

ON THE ORNITHOLOGY OF THE RHINO
SANCTUARY UDJUNG KULON
IN WEST JAVA (INDONESIA)

by

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Family ANATIDAE

70. *CAIRINA SCUTULATA* (Müller) White-winged Wood-Duck.

This large duck is probably not a regular visitor to Java. The author has never seen it in the reserve, nor elsewhere. However, it was recorded in this area by the big-game hunter De Kanter who, in the beginning of the Thirties regularly visited Udjung Kulon to shoot tiger. In his September 1932 report he noted as a very rare event that on September 17, four "Manila ducks" (tame ducks rather similar to the present species) flew over his camp along the mouth of the Tjitelang. There is no other wild duck like those observed by De Kanter and this wood-duck is known to breed in south Sumatra, hence the species is included here.

General remarks. This is the rarest duck in Java, but it is said that it is not exactly rare in certain parts of south Sumatra, where it is found in freshwater swamps and swampy forests far from the coast, and that it is diurnal in habits. Single birds and pairs are most usual. They roost on horizontal branches of high trees, often frequenting the same trees for months.

Flying birds are said to utter a call like "tatta-tatta-tatta", repeated every 3 to 5 seconds and from feeding or roosting birds a weaker "tietieta-tietieta-tietieta" has been heard.

The nest is composed of dried leaves and other plant material mixed with some down and it is placed in trees at a height of 3 to 8 metres, also in holes and hollows of big trees, or in forks or on tree-stumps (Hoogerwerf 1950).

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B 71. *DENDROCYGNA JAVANICA* (Horsfield) Whistling Teal.

During periods of deeply flooded marshes, which do not occur every year, Whistling Teal have been regularly recorded though never beyond the Djaman-Niur area. On one occasion some were seen crossing the sea between Ujung Kulon and Pulau Panaitan. Generally small flocks of 5 to 15 were recorded, but once 17 and in the same month (July 1955) 40 were counted; on rare occasions apparent pairs were found (March, November) but breeding was not confirmed.

General remarks. This is the most common duck in Java, but is erratic in appearance and numbers; it is a favourite game-bird and many thousands are shot or captured annually. They frequent brackish and freshwater swamps, marshes, pools, flooded ricefields, muddy harvested fields and similar boggy environments, often close to the sea but also far inland, to at least 800 m. above sea level, although they prefer the lowlands. They are sociable birds, generally assembling in flocks, often together with *Dendrocygna arcuata*. They feed while swimming in the water or walking in fallow damp paddy fields and also on seeds in boggy country grown with graminaceous and herbaceous plants. Although shy they frequent fairly densely populated areas often feeding at night when diurnal activities are too dangerous.

The small ducks utter a far-carrying high-pitched whistle "hie-tieeeeeuw" or "tjieuw, tjieuw", especially in flight.

Nests may be found in holes or hollow trees high above the ground, or amongst sedges and other graminaceous plants and weeds on the ground, often close to marshes or on the banks of brooks and rivers, but occasionally far from water. There is little or no lining other than the bird's down.

Family PHALACROCORACIDAE**B 72. *PHALACROCORAX SULCIROSTRIS SULCIROSTRIS*
(Brandt) Little Black Cormorant.**

There are no prewar observations but six later ones, including those of breeding birds, show that the westward extension of the breeding range of this Cormorant-not recorded until recently-has reached the western-most part of Java. However, the number of specimens found in the reserve was small and none were observed

beyond the Djaman-Niur area. In March 1955 breeding was recorded in the Niur heronry.

General remarks. Till about 1930 the occurrence in Java of this cormorant was based upon one specimen, but around 1933 the first breeding was reported from East Java and after the war breeding was also recorded in western Java. Here suddenly a good many individuals were found in a heronry on a small coral island off Java's north coast, which remains the only breeding colony in West Java. It is perhaps restricted to the coast and immediate neighbourhood where it feeds in brackish fishponds, at the mouths and estuaries of rivers, etc. and in freshwater swamps and marshes, but rarely in the sea. Solitary birds or a few together at the same feeding place are most common.

They are silent birds but at the breeding site they produce far-carrying, creaking screams, somewhat resembling those of the European *Phalacrocorax carbo*.

They breed in colonies, often in the company of herons etc., in trees or shrubs. The nest resembles those of the smaller herons, but it is partly made of fresh twigs with the leaves still attached and is often concealed among the foliage (Hoogerwerf 1947d, 1951a, 1954). Plate XXV. fig. 1.

B 73. PHALACROCORAX PYGMEUS NIGER (Vieillot)

Little or Pygmy Cormorant

Unlike the preceding species, this one was found on many trips to the reserve, especially in the rainy season when deeply flooded swamps form an excellent habitat. However, there are few records from beyond the Djaman-Niur area. Although birds in nuptial plumage were seen, breeding is not proven in the reserve.

General remarks. This is the most common cormorant. It is widely distributed along the coasts of Java, penetrating considerably farther inland than the preceding species, but it undeniably prefers the lowlands. In habitat and behaviour this small cormorant resembles the preceding one, but it is perhaps more often found in small flocks.

Almost all sounds heard at the breeding site. Its call differs much from that of the preceding species. It is rapidly, long-drawn "kè-è-è-è-è".

This too is sociable when breeding; nest-site and nest do not differ much from those of the preceding species, but the nest is smaller and even more composed of fresh twigs and leaves and better concealed among the foliage. Plate XXV. fig. 2.

Family ANHINGIDAE

B 74. ANHINGA MELANOGASTER Pennant Snake-bird or Darter.

More frequently seen in the reserve than either of the preceding species, mainly in the areas visited by them but also along the mouths and estuaries of almost all the large rivers and sometimes seen feeding at sea (Tjikuja Bay). Most often single birds were observed, perching on high leafless treetops or dead *gebang* palms, but in May 1938 there were 15 scattered birds in the Djaman swamp and in December 1950, 7 along the Niur. Occasionally feeding took place in such clear water that from a hide the diving birds could be clearly seen when swimming under water. Although birds in nuptial dress were repeatedly met and the courting call heard, breeding in the sanctuary was not proved.

General remarks. Broadly speaking this bird occupies the range of the preceding species, but the Darter is more common in the interior of Java, reaching altitudes of 1500 m. or even higher. Habitat and behaviour resemble somewhat those of the Little Cormorant, but occasionally it also feeds in the sea and it is found more often perching on high dead treetops as many birds of prey do, not to look for prey but to enjoy fresh air or the sun. Single birds are most common but sometimes several together and occasionally with one of the preceding species. Expert swimmers and divers, usually nothing more than its neck and head are visible when swimming and it then resembles a snake.

A far-carrying, piercing scream is produced, perhaps almost exclusively during courtship.

It breeds in colonies, but single nests are also found often in company of cormorants, herons etc. It usually breeds on high trees in coastal areas, but also on low trees. Nests do not differ much from the nests of the cormorants but perhaps not so many leaves are used and the nests are often not so well concealed. (Hoogerwerf 1951).

Family SULIDAE

75. *SULA LEUCOGASTER PLOTUS* (Forster)

Booby or Brown Gannet

As with the Bridled Tern (No. 48) birds approaching the coast so closely as to be clearly visible from the beach were extremely rare in the reserve, and then only during very rough weather. However, in September to November a mile or so west of the Tjikelapabeureum several hundreds of these Gannets may unite on some rocky islands off this inhospitable west coast. In September 1953 their number was estimated to amount to 400 to 500 individuals. Smaller parties were also seen there in January 1943, March 1953 and July 1955. Breeding there is not excluded, but it is more likely that their erratic occurrence along the west coast is caused by seasonal fluctuations in the supply of certain species of fish, because the birds congregating on those rocks seemed to be roosting. Plate XXVI. fig. 1.

General remarks. Of the three species of gannet occurring in the neighbourhood of Java, this is the most common. Large concentrations are also known, at least periodically, on small islands off Java's north and south coasts, although breeding there is not yet proven. Fairly regularly seen over the surrounding seas but rarely approaches the mainland. Single birds and small parties or mixed flocks with terns, especially with *Sterna anaethetus*, may be found feeding on fish-shoals or skimming the surf in rapid flight.

Nests found on the volcanic island Gunung Api in the Banda Sea (Moluccas) were on the ground among lava blocks or on the humus in thin *Pisonia* forest. They were shallow depressions lined with some pebbles, rotten wood, etc. Some nests were rather extensive heaps

of such pieces of wood with a deep nesthole in the centre. Scattered over that small island there were many nests with those of a number of other oceanic birds (Hoogerwerf 1939, 1947 b, Kooiman 1940).

