer layers of the earth produced foldings of the mantle to raise up mountain chains from the Alps east to the Pamirs and the Himalayas and the north-south systems of ridges of eastern Assam, Burma and southwest China.

The most recent geological period has been the Pleistocene or Ice Age, marked by four successive cold periods with cycles of glaciation, lowered climate and increased rainfall alternating with milder, drier intervening times. During these alternations, the locking up of water in the form of ice lowered the sea surface to connect many continental shelf islands such as Ceylon with the mainland. Our present climate of relative warmth and unlocking of ice with rising seas has persisted for approximately ten thousand years.

In terms of climatic history, India and the related components of the Oriental Region have been stable for a very long time. The recent ice ages of the Pleistocene may well have coincided with increased rainfall or pluvial periods in the tropics. Greater humidity and accompanying cloud cover help to create cooler average temperatures. All these conditions would suffice to lower temperatures sufficiently on mountain ranges or highlands so that temporary avenues or highways

for mountain stepping-stone-hopping can be provided for species of animals and plants adapted to cooler climates. Much of the spread then of mountain-adapted or cool climate-adapted species into the highlands of the tropical zones and their later isolation and evolution in time into a radiating network of related species can be postulated as a result of one's knowledge of the changes in the climate cycles in the Pleistocene. Thus geographical isolation could combine with small climate changes to promote adaptive changes in species. Subsequent climatic events bringing together former isolated populations a second or third time would serve as the testing ground to determine if genetic isolation had been achieved. If so, new species had been born in the process.

One of the most noted current zoogeographers of India was the late Dr Sunder Lal Hora of the Zoological Survey who developed an important thesis of the distribution of torrential river fish. His Satpura Hypothesis (1950) postulates that by middle Eocene times at the beginning of the Recent or Cenozoic Era, the Himalayan mountains began to erupt, rising up and starting the cutting off of the Tethys Sea. This rising has been slow and continuous down through the Pleistocene. South of the Himalayas in the northern Indian Peninsula volcanic action occurred in late Cretaceous and early Eocene times covering some 20,000 square miles of land with a thick series of volcanic layers known as the Deccan traps. The result was that formerly continuously distributed tropical climate species of plants, insects and vertebrates became isolated in south India and Ceylon, separated from related populations in eastern India and east to China. These upheavals, traced by geologists, affected the drainage of rivers and the distribution of related fish. Originally, peninsular Indian streams up to the Miocene Epoch had drained north into the Sea of Tethys or its related river systems. The Deccan explosives and the Himalayan rise turned peninsular Indian drainage systems to the east. Contemporary rivers of southern China and southeast Asia changed their courses from east to south and west enabling their fish species to reach Burma. Dr Hora believed that these fish from southern China eventually populated the Himalayas from the east, spreading very gradually westwards. Fossils of the Pliocene Epoch just before the Pleistocene show that fish species were becoming distributed west along the feeders of the great river called by geologists the Indobrahm, which drained the enormous marshes left by the disappearance of the Sea of Tethys.

South of the Indobrahm at the edge of the Deccan traps arose an elevated series of hills running from east to west from the southern edge of the Himalayas in Bengal and Bihar nearly to the sea at Bombay. Hora explained the distribution of the hill-stream fish along these Satpura Hills from the eastern Himalayas to western peninsular India and eventually gradually south to Kerala, and, in a few cases of related

forms of higher vertebrates and plants, aided by the climate cycles, south into Ceylon.

By Pliocene times the Ganges system of today began to form, draining the Himalayas and flowing south and east instead of west as had the Indobrahm. A recent feature of this system has been the capture of the Tsangpo, the eastward-flowing river of Tibet, through the penetration by climatic erosion of the upper Assam gorges by the Brahmaputra, a tributary of the Ganges system. Presumably the Brahmaputra did not manage to erode its way north into the Tibetan gorges to capture the Tsangpo, turning it away from the Yellow River and Yangtse systems very recently. But in a relative sense it must have been rather recently in the Pleistocene Epoch.

Even though much of this history is old, as far back as Pleistocene or late Miocene times, the resulting evolution, the resulting patterns of distribution of the avifauna of India as it is understood today, show distinct traces of these events. Sálim Ali (1949) has pointed out the importance of the Satpura Hills as an ornithogeographical highway, as has Ripley (1949).

In regard to the great marshes of late Pliocene time, aftermath of the Sea of Tethys, it would appear that several bird species in their peculiar evolution and adaptation mark the long persistence of this phenomenon. They can be thought of as living relics of a past epoch. The preference of these species is for marshes of large extent along the remains of the system, the 'Indobrahm system'. That they remain today means only that the resulting river and marsh habitats have not been too unsuitable, although one of the species has unfortunately very likely become extinct in the last thirty years. This is the Pink-headed Duck, *Rhodonessa caryophyllacea*, a relict species of the present Ganges river drainage area (Ripley, 1953).