76. *SULA SULA RUBRIPES* Gould Red-footed Gannet.

Up to 1932 this small gannet was known from Java by one record, a semi-adult specimen in the Bartels collection, but there are some old doubtful records. More recently there are some more records, all from Udjung Kulon; in December 1932 a dead semi-adult was found along the south coast of the reserve. This is now in the collection of the Bogor Museum. In May 1939 two (again semi-adults) were seen flying over the sea near Pulau Panaitan when the weather was very rough. Finally the first specimen in adult plumage was found by the author at almost exactly the same place where the 1932 bird was found. This was on September 26, 1953 and was a freshly-dead bird in splendid condition. This is the first really adult Red-footed Gannet known from Java; it was donated to Bogor Museum.

General remarks. As far as I know there are no further records of birds obtained or observed on Java and immediate surroundings. The closest breeding colony is the volcanic island of Gunung Api (Banda Sea, Moluccas). Plate XXVI. fig. 2. (Bartels 1921, Hoogerwerf 1939, 1948a).

Family FREGATIDAE

77. *FREGATA ARIEL ARIEL* (Gray) Lesser Frigate Bird.

Frigate birds were fairly regularly seen over the sanctuary and it could be ascertained this species was involved. In March 1952 seven adults were encountered soaring above the rocky west coast not far away from Sangijang Sirah, the most southwestern point of the reserve. In October 1941 and again in October 1953 some adults were found feeding, in company with some terns, quite close to the Handeuleum islands.

General remarks. Of the three *Fregata* species known from Java this is the most common. Almost every month individuals can be observed, though most frequently during the rainy season and often in small, or occasionally fairly extensive, flocks. Generally seen soaring, often high in the air but low flying individuals, preying on fish, often in the company of terns and birds perching on bamboo stakes or snags that stick out of the coastal waters, are also fairly common.

There are no breeding colonies known within the Indonesian area.

Family ACCIPITRIDAE

B 78. ACCIPITER TRIVIRGATUS TRIVIRGATUS (Temminck)

Crested Goshawk.

There are only four certain records from the reserve. Appears rare in this area and perhaps an occasional visitor. The observations relate to single birds seen in open forest at different localities. In December 1950 and March 1952 one was seen hovering, which is characteristic for this species. Twice birds perching amid dense foliage were involved.

General remarks. Rather common in Java with an extensive range to at least 1500 m. above sea level, not much concerned about its habitat. It is found both in the margins of primary forest in mountainous areas and amid moderately wooded parts of the cultivated plains. It usually perches well hidden among, or close to, the foliage of low trees, rarely hunting in the open. This is the only small bird of prey regularly to be found circling high in the air, like the European *Accipiter gentilis* with which it also agrees in habits.

The high-pitched "klie-klie-klie" is not frequently heard and is perhaps mainly during the courting and mating season.

It breeds on trees, often high above the ground; the nest is a large structure of sticks and twigs, lined with some fresh leaves (Hoogerwerf 1948 c).

79. *ACCIPITER VIRGATUS* subsp. Small Sparrow-Hawk.

The only three records of this small bird of prey are of the years after the war and only single birds were involved, two along the Niur and Tjidaon pastures and a third on the well-forested Pulau Peutjang island. It was impossible to determine the exact identity of these sight records, so that it remains uncertain whether we saw the breeding subspecies *virgatus* or the migratory race *gularis*.¹ On account of its inconspicuous habits it is difficult to establish the status of the species in the sanctuary, but it is likely to breed there.

General remarks. More common than the preceding species, and during the rainy season the sedentary population of the subspecies *virgatus* is increased by representatives of the migratory race *gularis*. Broadly speaking it occupies the same range as *Accipiter trivirgatus* but it is found at considerably greater altitudes, though rarely above 2500 m. and perhaps less common in the lowlands. It is still more a forest bird than the larger goshawk, penetrating fairly commonly into primary forest and living in the seclusion of dense foliage. Also when hunting, generally low or at moderate height, it rarely leaves the cover of shrubs or trees though such cover may be close to human dwellings. Single birds or pairs are most common, but occasionally a few more are present in the same area.

Its call is a piercing "ie-ie-ie" resembling that of the preceding species.

Nestsite and nest resemble those of the Goshawk but the few nests seen by the author were lower and they were smaller and contained more fresh leaves.

B 80. *ICTINAETUS MALAYENSIS* (Temminck) Black Eagle.

Scarce in the reserve, and recorded only once. During two consecutive days in November 1954 a semi-adult was observed in the Djaman area, apparently looking for birds' nests in the crowns of some medium sized trees, judging from the loud uproar of some little birds.

1) *Gularis* and *virgatus* are often treated as separate species. Ed.

General remarks. Although this eagle occupies an extensive range, because it is found from sea level to the highest altitudes it may be considered a sparsely distributed species, preferring the higher parts of its range. It is a shy bird of thickly forested regions including primary forest, and not frequenting cultivated areas except the marginal parts. Its nest-robbing habits do not bring it too often outside the foliage of shrubs and trees, so that it remains well concealed except when it soars high in the air, as it often does, or swoops back to earth with a falcon-like swiftness. Single birds are most often seen.

Its peculiar high-pitched call "hie-lie-lieuw" or "klie-ieuw . . . klie-ieieuw" resembles that of the preceding species.

It breeds in tall trees in or close to heavy jungle. The nest resembles that of most other birds of prey, and is often lined with many fresh leaves (Bartels 1929 d).

B 81. *SPIZAETUS CIRRHATUS LIMNAEETUS* (Horsfield)

Changeable Hawk-Eagle.

Six records of this eagle suggest that it is less rare here than the preceding one, but it is certainly not common and it probably does not breed in the reserve. Almost all observations are from the environments of the game pastures, but one was at the Pemageran estuary. In September 1937 a Pied Hornbill, certainly heavier in weight than this predator, was seized but released (still alive) on our approach.

General remarks. Common, though rather sparsely distributed in Java to at least 1500 m. above sea level in West Java and found at the highest altitudes in the eastern parts. As regards habitat, it is found in densely wooded, inhospitable locations and in the cultivated parts, provided there are sufficient high trees in which to remain hidden or to perch. Most hunting takes place in the open, often low above the ground and rarely far from cover. Although wary, it is very bold when hunting, often approaching human dwellings very closely. It is more often seen than the preceding species because it

perches on dead treetops or in other exposed positions allowing a clear view of the surrounding country, and because it often hunts in the open.

Its call somewhat resembles that of the Black Eagle with which it often shares its habitat; it is a shrill, penetrating "klie-lieuw . . . klie-lieuw" or "klieieh-klie".

Nestsite and nest resemble those of the preceding species (Sody 1920).

B 82. *SPILORNIS CHEELA BIDO* (Horsfield) Serpent Eagle.

More regularly recorded than both the preceding species; presumably breeding here. There are records from many different parts of the reserve both from game pastures, especially freshly burnt ones, and from well-wooded regions. Once a snake and once a large insect was seen as a prey, and in November 1940 one had seized a Jungle Squirrel, *Ratufa bicolor*—a large and probably unusual prey.

General remarks. Also common in Java, it occupies the same range as both the preceding species, but it is not found at altitudes exceeding 1500 m. It often shares the habitat of both these species, in behaviour more resembling the hawk-eagle, and like it often found hunting in densely populated areas, perching equally often in exposed positions but often also well concealed amid the foliage; its prey is almost always taken from the ground. Its hunting grounds also include primary forest and similar environments. Single birds or pairs are most common.

The high-pitched, penetrating call, a plaintive "lie-lie-lieuw" or "klieie-lik" is often heard from perched birds or soaring individuals.

The nest resembles that of the preceding species, but it is often considerably smaller and lower above the ground. Repeatedly nests have also been found on nestferns (Hoogerwerf 1948 b, 1962 c, 1967, Kooiman 1937, Sody 1920 a).

B 83. BUTASTUR LIVENTER (Temminck)

Fulvous-winged Buzzard-Eagle.

Apparently uncommon in most of Java and in Udjung Kulon a rare straggler, only twice observed. In January 1943 one was seen in the margins of a coastal forest near Java's First Point and a second in October 1952 on medium-sized trees bordering the Tjigenter pasture.