Two other species of local distribution in marshy areas in the central and northwestern parts of the subcontinent are: 1) the Bristled Grass Warbler, *Chaetornis striatus*, and 2) the Sind Jungle Sparrow, *Passer pyrrhonotus*, the latter found as far west as eastern Iran.

Indian zoogeography shows evidence for two of the well-known zoogeographic theories. The first of these is Gloger's theory, which states that in areas of increased humidity warm-blooded animals tend to have darker surfaces than their immediate relatives living in drier areas. Many species of birds and mammals which live in the forests along the foot of the Himalayas, in the Western Ghats, or in Ceylon tend to substantiate Gloger's theory. Such small forest birds as partridges, babblers, flycatchers, warblers and sunbirds have paler populations — geographical subspecies so-called — living to the west in areas of decreased rainfall. Along the sweep of the Himalayas where the monsoon rains fall more heavily in the east, east of eastern Nepal, this phenomenon shows as a break, a discontinuity in the continuous gradual progression

of colour tones of the bird populations. West of this break in the climate, bird populations tend to be paler, to the east darker.

Another theory is that of Bergmann. Bergmann's hypothesis states that warm-blooded animals tend to become larger than their nearest relatives, in areas of increased cold climate. This genetic selection is in response to the physical fact that a larger animal has a diminished exposure of surface in relation to its internal volume than a smaller animal. Thus a mouse, for example, has a greatly increased surface area compared to its internal volume than has a larger rat. The theory implies, however, that only closely related geographical subspecies of the same species be compared. Certain bird species in the Himalayas appear to respond to this hypothesis as their high-altitude populations are larger than their plains relatives. Some warblers, magpies, bush chats, robins, mynas and a nuthatch seem to show size differences. Again throughout the Indian plains there seems to be a similar correlation with degrees of latitude. Many species of birds living year-round in the plains south of 20–22° N. latitude tend to average smaller in overall proportions than the populations of the same species living farther north. Examples of this may be found in the pigeons, parakeets, trogons, drongos, mynas and bulbuls among others.

Zoogeography is certainly not a static study, for one of its major principles is that no climatic zone, no set of physical circumstances connected with a geographic area, none of these, are ever stable or immutable. The dry zone areas from Egypt and the Red Sea countries north to the mountains of northern Iraq and Iran and east into West Pakistan have had much the same climate for the last eight thousand years, but overall desiccation has been progressive during this period, greatly speeded up perhaps in the last fifteen hundred years, and galloping indeed in the last three hundred years. This area has become the arena in which sheep and goats are triumphant. The pastoral flocks and herds have prevented the acacia and thorn scrub which once covered the land from perpetuating itself. With the scrub has gone the grass, and eventually the decline of streams, resulting in all the forced counter-measures at enormous expense and effort which from time to time have been invented to stop the relentless march of desert created by man's domestic helpmates.

Records of the seventeenth century in India tell of the Mughal court and the hunting exploits of emperors like Jehangir who personally killed 3203 large mammals between the age of twelve and forty-eight.[1] These records show a strikingly different environmental pattern from our own. Rhinoceros, found today in India in two limited areas in the northeast, in West Bengal and Assam, and in the central Nepal terai, then occurred north to Peshawar on the northwest frontier of West Pakistan. Northwestern India and much of West Pakistan are semi-deserts

[1] Sálim Ali 1927: 841.

today. Heavy swampy undergrowth and savannah forest suitable for rhino must have been continuous in extent in the seventeenth century at least eight hundred miles to the northwest of where it occurs at present. And here climate itself has not been a factor. It is worth remembering in the context of zoogeography that human beings can affect the habitat rapidly and irreversibly through overgrazing and fires, and eventually animal distribution itself. The discipline of zoogeography thus has much to teach conservationists. Certain species of animals which are on the lists of threatened species made up by various international organizations today are in this perilous state directly as a result of long-range changes in the environment brought on by overgrazing or over-cultivation or similar land-use habits which have become an almost immemorial pattern in many cases.

In this context it is vital to recall that birds, just as other animals, are pinned to that environment for which genetic selection and adaptation have suited them just as surely as other animals. Though mobile and airborne, birds select the habitat whether on migration or through cycles of wandering in search of food, or through protracted residence, which most nearly suit their special, their own adaptations for food-gathering, roosting and nesting, for protection from predators or for adaptations to climate. It is worth considering some of the fifteen or so forest types found in India and pointing out how closely birds are related to these environmental conditions. These types have been delineated by Champion (1936) and are described and illustrated in *Synopsis* (1961), pp. ix-xvi. Here certain species of birds may be seen, and only here.