General remarks. Little is known of this bird in Java, where it is apparently restricted to the lowlands, preferring rivers, marshes and swamps in well forested areas, and seems more common in Central and East Java than in the western parts of the island. Also found in quiet corners of cultivated regions, often sharing the habitat of *Elanus caeruleus*, and frequenting open country dotted with shrubs and tall trees and preying on rats, lizards, frogs, crabs etc.

Silent, except during periods of mating and breeding when it is fairly noisy, uttering mewing notes like "ih-ēēēhhh", repeated 3 to 5 times, also a long-drawn "euhhhhhhh-éh", a short "kwihhhht" produced with intervals of 10 to 15 seconds, "koowihhhh-pè" or "tjikwèhhh".

The nestsite resembles that of *Elanus caeruleus* (No. 87) because the nest is often in a tall tree in open country, but better concealed among a well-leafed crown. A solid structure of sticks and twigs, often used with the leaves still attached.

B 84. HALIAEETUS LEUCOGASTER (Gmelin)

White-bellied Sea-Eagle.

Some couples of this large eagle are almost certainly resident in the reserve as courting or mating has been noted. It may be assumed that at least one pair regularly breeds along the inhospitable rocky west coast. There are no records from beyond the coastal zone.

General remarks. Rather common, though sparsely distributed in many coastal regions of Java, rarely far from the sea. Although fish may form the main food also found preying on eggs and young of

various species of herons. Such large prey as fledgling Common Herons and semi-adult flying foxes are taken, and scavenging has been noted.

The male's call "hakk-hakk" often alternating with a plaintive "kliiii-kliiii-kliiii", perhaps produced by the female, is fairly regularly heard.

Nest huge, often used for many years, found both on unclimbable trees and on bare rocks. Often lined with fresh leaves (Hoogerwerf 1936a, 1948 b).

B 85. *ICTHYOPHAGA ICTHYAETUS ICTHYAETUS*

(Horsfield)

Larger Fishing-Eagle.

Occurs about as often in the reserve as the preceding species, but shyer and less commonly recorded. Noted from divergent localities but always from forest bordering streams, marshes and swamps, never from the coast. Only single birds seen. In most cases it was the bird's call which attracted attention; this cannot be confused with the voice of any other bird of prey. Fish, crabs, etc. are the preferred food, but it once attacked young egrets in the Niur heronry, without result.

General remarks. Little known in Java, apparently more because of its shyness than its scarcity, although the increasing land use in the lowlands may be decreasing the population. Not known from over 800 m. above sea level. Favours the lowlands, inhabiting well-wooded country similar to the habitat described for Udjung Kulon.

A silent bird; but occasionally a loud "ba-hak" is produced, almost always from a well-concealed position.

Nestsite and nest resemble those of the Changeable Hawk-Eagle (No. 81), but most frequently located near extensive swamps or along well-forested river banks.

B 86. *HALIASTUR INDUS INTERMEDIUS* Blyth Brahminy Kite.

The records point to clear differences in occurrence between the prewar period and the years after the war. There are no records at all from the first period, but six later ones. Its absence from the

reserve struck the author during his first visit so that it is almost impossible that it was often overlooked. Adult as well as semi-adult birds were seen, but breeding was never proven.

General remarks. One of the most common and familiar birds of prey in Java with a very extensive range, in West Java to at least 1500 m. above sea level and in the eastern parts of the island recorded from the highest altitudes. It frequents all types of beaches and the most divergent haunts in the interior, preferably open forest country, cultivated plains and hills, even penetrating villages and large towns. Occasionally a local population may reach a surprising size: about 100 birds occurred together, preying on offal, at a public slaughter-house in the outskirts of Djakarta.

It utters a plaintive "hie-ieuw" or "ihhhēēē-hhhēēēhhh-ēēēhh".

Nestsite and nest do not differ much from those of most other birds of prey; the nest is often placed on medium-sized trees in the mangrove or forest bordering streams, lagoons, etc., also on tall trees in the cultivated plains or freshly cleared plots in submontane regions, (Hoogerwerf 1948 b,c., Sody 1926).

B 87. *ELANUS CAERULEUS HYPOLEUCUS* Gould

Black-winged Kite.

An occasional visitor to Udjung Kulon. Only once seen. In December 1939 a solitary bird was seen flying over the Tjikarang pasture. The small area of open plains may perhaps explain its rare occurrence here.

General remarks. Fairly common in Java, but erratic in occurrence because of varying feeding possibilities; it occupies the same range as the preceding species but occasionally is found in West Java also up to at least 2500 m. above sea level. It is most frequently found in the rice-growing locations, because it is dependent on open plains, scattered with tall trees. Occasionally it also appears in large towns: about 1936 a breeding pair was observed in a high tree in the centre of Djakarta! Often seen perching on tall trees and other exposed posts in open forest country, enabling it to keep a clear view of the

surroundings, or hovering as preying *Falco moluccensis* does. Single birds or pairs most frequently recorded.

Very silent, but occasionally, especially in the mating season, it utters a long-drawn, nasal "ēēēhbbb".

Nest often rather conspicuously placed on solitary tall trees in open areas, or in open cultivated lowlands, almost daily frequented by people (Rengers Hora Siccama 1941).

88. *PERNIS PTILORHYNCUS* subsp.

Honey-Buzzard.

Rare in the reserve and probably not permanently present, though its rather covert habits may be the reason for the paucity of records. Once a single bird was seen crossing the Niur pasture, and a second time at almost the same place there were two possibly different individuals; both these are October records. The racial identity could not be ascertained.

General remarks. Not exactly rare in Java between sea level and at least 1500 m. even within cultivated, reasonably forested country, but their covert behaviour may mean that they are commoner than the records indicate. During the rainy season the resident population of the subspecies *ptilorhyncus* is swollen by the migrant *orientalis*. In habitat and behaviour somewhat resembles *Ictinaëtus malayensis* (No. 80) but perhaps more often frequents cultivated areas at lower altitudes.

Very silent; the call is said to be an often repeated, high-pitched "kiek-kiek" and a plaintive long-drawn "klieiek".

Very little is known about its breeding habits as far as Java is concerned; nestsite and nest are said to resemble those of *Ictinaëtus malayensis*.

B 89. *FALCO SEVERUS SEVERUS* Horsfield Horsfield's Hobby.

One record; a solitary bird found on March 2, 1952 in the neighbourhood of the Sangijang Sirah grotto which is inhabited by extensive populations of swiftlets and bats. A bird which may seem less common than it really is, although it prefers higher elevations which may explain its scarcity in Ujung Kulon.

General remarks. Although found from sea level to the summits of Java's mountains, it is rare at lower altitudes. Fairly common above 800 m., but rare again above 2500 m. Habitat rather similar to that of *Accipiter virgatus* (No. 79) though it does not penetrate heavy forest. Often perches on high exposed points or on the lower branches of tall trees, preying on insects and birds, which almost without exception are captured in the open, usually after a speedy swoop, chiefly hunting in the early morning and late afternoon.

The species is rather noisy. It produces a far carrying high-pitched "tie-tie-tie-tiet" or a piercing "hie-hie-hie-hiek".

Nests in well-forested mountainous country, often on thinly leafed, epiphyte-laden trees, frequently on nestferns (Bartels 1926).

B 90. *FALCO MOLUCCENSIS JAVENSIS* Mayr

Moluccan Kestrel.

Scarce in the reserve. Only two observations are on record, one in January and one in March, of birds hovering over open plains near Tdj. Alang Alang. An occasional visitor.

General remarks. Uncommon in the lower parts of West Java, more frequent higher though it does not occur above 1500 m. and is most common in the more arid eastern parts of Java where it is found at the highest altitudes. In habitat and behaviour the kestrel resembles *Elanus caeruleus*, but it prefers quiet corners of the cultivated parts and rugged mountainous country.

Silent, but occasionally a high-pitched fairly penetrating call is uttered, resembling that of the preceding species.

The few nests known in Java were found in the environments frequented by *Falco severus* and placed on epiphyte-covered trees or on nestferns; they were composed of very little material. Also said to breed in holes in trees. In the Kangean Archipelago the author found a nest in an isolated tall tree rising from a cultivated plain, exactly like an *Elanus caeruleus* nest; it was perhaps previously deserted by this species. (Hoogerwerf 1965 c).

Z 91. *FALCO CENCHROIDES* Vigors and Horsfield

Nankeen Kestrel.