A) Tidal Forest can be described as an evergreen forest of species of mangrove trees reaching *c.* 30 m. in height, found usually on soil covered at high tide, with an undergrowth of *Pandanus*, canes, some grasses, and many low-height mangrove species, especially nearer the sea. The mean annual temperature is 27° C. with an annual rainfall of about 270 cm. The soil is entirely river-borne silt, often with a coating of overlying sand. This type of forest is found along creeks on the west coast of India and West Pakistan (near the mouths of the Indus), and on the east coast at the mouths of the Mahanadi, Krishna and Godavari rivers, in the Sunderbans of India and East Pakistan, along brackish creeks in Ceylon, and in the offshore islands, particularly the Andamans and Nicobars.

Certain species of birds are primarily only to be found in this habitat:

1) Brownwinged Kingfisher, *Pelargopsis amauroptera* (No. 729 of *Synopsis*). East Pakistan and southeastern West Bengal.

2) Blackcapped Kingfisher, *Halcyon pileata* (739), more likely to occur in tidal forest than anywhere else, although wanders inland in the cold weather.

3) Whitecollared Kingfisher, *Halcyon chloris* subspecies (740–743), southern Maharashtra, Sunderbans, and offshore islands.

4) Bluewinged Pitta, *Pitta moluccensis megarhyncha* (868), tidal forest and adjacent semi-evergreen forest in the Sunderbans of East Pakistan.

5) Grey Thickhead or Mangrove Whistler, *Pachycephala cinerea* (1470), Calcutta east through the Sunderbans, mostly in tidal forest, but also inland in semi-evergreen forest; Andaman Islands.

6) Orangebellied Flowerpecker, *Dicaeum trigonostigma* (1898), tidal forest in Sunderbans and adjacent semi-evergreen and moist deciduous forest.

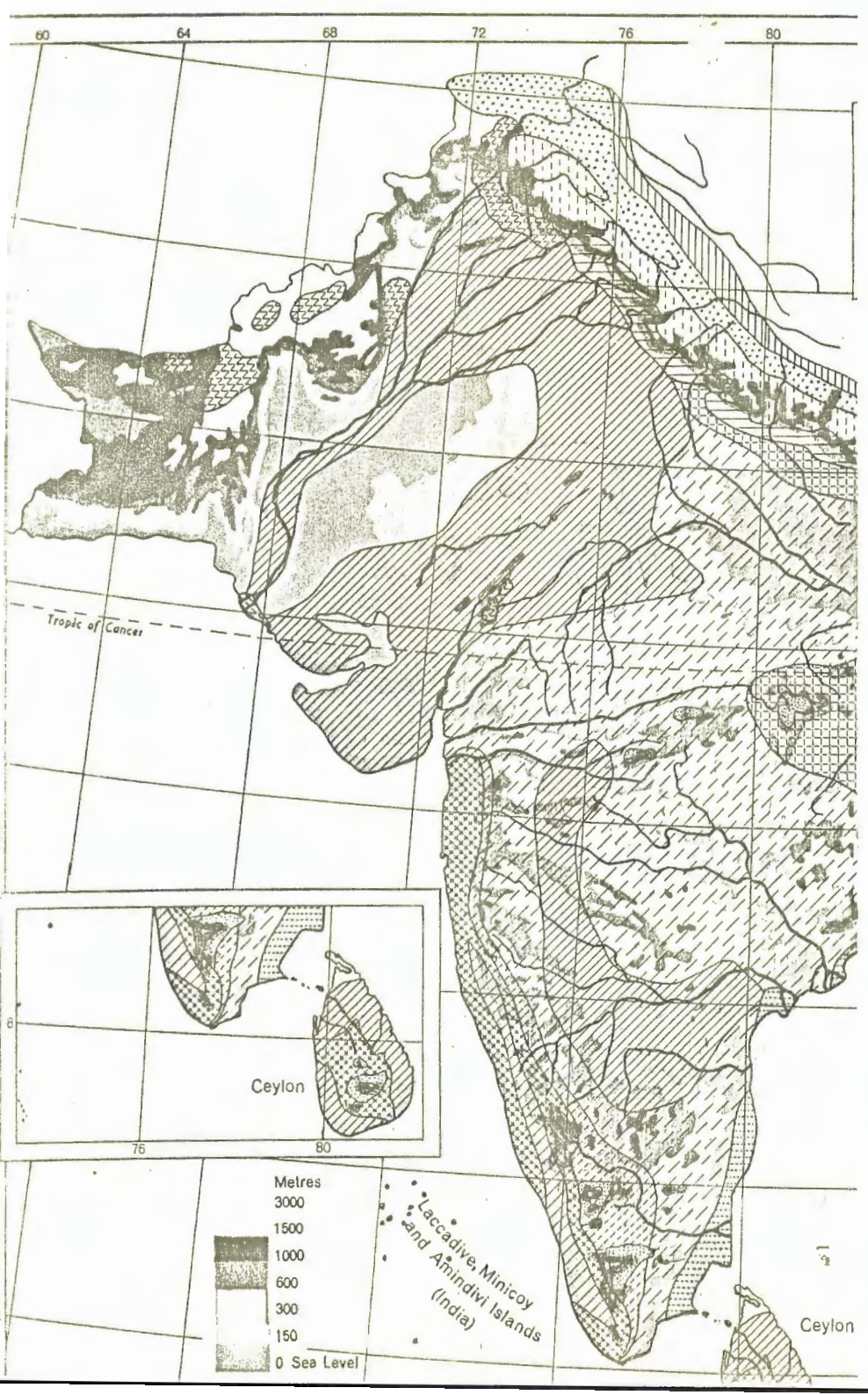
In addition certain hawks, eagles or rails may be found in tidal forest but these species have a wider tolerance for a variety of conditions.