Very rare. Encountered in Ujung Kulon only once—on December 2, 1950. A bird which was apparently ill or exhausted was seen on a low tree in the Djaman area. It was shaken out but managed to escape.

General remarks. Little known in Java. An Australian migrant of which a few specimens are present in collections. Common in many parts of Australia, in habitat and behaviour resembling the preceding species.

B 92. *PANDION HALIAETUS MELVILLENSIS* Mathews Osprey.

Perhaps less common in the reserve than the White-bellied Sea-Eagle but certainly resident. A nest was found, containing at least one almost full-grown fledgling, in October 1942. It was placed in a very tall forest-giant in a well-wooded coastal region. In December 1950 a semi-adult sea-eagle was chased away by two Ospreys in the Tjitjangkok region, again close to the sea. On another occasion an Osprey was seen wheeling high in the air with a sea-eagle, some White-necked Storks and a Painted Stork, certainly not a common event. In view of the large extent of white in the occipital feathering on birds observed, it is assumed that in all cases the breeding subspecies *melvillensis* was involved.

General remarks. Perhaps less common in Java than the White-bellied Sea-Eagle with which it often shares its habitat. It is generally assumed that the subspecies *melvillensis* is restricted to coastal regions and that the migrant *haliaëtus* penetrates far inland when visiting Java during the rainy season. The latter, however, not recorded for Java earlier than 1923, is extremely rare.

Family STRIGIDAE**B 93. *KETUPU KETUPU KETUPU* (Horsfield) Fish Owl.**

Only a few records, but considering the difficulties of seeing owls in such heavily forested country as Ujung Kulon, one may

suppose it to be a not uncommon resident in the reserve. Always met in dense jungle, usually not far from a small brook or river, often at a considerable distance from the coast. The characteristic "toog" or "took", occasionally repeated many times, was never heard in Udjung Kulon nor any of its other calls.

General remarks. Perhaps one of the most common owls in Java, occurring in the cultivated lowlands, in villages and towns, in scarcely inhabited country, and primary forest to at least 1500 m. above sea level. Although naturally nocturnal in habits it is perhaps one of the few owls often met in daytime too.

Besides the calls mentioned above a rolling "kootookkookkooktook" can be heard and a "pof-pof-pof" repeated during 20 to 30 seconds.

Most nests were found on nestferns in tall trees and lined with some vegetable matter; occasionally nests of other birds are occupied. (Bartels 1926, Hoogerwerf 1949).

B 94. *OTUS BAKKAMOENA LEMPIJI* (Horsfield)

Collared Scops Owl.

Apparently resident and more common in the reserve than the preceding species, for it was heard often, although never seen. Unlike most owls it has a pleasant call. Most records are from the forested edges of the pastures, but some are from coastal areas or the edge of primary forest, especially where clumps of bamboo were numerous.

General remarks. As widely distributed in Java as the preceding species, but reaching considerably higher in the eastern parts. It commonly occurs in almost all parts of the cultivated regions, including villages and towns, but avoiding primary forest. Palms and clumps of bamboo seem especially attractive.

Its call is a melodious "boo-euh", "wooh" or "hook", often repeated for minutes on end.

It nests in holes in trees, on nestferns, in the axillaries of palm leaves, in thick bamboo-clumps, etc. (Bartels 1939, Rengers Hora Siccama 1939).

B 95. *STRIX SELO-PUTO SELO-PUTO* Horsfield Wood-Owl.

Resident in the reserve. Heard and seen more frequently than either of the other two owls recorded; nearly always in well forested parts of the sanctuary, including Pulau Peutjang where it was twice noted: in March 1952, one, and on July 31, 1955, two or perhaps three, in the canopy of some tall trees.

General remarks. Widely distributed species in Java, in cultivated country, villages and towns, up to at least 1500 m. It hides among densely leafed tall trees, coming out to hunt at dusk.

Its characteristic call is a gloomy "kootookbelook", "belook", "hoop-hoong" or an often repeated "hoog".

Most breeding takes place in holes or hollows in big trees, but nest-ferns are also used as a nest site. Plate XXVII. fig. 1.

Family PSITTACIDAE

B 96. *PSITTACULA ALEXANDRI ALEXANDRI* (Linnaeus) Redbreasted Paraquet.

Recorded only once. On May 26, 1941 there was one in the Niur area. A noisy bird, its more frequent occurrence in this area would not have remained unnoticed. Presumably therefore a rare straggler.

General remarks. Widely distributed bird in Java. Most frequent in the cultivated lowlands and open forest up to 1500 m. but irregular. Sociable, usually operating in small, occasionally large, flocks which may raid standing crops of rice and maize.

It produces a harsh and penetrating screech, like "ēēēē-ēēēē-ēēēē", or "ēkkkkēk".

Its nest is rather similar to those of woodpeckers or barbets and it may occupy their deserted nests though it usually breeds in self-made holes. No lining except some wood-mould or chips, (Hoogerwerf 1962).

B 97. *LORICULUS VERNALIS PUSILLUS* Schlegel

Indian Loriquet.

Probably a resident in the reserve, but its covert habits make it difficult to determine the population density. The few records are from the old path from the coast to the lighthouse on Java's First Point where some were feeding on the flowers of old *Cassia siamea* trees.

General remarks. More a jungle bird than the preceding species, living rather quietly amid the foliage of trees and shrubs, preferring well-forested areas and forest edge to real primary forest. It ranges from sea level to at least 1500 m. with a pronounced preference for the higher parts. It most often attracts attention through its high-pitched call and its extremely rapid flight during which it looks headless; generally in pairs or small flocks.

Its call, a high-pitched, fairly penetrating "srie-ie" is most often uttered in flight and then the humming of the wings may also be heard from some distance.

It nests in a hollow or hole, generally in a treefern, but also in trees where it uses old woodpecker or barbet nests.

Family CORACIIDAE**B 98. *EURYSTOMUS ORIENTALIS ORIENTALIS* Vieillot****N *EURYSTOMUS ORIENTALIS CALONYX* Sharpe**

Broad-billed Roller

Rather regularly encountered in many different localities, though only once along the south coast (close to the Tjibunar mouth). Seems to prefer medium-sized trees in the pastures and in open forest where it is fairly conspicuous because it perches on leafless treetops or similar points from which it has a clear view and preys on insects which are caught on the wing. Observations of two or more individuals were more common than those of single birds. In January 1943 a small flock was seen flying over an open pasture bordering the coast.

Probably most records relate to the dark-billed migratory race *calonyx*, because in only two cases was the breeding subspecies *orientalis* identified by its ivory yellowish bill.

General remarks. The species has an extensive range in Java, from sea level to at least 1500 m, inhabiting well-forested areas, forest edge and open country with some scattered tall trees as is typical of newly cleared agricultural plots. Most active in the early morning and in late afternoon.

It is often the characteristic call which betrays its presence; it is an unharmonious, froglike "gerak-gerak", "gak-rak . . . gak-rak", a hoarse "tjēēp—tjēēp", or "kchèk-kchèk-kchèk" etc.

It nests in self-made or existing holes and hollows in trees or palms, usually high above the ground (Bartels 1921, Sody 1926 a., Hoogerwerf 1965 b).

Family ALCEDINIDAE

B 99. *PELARGOPSIS CAPENSIS FRASERI* Sharpe

Stork-billed Kingfisher.

Regularly observed but more often prewar than in recent years and more often along the coast or close to the shore than inland. Single birds most usual. They remain well concealed in leafy shrubs and trees, so that it is frequently the far-carrying call, often uttered in flight, which draws attention. A nest found in March containing two young almost ready to leave it, was in a hollowed out cavity in a termites' nest on a tree. Accidentally it was damaged and the young fell out; when put back they were almost immediately fed by the parent birds as if nothing had happened.

General remarks. A common bird in many coastal parts of Java, especially in tidal forests, but it also frequents streams, brooks and swamps amid well-wooded inland regions up to at least 800 m, occasionally penetrating fairly far into primary forest.

Its call is an unmelodious harsh roar, like "kie-iek-kie-iek-kie-iek" or a long-drawn "ihhhhheu-ieuh".

Extremely little is known of its breeding in Java. Besides tunnels made in termites' nests it breeds in holes in trees or in riverbanks, etc. The nest is often lined with fragments of prey, insects, small fishes, lizards, frogs etc. (Hoogerwerf 1963 a).