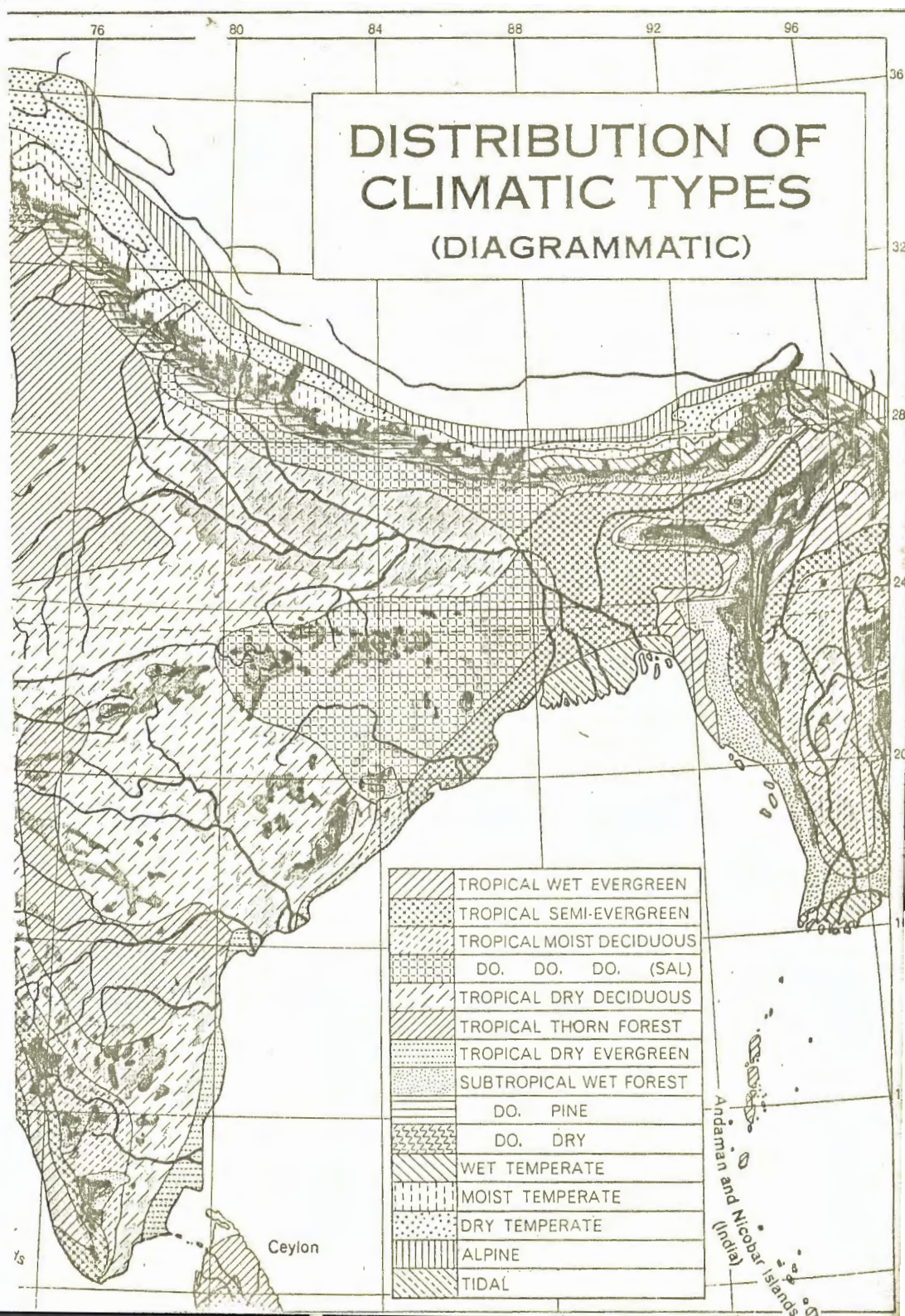
Related to the tidal forest in space and in food supply are the sea beaches themselves, where characteristic migrant shore birds, gulls and terns can be found. Some of these species prefer the open pure salt water and adjacent beach, others the tidal mudflats and brackish reaches of water, and many of these forms, particularly the terns, nest in the mangroves. The Reef Herons, *Egretta gularis schistacea* and *Egretta sacra* (50, 51), are found only on brackish or salt water, along tidal mudflats or reefs, the Crab and Great Stone Plovers, *Dromas ardeola* and *Esacus magnirostris* (434, 437, 438) are found only on sea beaches, though the latter may occur on sandy river beds of the largest rivers, an *ersatz* or substitute biotope as it were.