B 100. *ALCEDO MENINTING MENINTING* Horsfield

Deep-Blue Kingfisher.

Rather common in the reserve, although its elusive nature hampers sight records. Widely distributed, often sharing the habitats of the preceding and the following species in coastal areas, along brooks, rivers, and swamps etc. in the interior, but almost never where sunlight penetrates much.

General remarks. Fairly common in Java. Although it visits coastal areas it prefers freshwater in well-forested country, including primary forest, up to at least 1500 m.

When flushed it often utters a high-pitched but not far carrying "tjiet" or "tjiep".

The nest is a cavity at the end of a tunnel in sandy soil in banks of waterholes, brooks, roadsides etc. with no other lining than some parts of insects, which are the main prey (Hoogerwerf 1965 c).

B 101. *ALCEDO CAERULESCENS* Vieillot

Small Blue Kingfisher.

Perhaps less common in the reserve than the preceding species, because its range is more restricted. Only found in coastal areas, including the tidal forests, chiefly feeding in brackish or salt water and often in sunny places, living less hidden than them.

General remarks. Rather common in suitable habitat in Java. Occasionally found in the interior up to approximately 800 m.

Its call resembles that of the preceding species, a penetrating, high-pitched "tieh-tieh-tieh".

Nestsite and nest resemble those of the preceding species but more often found in the open.

B 102. *CEYX RUFIDORSUS RUFIDORSUS* Strickland

Three-toed Kingfisher.

Generally distributed in the reserve, where a wealth of suitable habitat is available, but perhaps not common. Again a bird of covert habits. Almost exclusively seeks the seclusion of thickets of palms, bamboo, shrubs etc. in most parts of the reserve, including the the forested hills of the interior. A fledgling was caught in a very dense palm forest and in October a newly excavated nest tunnel was found in the soil attached to the roots of a fallen tree in primary forest.

General remarks. More a jungle bird than all the preceding kingfishers; not necessarily found near water.

Its voice does not differ much from that of *Alcedo meninting* and it is most often heard when flushed.

Nestsite and nest resemble those of the previous species but the Three-toed Kingfisher sticks still more to locations where sunlight scarcely reaches the ground (Hoogerwerf 1967).

B 103. *LACEDO PULCHELLA PULCHELLA* (Horsfield)

Banded Kingfisher

One of the rarest birds in the reserve. Only twice recorded, though it is almost certainly a resident; in September 1953 an adult male, and in July 1955 a female. On both occasions the birds were found amid heavy secondary forest without water nearby.

General remarks. A rare bird almost everywhere in Java but it may be more numerous than the few records suggest. It frequents well-wooded parts from sea level to at least 1500 m. also frequenting primary forest. It is quiet, usually solitary and to be found in or close to dense foliage not far above ground.

Very little is known of its breeding habits in Java; it is said to use cavities made in termites' nests, in the banks of streams etc.

B 104. HALCYON COROMANDA MINOR Temminck & Schlegel
Ruddy Kingfisher.

In September 1937 a single bird was seen in the extensive mangrove of the Tjisimping area and not earlier than November 1954 a second was seen along a jungle path through dry coastal forest near Java's First Point.

General remarks. Broadly speaking rare in Java, but locally perhaps not uncommon, although absent from many apparently suitable localities. Almost exclusively restricted to tidal forests and surroundings. Shy and wary. It apparently does not occur at all more than a few hundred metres above sea level, in any case no records are known above 800 m.

The call, not known to the present author, is said to resemble that of *Pelargopsis capensis* (No. 99), but to be softer.

Almost nothing is known of its breeding in Java; it is said to breed in heavy shade in sites similar to those of *Ceyx rufidorsus* and *Alcedo meninting*.

B 105. HALCYON CYANOVENTRIS (Vieillot) Javan Kingfisher.

Noted in the reserve considerably more often prewar than recently. There is probably a real difference in abundance between these periods. It was never common however though it may be considered resident. It perches on tall, often leafless, trees or similar exposed points giving a clear view of its surroundings. Not concerned much about the proximity of water and it avoids salt water. Most observations are of single birds from the pastures and from dried-up swamps.

General remarks. Common in many suitable localities between sea level and at least 1500 m. in Java, in cultivated areas and heavily forested country but forests with a continuous canopy are avoided.

It utters a far carrying scream, a penetrating "tjie-rie-rie-rie-rie-rie", and many times repeated "tjeuwiiiiiii", or "tschriiii", "tschriiiiwiwiwiwi . . . ēēēēēēēēēē".

Its nest is a cavity at the end of a tunnel excavated in the steep banks of streams, waysides etc., often in open sunny places.

B 106. HALCYON CHLORIS PALMERI (Oberholser)

White-collared Kingfisher.

The most common kingfisher in the reserve, frequenting the habitat preferred by the preceding species, and also the beach and the mangrove. It avoids dense forest or similar shady locations but penetrates farther than the preceding species.

General remarks. Broadly speaking the most common kingfisher in Java, especially in the cultivated parts and marginal areas up to at least 1500 m. It often shares the habitats of the preceding species or *Pelargopsis capensis* (No. 99), often feeding in dry places with no water at hand.

Its call is a far carrying, unpleasant scream, an often repeated "ngès-ngèk", a penetrating "tjeu-kè-kè-kè-kè-kè" or a harsh "tjiprüh" of "prüh-prüh-prüh-tjiprüh-tjihhhhprühhhh" or a short "tjirrr".

Nest site and nest resemble those of the preceding species but termites' nests are perhaps most frequently selected (Hoogerwerf 1965 c).

Family BUCEROTIDAE**B 107. BUCEROS RHINOCEROS SILVESTRIS** Vieillot

Rhinoceros Hornbill.

This hornbill gives the impression of being considerably less numerous in Ujung Kulon than the two following species, which are less particular in the choice of their habitat. However, it is decidedly not rare in the reserve in suitable habitat and it is certainly a resident. Usually the far carrying call betrays the bird's presence. In August 1956 approximately 20 individuals were counted in the canopy of a tall, fruiting *Ficus*, this was the largest flock noted in the sanctuary. Over long distances the birds fly very high, one after the other with the male in front and then their wingbeats may be heard as far as a mile away.

General remarks. This hornbill cannot thrive without extensive stretches of heavy forest with a continuous canopy, and is restricted to such country. Even then it is often rare or completely absent in apparently suitable habitat. It has an extensive range and is found up to at least 1500 m. It is very shy and wary, generally living in pairs, occasionally in the company of a young bird or flocking at fruiting trees.

The most frequently uttered, far carrying call is the deep "hok" of the male and "hak" of the female; usually the male's call is directly followed by that of the female, so that it seems to be produced by a single bird "hok-hak . . . hok-hak . . . hok-hak"; often repeated many times and audible kilometres away.

Nestsite and nest resemble those of all or most other hornbills; holes or hollows in tall trees of which the width of the entrance has been narrowed by the breeding female using its excrement as cement. It is then fed by the male which afterwards also brings the food for the young, which is then fed by the female. The female, after moulting, leaves the nesthole when the young is half grown and the entrance to the nest is narrowed further by the young bird which is then fed by both parents (Bartels 1937).

B 108. ANTHRACOCEROS CONVEXUS (Temminck)

Pied Hornbill.

This may be the most common hornbill in the reserve because of its wide choice of habitat, found in primary and secondary forest and also in palms and tall trees along the coast, including the mangroves. It also frequents the pastures and other open forest, especially when *gebang* palms (*Corypha utan*) are fruiting. Generally seen, in small flocks, rarely more than five though in January 1943 there were 15 on the fruits of a heavy *Ficus* along the Tjibunar mouth and in October 1941 in the Tjigenter area.

General remarks. In the lower parts of Java perhaps more common than the preceding species but rare in the mountains above some 800 m.

Its far carrying screaming call is a series of piercing notes in which the "è" and "ie" predominate.

Nestsite and nest resemble those of the preceding species as do its breeding habits, but it is thought that the male bird brings earth to the female to narrow the entrance to the nest when breeding starts (Bartels 1937, Sody 1939).

B 109. *RHYTICEROS UNDULATUS UNDULATUS* (Shaw)

Malaysian Wreathed Hornbill.