In contrast to the tidal forest zone, the birds of which show affinities with species of Indonesia and the China coast — the Indochinese subregion as it has been termed by zoogeographers — consider for a moment another zone which recalls the Somali arid zone of east Africa. This is

B) Tropical Thorn Forest. This is a low open forest, characterized by *Acacia* species, reaching 6–9 m. in height, desert-like undergrowth with sparse grass, thick, woody weeds, succulents, a so-called xerophytic type of vegetation, mean temperature annually 25° C., reaching a maximum of *c.* 40° C., and a minimum of *c.* 4° C. The annual rainfall varies from 48 to 76 cm. and is sometimes as low as *c.* 25 cm. The soil is shallow, often alkaline. This zone occurs from sea level to *c.* 600 m. altitude. Thorn forest occurs in non-desert parts of West Pakistan, south of the frost line, large parts of western India, in East Punjab, Rajasthan, Kutch and Saurashtra and southwest Madhya Pradesh running south in Maharashtra to East Khandesh, Aurangabad, south to northern Mysore and east in Andhra to Guntur district; also in the Jaffna area and other parts of northern Ceylon, Rameswaram Island and the adjacent southeast Indian coast. In central peninsular India the heart of this zone occurs in the Deccan plateau, site of much of the Deccan trap rock-formations mentioned earlier.

The birds of this zone show distinct affinities with those of eastern Africa as pointed out by Meinertzhagen (1951), and emphasize that


60
64
68
72
76
80
Tropic of Cancer
Ceylon
76
80
Metres
3000
1500
1000
600
300
150
0 Sea Level
Laccadive, Minicoy and Amindivi Islands (India)
Ceylon


DISTRIBUTION OF CLIMATIC TYPES
(DIAGRAMMATIC)
76
80
84
88
92
96
36
32
28
24
20
16
12
TROPICAL WET EVERGREEN
TROPICAL SEMI-EVERGREEN
TROPICAL MOIST DECIDUOUS
DO. DO. DO. (SAL)
TROPICAL DRY DECIDUOUS
TROPICAL THORN FOREST
TROPICAL DRY EVERGREEN
SUBTROPICAL WET FOREST
DO. PINE
DO. DRY
WET TEMPERATE
MOIST TEMPERATE
DRY TEMPERATE
ALPINE
TIDAL
Ceylon
Andaman and Nicobar Islands (India)

Africa itself has been a centre of dispersal as shown by Moreau (1952) and noted in one case by Husain (1958). Typical of these are:

1) Grey Partridge, *Francolinus pondicerianus* (244–246), West Pakistan and India.

2) Likh or Lesser Florican, *Sypheotides indica* (357), tropical thorn, scrub, grassland, and cultivation in southern West Pakistan and western and central India.

3) Jerdon's Courser, *Cursorius bitorquatus* (441), perhaps extinct, Deccan tropical thorn forest.

4) The Bee-eaters have two species which suggest strongly a preference for this zone, though their more wandering habits and wider distribution make them less good examples. These are the Bluecheeked, *Merops superciliosus* (747) which breeds in West Pakistan and India and winters in Africa, and the Green, *Merops orientalis* (749–752), which occurs in tropical thorn forest from Iran to Ceylon, although one population of the species reaches Assam and Burma.

5) Two Finch-larks of the genus *Eremopterix*, namely *grisea* and *nigriceps*, the Ashycrowned and the Blackcrowned (878, 879), are Ethiopian in their affinities and live in thorn scrub and the edges of desert in tropical thorn areas.

6) Sykes's Crested Lark, *Galerida deva* (902), is found in parts of northern India and the Deccan on rather dark soils.

7) Yellowthroated Bulbul, *Pycnonotus xantholaemus* (1135), peninsular India, perhaps ranging too high in altitude to be completely in this zone.

8) Common Babbler, *Turdoides caudatus* and its relatives, Large Grey Babbler, *T. malcolmi*, and Whiteheaded Babbler, *T. affinis* (1253, 1254, 1258, 1267, 1268), West Pakistan, peninsular and northern India and Ceylon.

9) Rufousfronted Longtail Warbler, *Prinia buchanani* (1506), West Pakistan and northern and central India to the Deccan.

10) Three of the Whitethroats, the Lesser, *Sylvia curruca*, the Small, *S. minula*, and Hume's Lesser, *S. althaea* (1567, 1569, 1570), breed or winter in tropical thorn forest in West Pakistan and India.

11) Two of the Leaf Warblers, the Brown or Chiffchaff in its Indian subspecies, and the Plain, *Phylloscopus collybita sindianus* and *P. neglectus* (1576, 1577), occupy this habitat in West Pakistan and northern India.

12) Brown Rock Chat, *Cercomela fusca* (1692), West Pakistan and northern India.

13) Whitewinged Black Tit, *Parus nuchalis* (1798), India.

14) The Spanish Sparrow, *Passer hispaniolensis* (1940), winters in tropical thorn forest. Some other sparrows have ranges suggestive of a preference for the tropical thorn biotope, but have spread out into cultivation or into reed-beds and tamarisk groves.

With the exceptic ... these species are related most close... the zoogeographical sense) species, suggesti... former continuously distributed population or a ...cestor in some form.

As was pointed out in ...e detail in the *Synopsis*, there are certainly 176 endemic (local) species of Indian birds (confined to the zoogeographic subregion of the Indian Peninsula and its environs) and of these the following affinities appear:

(1) (*a*) related to Palaearctic species (i.e. Europe and Asia)
number 30 Percentage of total 17

(*b*) questionable, perhaps Palaearctic
2 1

(2) related to Indochinese (i.e. SE. Asian species)
109 62

(3) (*a*) related to Ethiopian species
30 17

(*b*) questionable, perhaps Ethiopian
1 1

(4) relict species, discussed earlier (Pinkheaded Duck etc.)
4 2

Thus the overwhelming proportion of Indian bird species are related to species of the eastern, tropical Orient, with almost an equal minor share being related proportionally either to African or to European-northern Asian (Palaearctic) species. This is important as a principle of Indian ornithobiography. The Himalayas have served as a barrier, encouraging the spread of tropical, Indochinese-related bird species into the Indian habitat, preventing the invasion of Eurasian-related species as much more than winter migrants. The entomological and botanical evidence, such as it is, suggests that in spite of glaciation in the Himalayas during the Pleistocene, climatically conditions were not too severe and that indeed the southern flanks of the mountains served as a refugium for relict species related to cold-climate adapted northern species, rather than serving as a continuous chain of contact along which dominant northern species could infiltrate. The habitats to the south of the Himalayas thus being continuously occupied, very few invaders could wage successful competition or find empty niches and room to spread out.

India's avifauna is one of the most interesting in the world and provides ample opportunity for further significant research in zoogeography and its related aspects of ecology.

Birds from the 'Indies', the areas now encompassed by Pakistan, India, Ceylon and east to Java, have been known to zoologists for as long as there has been an organized science of zoology. Travellers and explorers of both the eastern and the western worlds have collected colourful birds from the countries which they visited since the chronicles of these travels have existed. These creatures, brought back to the courts of emperors and kings, inspired wonderment as well as scientific curiosity. Attempts to list the products of nature are apparently a natural phenomenon of man's orderly and tidy mind. Man is instinctively an arranger. Subjectively man strives to create a rational order out of what otherwise he assumes to be chaos. Religion demands it. Science requires it.

The literature of these attempts at organization is classical, extending back to the philosophers, Hippocrates, Aristotle and Plato, at least to the fifth century B.C. Systematics, or taxonomy as it is often interchangeably called, is the science of classification of animals. It is built up out of the basic study of the anatomy or morphology of an animal, as well as its physiology, or the living interactions of the organ systems and structure of the animal. Modern taxonomy also includes a compilation of evidence obtained from genetics, the study of the breeding of animals including the cellular phenomena associated with the union of components from egg and sperm. An additional requirement is a knowledge of the environment and its effect upon animals, or ecology, as that study is called, as well as environmental and animal history derived from the study of geology. Thus a modern taxonomist becomes perforce an evolutionist, and an evolutionist should properly be one of the most widely trained of all zoologists, proficient in genetics, morphology, zoogeography, systematics, embryology, physiology, ecology and palaeontology.

Present-day systematics developed in the eighteenth century with the attempts to create 'systems' of nature. A number of authors such as John Ray (1627–1705) pioneered attempts to characterize the genus, or *genos*, and species, or *eidos*, of Aristotle, but it is the Swedish naturalist, Carolus Linnaeus (1707–78), who laid the foundation of systematic zoology. The tenth edition of his *Systema Naturae* (1758) is considered the fundamental work and the date, the foundation date for species names. Each animal then known to the scientific world could be given, under the Linnaean concept, a binomial name: Genus, a name including all forms considered to be related to one another, and Species, the distinctive or specific name which in a sense separated that animal from all others. All ducks belonged to the genus *Anas* for

d the different ducks had different specific names, *acuta* ail, *crecca* for the common teal, *penelope* for the wigeon, : common pochard or diving duck. Above these categories er, and above this of course the Class, which in the case of ved all birds in one animal class, AVES. The great merit ıean volume is that the class and the orders and genera are :d by keys, groups of characters which give them uniqueness ion one from the other.