Perhaps more numerous than the Rhinoceros Hornbill (No. 107) but less abundant than the preceding species in the reserve. It has a pronounced preference for primary forest but is also found sometimes in more open secondary forest. Rarely seen singly most often in pairs and large assemblages are uncommon though repeatedly 10 to 15 and once 20 were counted in the same fruiting tree. Once, on Pulau Peutjang, 15 were found congregating with some Pied Hornbills in the canopy of two adjacent forest giants (*Bischofia javanica* and *Tetrameles nodiflora*) of which a great many leaves and shoots were scattered on the ground but not a single fruit or flower, a phenomenon never witnessed anywhere else. Flying birds, covering large distances, are usually pairs with the larger male, distinguishable by the yellow pouch, in front of the female which has a blue throat. The wing-beats can be heard at a distance of at least a kilometre.

Although fruit and other vegetable matter is most probably the most common food of all these three hornbills, figs forming a very important part, insects, reptiles, amphibians and even small mammals and bird-eggs occur in their diet. Once this species was seen in a low tree above a coral reef apparently preying on crabs and on another occasion one almost landed on a reef to take a crab but was disturbed by the author's approach.

General remarks. In Java this species occurs up to 1500 m. and probably more frequently found higher up than the other species. In behaviour it resembles the Rhinoceros Hornbill, but is perhaps still more shy and wary.

Its call is a deep, far carrying "ee-guk" or "koo-guk . . . koo-guk" and occasionally a scraping sound is produced.

Nest-site, nest and breeding habits resemble those of the Rhinoceros Hornbill. The selected holes, almost without exception in forest giants and very high above the ground, may vary considerably in size, but the width of the entrance is invariably narrowed to a cleft of only 4 to 8 cm. The egg-chamber is usually so narrow that the sitting female, and later also the young, keep their tail folded upward. They defecate through the nest-entrance, so that the bottom of the hole remains clean and only contains some wood-mould and other rubbish, including vomited fruit-stones, food-debris, and some feathers, for during its stay in the nesthole the female's wing and tail quills are moulted. It is a remarkable fact that the female's flight is quite normal when finally it leaves the nest after having been shut up in such a small abode for 2-2½ months (Bartels 1937).

Family MEROPIDAE

B 110. MEROPS LESCHENULTI QUINTICOLOR Vieillot

Bay-headed Bee-eater.

Bee-eaters in the reserve frequent the open, thinly forested regions or spots where some scattered trees are the only remnants of the cleared forest.

Of the species breeding here this is by far the less common, although during September and October it may be regularly recorded at various localities, particularly at the Tjigenter pasture where breeding was witnessed in these months. In July 1955 newly excavated nest-tunnels were found along the south coast. In the reserve nesting birds almost invariably associate with the following species, which is always more numerous. Records in the rainy season are rare, one in January, two in March; in the first case some were seen with both the other species. Single birds are rare. They usually perch on leafless trees or other exposed points watching flying insects which they catch on the wing, often performing all manner of aerobatics. The chief prey are large insects such as dragon-flies, beetles, bees and occasionally butterflies, which are often stripped of their wings or crushed against branches.

General remarks. Occurs in Java from sea level to at least 1500 m., preferring the lower altitudes. Locally, fairly common, especially along the south coast.

Their call resembles that of most other bee-eaters; it is an often repeated, rather musical "tûwiet", "tjie-tie-wie-wie-wie-wiet" or "tjieuw-tjieuw-tjieuw", alternating with an unmelodious "tû-tû-tû-tû.. tûrrrr".

Nestsite and nest resemble those of the following species.

B 111. *MEROPS VIRIDIS VIRIDIS* Linnaeus

Blue-throated Bee-eater.

The most common bee-eater in the reserve, frequenting the same habitat and displaying almost the same behaviour as the preceding species, but scarcer during the rainy season, with only one record during the southwest-monsoon (November 1954). Gregarious breeding was noted from June, with a peak from August to October. The Tjigenter pasture was favoured but occasionally nesting was also recorded from almost all other pastures covered with short grass or similar vegetation.

General remarks. Outside the reserve its range is restricted to lower altitudes than the last species, not exceeding perhaps some hundred metres. It is local and erratic, sometimes completely absent in locations where it may periodically be abundant.

Its call does not differ much from that of the preceding species, it is a penetrating, fairly melodious "toowiet-toowiet-toowiet" or "twiet-twiet".

The nest is a cavity 50 to 80 cm. deep at the end of a tunnel, 75 to 125 cm. long, excavated in dry sandy soil. It is lined with some remnants of insects on which the birds prey. The large quantity of sand excavated is almost entirely removed by the birds so there is little evidence of the nest's presence. Nesting in vertical earthen walls is also known. Chief enemies of nesting birds in the reserve are monitor lizards, snakes and the ichneumon.

N 112. *MEROPS PHILIPPINUS JAVANICUS* Horsfield

Brown-breasted Bee-eater.

Almost exclusively observed in the Djaman-Niur area, chiefly during September and October, sometimes with one of the preceding species. Fairly large parties were not uncommon: on October 17, 1952 there were 75 in the Niur area and on December 29, 1941 approximately 150 in the Djaman region roosting on a dead *njamplung* tree along the coast. The earliest record in the reserve is September 30, the last March 8.

General remarks. During the rainy season this is the most common bee-eater in Java from sea level to at least 1500 m. It may be found from the wildest parts of the island to villages and towns if the environment is suitable. In behaviour it much resembles the preceding species but when hunting it remains longer on the wing than the other bee-eaters.

Unlike many other migratory birds this bee-eater is rather noisy in winter-quarters: its call resembles that of the preceding species, it is an oft repeated piercing "toowiet" or "twiet" often uttered in flight.

Breeding is not known from Java but there are a few indications that this takes place, for the author once observed a bird of this species nervously circling for a considerable time with a large insect in its bill, and in June 1954 he found some of these bee-eaters excavating a nest-tunnel. When the author approached an alarmed bird wheeled in the air and finally a second was flushed from the nesthole, which proved to be approximately 50 cm. deep and apparently not yet ready. This was on Paliath Island (Kangean Archipelago) east of Java (Hoogerwerf 1948a, Sody 1926a).

Family CAPRIMULGIDAE**B 113. *CAPRIMULGUS AFFINIS AFFINIS* Horsfield**

Allied Nightjar.

Not exactly a common resident in the reserve. Recorded more often after the war than before and less frequently along the south and

west coasts than elsewhere, but never far from the coast. The higher parts of sandy beaches with a sparse ground cover of *Spinifex littoreus*, *Ipomoea pes-caprae* or similar plants, bordered by open scrub jungle seem the favourite habitat for daytime roosting. It also breeds there, sometimes even between some wreckage on the open beach, very often in the blazing sun. Usually single birds or pairs are flushed from their roost or nest on the ground.

General remarks. The most common nightjar in Java frequenting the habitat described for Udjung Kulon, but also inland on sparsely grown open places such as pastures, fallow agricultural plots, etc. It even occurs in densely populated country, including villages and towns where it visits parks and sportsfields and may be found breeding on the gravel-covered roofs of high buildings. It does not appear much above 1500 m.

The call, uttered at twilight and at night is a loud, sharp "tschrooiët", "tjoowie-tjoowie" or "tschoorrr". When alarmed a short "tsjook".

The nest is typically a shallow depression in the sand without any lining. The author once found 10 nests within a few hours in a cattle pasture of about 10 acres, bordering the Java sea. Nightjars were abundant there, even hunting by day, soaring and dashing around grazing waterbuffaloes.

B 114. CAPRIMULGUS MACRURUS MACRURUS Horsfield

Long-tailed Nightjar.

Unlike the preceding species does not like roosting in open, sunny places but sticks to the shadow of trees and shrubs, also to jungle with a closed canopy, especially near clumps of bamboo. Encountered less frequently in the reserve than the preceding one, but on account of the wealth of suitable habitat it is probably more common really. Occasionally it may be found in the same surroundings. When flushed from the ground this species often lands on trees or shrubs, whilst the preceding species was never seen on a branch or other point above the ground.

General remarks. Up to at least 1500 m. this nightjar is generally distributed; it prefers open, well forested parts to really heavy woods. Usually single birds or pairs are found.

The nocturnal call differs considerably from that of the Allied Nightjar; it is a loud, metallic "wook" often repeated many times, or "tschorrr" resembling the sound of a stone thrown on very hard ice. It is also described as a grumbling "ko-o-o-o-o-orr" followed by a harsh "tjèr-tjèr-tjèr-tjèr-tjèr-tjèr".

Nestsite and nest resemble those of the preceding species but the nest is never found in sunny places and is better concealed, though it is almost always on bare ground, and never among dense cover.

Family APODIDAE

B 115. HEMIPROCNE LONGIPENNIS LONGIPENNIS

(Rafinesque)

Crested Tree-Swift.

Not common in the reserve. Some pairs are resident and breeding was repeatedly proven. Almost all observations, of single birds or pairs, are from the coast or nearby where they were found on leafless treetops, chiefly of tall *njamplung*. In July a female was with an almost full-grown egg in its ovary.

The feeding habits resemble those of the bee-eaters and the Swallow-Shrike (No. 203) though their aerobatics are less daring and obtained the birds rarely descend so close to the ground.

General remarks. In Java it has an extensive range, occurring from sea level to at least 1500 m. found from wild country where some scattered trees in freshly cleared agricultural plots are the only remnants of the cut forest, to tall trees bordering highways through villages or towns.

Generally silent, from time to time they utter a high-pitched "hie-tie-ie-tie-tèw-tèw" or "tèw-tèw-tèw".

The nest is a tiny cup, composed of the bird's saliva mixed with some moss, fibrous material, down or feathers, strongly cemented together; it is just large enough to contain the single egg on which the bird sits erect (Bartels 1929 b, Hoogerwerf 1965 c). Plaque XXVII. fig. 2.

B 116. COLLOCALIA FUCIPHAGA FUCIPHAGA Thunberg

Brown-rumped Swiftlet.

Mainly because of several grottoes (Sangijang Sirah and Pulau Peutjang) where it breeds, it is repeatedly observed in the reserve. Formerly the harvesting of nests in the first-mentioned cave was leased by the Government; although this was stopped some years before the war, people continue visiting the place which is known as a pilgrimage grotto. It was repeatedly observed that many hundred birds associating with individuals of the following swift, left the cave around sunset whilst only a very few returned later. This suggests nocturnal feeding although diurnal feeding may be more normal. The behaviour of this swiftlet is rather similar to that of most others; they are very fast-flying birds, often seen in small flocks around the canopy of very tall fruiting forest trees, probably feeding on small insects. Also often seen flying low and bathing in flight was frequently observed amongst birds just skimming the water of rivers, marshes etc.

General remarks. In many places in Java this is a common and very widely distributed swiftlet for it is found from sea level to the highest mountaintops. Found feeding, above the sea, above highways and cities, swooping along craterwalls or mountain summits, or skimming over the canopy of extensive primary forests.

The high-pitched "tschjierrr" is not often heard except at the breeding places. According to Lord Medway (1965) this is one of the swifts producing "a penetrating rattle-like call, composed of an irregular succession of brief clicks" when moving in total darkness or in poor light.

Nests are almost exclusively composed of saliva attached to rocks, often in grottoes, or to rafters of houses in villages and cities. In many parts of Indonesia the nesting sites, often grottoes along the coast, are leased by the Government and the nests harvested for commercial purposes (Hoogerwerf 1967).

B 117. *COLLOCALIA ESCULENTA LINCHI* Horsfield & Moore
White-bellied Swiftlet.

This swiftlet also breeds in the reserve, and can be encountered regularly, often with the preceding, dark-bellied species feeding around the canopy of tall fruiting or flowering trees or at places where both species bathe (Niur).

General remarks. There is apparently little difference in the habitat of this and the preceding species and they both are found from sea level to the summits of the highest mountains.

Its call resembles that of the preceding species; according to Lord Medway (1965) it does not produce the "rattle call", from which he concludes that this swift is perhaps not able to find its way in darkness.

The nests of this swiftlet—to be found in environments similar to those of the preceding species—are non-edible, composed of fragments of plants, often pine needles, firmly cemented together with the bird's saliva (Hoogerwerf 1951).

B 118. *CHAETURA GIGANTEA GIGANTEA* (Temminck)
Spinetail Swift.

Only one certain record from the reserve: on September 21, 1953, during fine weather a small flock of six birds was observed above one of the Niur pastures, occasionally descending as low as a few metres above the ground. I was deeply impressed by the enormous speed of their flight, though their stay did not exceed ten minutes. In addition to their large size they had distinctive white undertail feathers and differed from the much rarer *Chaetura caudacuta* by the lack of a light area on chin, throat and neck.

General remarks. Certainly not common in Java, although it is found from sea level to the highest altitudes. The highest parts are perhaps the most frequented. However, this tireless flyer is almost everywhere of erratic occurrence, usually in small parties rather than in pairs, and occasionally in extensive flocks, not infrequently with *Collocalia gigas*.

Rather silent, producing a swallow-like chatter; birds flying past close to are said to produce a whistling sound, resembling the sound produced by rapidly scratching one's nails over an undulating zincplate.

Its nest is not known from Java, though it certainly breeds. From Continental Asia the species is known to breed in completely hollow trees, depositing the eggs in a shallow depression at the bottom. (Bartels 1923, 1929 c, 1931 a).

119. *CHAETURA CELEBENSIS ERNSTI* Bartels

Bartels' Spinetail Swift.

A very rare visitor to the reserve. Only one certain record. When watching big game from a blind along the Niur, on October 16, 1941, one was seen flocking with some smaller *Chaetura leucopygialis*, repeatedly bathing while skimming over the surface of the water. This bird was considerably larger and entirely black; it is distinguishable from *Collocalia gigas*, another completely black species, by its larger size and the distinct spinetail.

General remarks. Everywhere in Java this swift—not discovered until 1926—is rare. It is not known whether it breeds in Java or is a migrant or a straggler (Bartels 1931).

B 120. *CHAETURA LEUCOPYGIALIS* (Blyth)

Grey-rumped Spinetail Swift.

The most plentiful *Chaetura* in the reserve, but still not more than ten records, of which the majority originate from the Tjigenter pasture. Also observed in the Niur region and also along the south coast. On all occasions several were seen together, often flying low above the ground. It seems justifiable to assume that this jungle-loving swift breeds in the sanctuary.

General remarks. As far as Java is concerned almost nothing is known of this little spinetail which apparently favours densely forested country, from sea level to at least 1500 m.

Low flying birds above the Tjigenter pasture uttered a high-pitched note, somewhat like "tirrr-tirrrr".

Nothing is known of its nest, nestsite or breeding habits in Java,

B 121. *CYPSIURUS PARVUS INFUMATUS* (Sclater) Palm Swift

The frequency of occurrence in the reserve does not accord with the abundance of palms of many different species, often in open places, which this species prefers. Recorded at different places, especially flying around palms scattered over open parts of the reserve, associating in small flocks or with *Collocalia* species.

General remarks. Common in Java from sea level to at least 1500 m. although perhaps less frequent than the *Collocalia* species mentioned above, because it cannot thrive without palms.

Its high-pitched chattering like "tjierietjiet" is more often heard than the calls of most other swifts.

The nest is a neat, thin-walled, small structure, chiefly made of seed down, often mixed with some feathers and bound with the bird's saliva. Just large enough to contain the two eggs, it is attached to vertically hanging palm leaves, usually not far above the ground but occasionally much higher.

N 122. *APUS PACIFICUS PACIFICUS* (Latham)

White-rumped Swift

A rare visitor to the reserve, observed only four times in January 1943 at three different localities, without exception above open pastures, with a maximum of 10 on January 7, in the Niur area. The lighter plumage and somewhat darker chin and throat, distinguished them the following species which also has a white back but averages considerably smaller in size.

General remarks. Erratic in its appearance and numbers; occasionally found during the rainy season in various localities, but preferring open places. It occurs from sea level to at least 1500 m. generally in flocks often with other swifts and once with *Glareola maldivarum* (No. 43).

N 123. *APUS AFFINIS SUBFURCATUS* (Blyth) House Swift

Although it breeds in Java and there are excellent nestsites in the reserve there is only one certain record. On February 28, 1952 one was seen along the south coast. The dark plumage and distinctly white throat were clearly visible.

General remarks. In Java this is a lowland species with a fairly restricted range, though occasionally found as high as 1500 m. Perhaps most common along the south coast, especially where rocks are plentiful; whilst it seems rare in the interior.

It produces penetrating, unmelodious, harsh and high-pitched screeches, most often uttered during the late afternoon.

It nests in colonies both in caves in rocky coasts, sometimes with *Collocalia* species, and on human dwellings in villages or towns. The nest is composed of clay and resembles that of the European House Swallow, but it often has a tunnelled entrance and occasionally many nests are cemented close together.