ngement then, this attempt at the creation of order from ediately won general recognition and has persisted down to . Subsequent modifications of the system have derived more understanding of the evolutionary process and the resultant on of what is meant, than from any tampering with the In essence the philosophy of arrangement has changed nfluence on scientific thought of the Darwinian school of ts. In Linnaeus's concept, each species was a distinct act of immutable and set apart. The Lord had created the world at lay within it in six days and on the seventh he rested. ıd related scientists of the mid-nineteenth century were able ıat species were not immutable, that changes occurred dating ugh the panorama of geologic time and continuing on into ıt and future. Species could arise out of other species, by a volving physical isolation and the gradual accretion of small es.

he years the acceptance of a dynamic rather than a static for species formation broadened and modified systematics. ledge of a wide spectrum of variations in populations of species increased, new terms came to be used for these es. Linnaeus himself used the word 'variety' to describe a that appeared to be atypical. Later nineteenth-century ike Kleinschmidt began to use the word 'race'. Gradually ept began to be refined as it became generally understood t scientists were trying to characterize were not individuals, ns that is to say, individual variants, but rather groups or ns all members of which, in interaction with each other, were g an evolutionary trend. Thus the concept of subspecies was The definition of this category was not really refined until the ı century when a number of authors particularly in ogy, such as Rensch and Mayr, reached a consensus. Two great es are involved here. The names typifying these evolutionary es are applied to a type specimen certainly, but they refer to an eeding population of common genetic inheritance. In addition pecies must have some geographic locus and some complex of al mechanisms which allow it to maintain genetic isolation. A cies must also have some essentially morphological characters

in order to allow it to be recognizable. Morphological rather than physiological or behavioural characters are still more acceptable to taxonomists than any others as they are more feasibly preserved in specimens.

All of this history of description and characterization of species has resulted in an elaborate series of rules of nomenclature over which systematic biologists have laboured for many years. The rules, after meetings and international congresses, eventually become codified into a Code for Zoological or Botanical Nomenclature. The latest official International Code of Zoological Nomenclature was published in 1961, reissued with some amendments and corrections in 1964 and will undoubtedly be reissued again and yet again. For it has become apparent over the past fifty years that man approaches his own attempts at systematizing the affairs of nature in an essentially subjective manner. Science has not yet afforded us visions of illimitable truth. Many of the essential facts of nature still elude us, and so even man's rules for order and precedence are finite. At least in the meantime we reach towards stability as we attempt to order nature.

The first bird from India to reside in the stable nomenclature of Linnaeus in 1758 was the Brown Shrike, *Lanius cristatus*, which appears on page 93 of *Systema Naturae*, the 10th edition, and is described thus: having a 'wedge-shaped tail', a 'crested head', a 'reddish body' etc. and, as with all proper names a type locality must be supplied, in this case 'Benghala' or Bengal. There is a citation to an illustration, plate 54, in George Edwards's volumes, published 1743–51, *A Natural History of Birds*. And so the type was established, a specimen figured in a published book and with a locality. The second species from 'Benghala', named by Linnaeus on page 95, is *Lanius caerulescens*, which is also illustrated in Edwards and which is now understood to be the Whitebellied Drongo, *Dicrurus caerulescens*, belonging to a different family. Linnaeus's name as author is suffixed to both *Lanius cristatus* and *Lanius caerulescens* when these names are used formally in citations in ornithological literature. But for the second bird it is placed in parentheses, as *Dicrurus caerulescens* (Linnaeus), to express the fact that the genus name has been changed or shifted subsequent to Linnaeus's original description of the species.

The third mention of Bengal in Linnaeus is *Psittacus alexandri*, whose habitat was said to be 'China, Benghala, Aethiopia', named after Alexander the Great, through whose expeditions the Redbreasted Parakeet had come to the notice of Pliny. The type of the species has subsequently been restricted to Java. Subsequently a larger subspecies has been recognized as occurring on the Asian mainland. A name for this was available, *fasciata* of P. L. S. Müller, 1776. Consequently when subspecies are arranged in linear form, the parakeet of

India becomes *Psittacula alexandri fasciata* (P. L. S. Müller)[1], and *Psittacula alexandri alexandri* (Linnaeus) is found in parts of Indonesia, the type locality being Java. And so zoology proceeded apace. Thomas Pennant's *Indian Zoology* 1791 (1790), incorporating the work of J. R. Forster and Loten's notes on new birds of south India and Ceylon, was succeeded by the really masterful work of T. C. Jerdon, whose *Birds of India*, 1862–4 in three volumes, was the first thorough work on the subcontinent.

Allan O. Hume added greatly to Jerdon's work by expanding the areas covered, particularly in the east in Assam and East Pakistan and describing many new birds for science. He also prepared the first checklist, in 1879, taken from Volume VIII of the random journal *Stray Feathers*, which he had organized and published himself. Hume's list included Pakistan, India, Ceylon and Burma east to northern Malaya, and comprised over 1700 species. He attempted to codify the rules of nomenclature as involving birds of the area by using the rules for nomenclature adopted at a meeting of the British Association in 1842. Wisdom was not infinite even then.

Hume says (p. 7): ' I say " based on the Code " because it must be clearly understood that I am not prepared to re-argue points definitely settled by that Code. I do not personally agree with many of its *dicta*, but I consider uniformity of such paramount importance as to render it the plain duty of every British naturalist to abide strictly by *all* its *dicta*.' Worthy ambition indeed; the Code is still venerated, but still manages to alter itself occasionally.

Oates and Blanford's great Handbook volumes of 1889–98 again included Burma, and again, like all preceding volumes, dealt only with the classification of birds down to the species level. It remained for E. C. Stuart Baker first to add subspecies names, or trinomials as they are sometimes called, to the Indian subregion avifauna. In this he followed Ernst Hartert, whose fundamental *Vögel der paläarktischen Fauna*, of 1910–22, reflected much of that changing philosophy of systematics which had been evolving since the close of the nineteenth century. The ideas, essentially held in America and in Germany at this time, produced the present concept of the polytypic species, a species consisting of a group of populations, closely related to each other, separated only by geographic boundaries, which could presumably interbreed should the barriers separating them break down, and which were far more closely related among themselves than in the case of any other *separate* species. At first these ideas presented considerable difficulty but by 1910 Hartert had been won over, and by 1920, Baker's Handlist of the Birds of the Indian Empire had begun to appear in serial parts in the *Journal of the Bombay Natural History Society*. This nomen-

[1] The author's initials are used in some cases as in this, because several Müllers have written on zoology.

clature has continued to the present day, with minor variations. The greatest changes perhaps appear between the publication of Baker's handbook, *The Fauna of British India including Ceylon and Burma*, 1922–30, and the publication of *A Synopsis of the Birds of India and Pakistan together with those of Nepal, Sikkim, Bhutan and Ceylon* in 1961. As one of us (Ripley) said in the Introduction to that volume, ' It is perhaps unfortunate but true that no such listing as this or Baker's earlier work is ever final '. We can only attempt to fill in additional small gaps in the nomenclatorial picture, at the subspecific level for the most part in systematics, or in chinks or wider gaps in the understanding of the habits of birds themselves as living things.

Naturalists, environmental biologists, epidemiologists and others including amateur bird-watchers, all tend to be highly impatient of changes in the nomenclature of birds or related vertebrates as they know them. Systematists in ornithology are particularly liable to attack if changes in established or current bird scientific names are made as a result of evolutionary study. There is a good deal to be said on both sides. On the one hand the users of names want stability and a sense of ultimate finality to be maintained at all costs. On the other, evolutionists, with whom some ecologists are today beginning to be aligned, are continually seeking for the truth of the phenomena of evolution. If in the process of delineating living and organic processes, nomenclatorial stability suffers, then suffer it must. Both sides deplore pedantic name-shufflers who collect scientific names of organisms like postage stamps and are said to extract personal prestige therefrom. These days actually would seem to be gone for ever in ornithology. Only rational trained biologists tend to be concerned with systematics nowadays, and in certain areas such as botany and entomology, *alpha* taxonomy, or the mere descriptions of natural living objects, is still a responsibility of paramount importance. In birds certainly there are few surprises around the corner. New species may continue to be found at a diminishing rate in remote corners of the globe and a few new subspecies may turn up almost anywhere. But where they do, and where they are described as *new*, it is for a secondary reason, an attempt to express reality, to show that organic processes are occurring around the clock at an appreciable rate and that change is the order of the day.

Two of the most recent subspecies of birds of our subregion have been described in 1960: *Chalcophaps indica salimalii* Mukherjee, and *Ardeola grayii phillipsi* Scheer. Additional subspecies from islands of the Bay of Bengal may appear shortly.

A more depressing corollary to our changing world is that subspecies as well as species are probably disappearing today at an accelerated rate. In some areas, particularly in the tropics, and particularly in plants and in such classes of animals as the invertebrates, many of these species and subspecies may disappear before they have even been

described as new to science, leaving no ascertainable ripple in man's time to mark their passing. Only the world's pool of genetic recombination is deprived here, not man's recording of it by ascribed names. Let us hope that biologists of the future will not know many species of the great subcontinent of southern Asia only by names as we today, by accident, commemorate the lost Dodo of Mauritius or the Solitaire. For all that they have gone, they were seen by knowing men, recorded, and their bony remnants described. In India the Pink-headed Duck was described as locally tolerably common in Oates and Blanford's day; as ' most shy and secretive ' by Baker thirty-one years later; and as probably extinct by ourselves thirty-six years later still. And so in two generations, within the lifetime of many people, one of the most curious species of birds in the world has vanished. ' What's in a name? ' indeed. Meanwhile the science and order of systematics continues, a service, a function to those who would use it knowledgeably, an attempt to delineate forces of nature in progress both now and *in statu nascendi*.