Family CUCULIDAE

N 124. CLAMATOR COROMANDUS (Linnaeus)

Red-winged Crested Cuckoo.

A rare migrant, only recorded twice (and probably the same bird) on January 8 and 13, 1943 in the Djaman-Niur area. The bird, which was not at all shy, was looking for food along the edge of some low shrubs, mainly *Lantana camara*.

General remarks. A rare straggler in Java most commonly found at low elevations, although known to occur up to 1500 m.

B 125. SURNICULUS LUGUBRIS LUGUBRIS (Horsfield)

Black Drongo-Cuckoo.

One of the most common cuckoos in the reserve, most frequently occurring in sparsely wooded areas, often betrayed by its characteristic call.

General remarks. One of the most common cuckoos in Java to at least 1500 m. in very rough country and in the cultivated parts of Java, often close to human dwellings, and even in villages and towns, but avoiding primary forest. Often found perching on dead treetops or other exposed points giving a clear view of its surroundings.

Its call, resembling that of the Brain-fever Bird (No. 131) is an ascending "hurrr-turrr-turrr-turrr" or "hie-tie-tie-tie".

Various hosts are known in Java in Udjung Kulon alone *Trichastoma sepiarium*, *Macronus flavicollis* and *Copsychus saularis* are parasitised (Bartels 1925, 1929, Sody 1926).

126. *CUCULUS FUGAX* subsp. Malayan Hawk-Cuckoo.

Only one record from the reserve: on October 10, 1941 a single bird was seen along a jungle path between the Tjigenter and the Pemagaran. It was apparently semi-adult. Its brownish upper-parts and the distinct dark longitudinal stripes of its under-side were the most striking features, but it was impossible to ascertain its subspecific identity, so the breeding race *fugax* or the migratory subspecies *nisicolor* may have been involved.

General remarks. A very rare bird in Java and, as far as I am aware, almost nothing is known of its range and habits, nor do I know on what grounds the subspecies *fugax* is considered to breed in Java.

B 127. *CUCULUS MICROPTERUS CONCRETUS* S. Müller
Indian Cuckoo.

The very few records from the reserve are based on the striking song which cannot be confused with the call of any other bird known to me. In November 1940 and again on several consecutive days in November 1954 it was heard in primary forest between the Tjigenter and the south coast. It is improbable that the subspecies *micropterus* which visits Java as a migrant would call so persistently when in its winterquarters so it is supposed that the breeding race *concretus* was involved. Perhaps not a resident in the area.

General remarks. Fairly common, although very local in Java, known from sea level to the summits of the highest mountains, but rarely above 2500 m. It frequents well-wooded regions, including primary forest and its edge. It is a shy, elusive bird, generally found in tall trees and certainly not in cultivated country or densely inhabited regions.

Its call is a far carrying "boh-koh-takoh", syllabized by the Sundanese people of Java as "tara-kapok", "kontrak-kagok" and

"opat-patok". Next to the call of *Cuculus poliocephalus* (No. 129) the voice is one of the most impressive sounds of Java's jungles.

Hosts of this cuckoo include various drongo species and *Dicrurus paradiseus* (No. 230) is fairly common in the reserve (Bartels 1925, 1929, Bartels, E. 1931, Sody 1926).

N 128. CUCULUS SATURATUS subsp. Gould's Cuckoo

Found twice in the reserve in November 1954, single birds in some scattered trees on the Tjidaon pasture and in a similar environment, in the Djaman area. It was impossible to establish their subspecific affinity, which is even difficult with birds in the hand; both races known in Java, *saturatus* and *horsfieldi*, are migrants and only found during the wintermonths of the temperate zones. Compared with the preceding species this one can be distinguished by greyish, instead of brownish, upperparts and by the absence of bars on the tailfeathers, which show pointed tips.

General remarks. Although not common in Java, sight records are more frequent than those of any other *Cuculus* species. It has the same wide altitudinal range as the preceding species and can be found from cultivated country, even close to human habitations, to well-forested areas and the edges of primary forest. Quiet and silent, living among or close to the foliage of medium-sized trees, shrubs and palms (Hoogerwerf 1962 c).

B 129. CUCULUS POLIOCEPHALUS LEPIDUS S. Müller
Small Cuckoo

The characteristic, carrying call was heard once in the reserve, on January 19, 1943 and this is the only evidence of its presence. I doubt that it is resident because in places where this is the case its voice is a regular feature.

General remarks. Although sight records are extremely limited everywhere in Java, its call suggests a very extensive range, though it may be restricted to heavily forested country, perhaps especially

remote upland regions, inclusive primary forest. In habits it resembles *Cuculus micropterus*, though it favours still more tall trees in primary forest. Known to occur from sea level to near the summits of the highest mountains, but it prefers the higher parts of its range, which may be why it is but a rare straggler to Udjund Kulon. The absence of *Rhipidura phoenicura*, *Phylloscopus trivirgatus* and *Seicercus grammiceps* which this cuckoo parasitizes, may be another reason.

Its very impressive call "set-goong-goong" "goo-goo" or "geu-goo-goo" (as in go) is extremely far-carrying and is quite different from the voice of all other cuckoos in Java. It is perhaps only produced during the mating season (Bartels 1925, 1929, Sody 1926).

B 130. *CACOMANTIS SONNERATHI MUSICUS* (Ljungh)

Banded Bay Cuckoo

Judging from the rather frequently heard calls the species is not rare in the reserve, though sight records are not common. It needs some experience to distinguish its voice from those of the two following species. Birds seen have been alone, sometimes perching for a considerable time in the open and in almost all parts of the reserve outside the heavy forests of the hilly interior.

General remarks. Generally distributed in Java and rather common from sea level to at least 1500 m. but perhaps somewhat less common than the other two *Cacomantis* species. It frequents cultivated country, densely inhabited areas, including villages and towns and wilder areas but primary forest is avoided. Usually found on low or medium trees amid or close to dense foliage as is *Surniculus lugubris* (No. 125). Single birds are most common but occasionally several may be heard at once.

Its call is a persistent, rather boring whistle "tjie-tjie-tjie-tjie" or "hie-tie-tie-tie-tiet" in an ascending scale, or an oft repeated, monotonous "pie-oo-wiet" with the stress on the long-drawn, ascending "wieiet"; it also sounds like "piēēēēt-piēēēēt-piēēēt-pie-oo-wiet, pie-oo-wiet",

In Java the only known host is the iora (No. 169) which is common in the reserve. Although reliably identified eggs of this cuckoo are not yet known, young were often seen in the company of the iora, so one supposes that its egg is almost indistinguishable from that of the fosterparents (Bartels 1925, 1929, Sody 1926).

B 131. *CACOMANTIS MERULINUS LANCEOLATUS* (S. Müller)

Brain-fever Bird

Besides two sight records and a specimen shot in July 1955, there are only a few audio observations; despite these rather rare records it may be considered resident in the reserve, easily escaping notice as outside the mating season it is very silent and elusive.

General remarks. In Java it occupies the same range as the preceding species, but prefers the higher parts of it. Little concerned about its habitat, occurring in wild country and cultivated areas, including villages and towns, though it avoids primary forest. Erratic in its occurrence and numbers, so that it may desert localities where it is periodically common. Generally it keeps well hidden among the outer foliage of shrubs and trees, usually not ascending higher than a few metres above the ground. Occasionally, but perhaps only in the mating season, calling birds perch in exposed positions.

Its call resembles somewhat that of the preceding species; it is a highpitched whistle of notes of the same tone "hie-tie-tie-tie-tie-tie", followed by some shorter ones in descending scale not, as in the preceding species, in an ascending scale.

Among the birds serving as brood hosts only *Orthotomus sepium* and *Orthotomus sutorius edela* are known to occur in the reserve; elsewhere *Cisticola juncides* and *Prinia flaviventris* are also parasitized. (Bartels 1925, Sody 1926).

B 132. *CACOMANTIS VARIOLOSUS SEPULCRALIS* (S. Müller)

Fan-tailed Cuckoo

Not a common bird in the reserve and certainly of erratic occurrence. Records of its call were more frequent than observations. It is difficult to point to differences in habitat and behaviour

between the three *Cacomantis* species inhabiting the reserve, but this one was also recorded in the primary forest and it was also more often found higher above the ground, occasionally even in the canopy of tall trees.

General remarks. Common in many parts of Java, it occupies the same range and frequents the same habitat as the other *Cacomantis* species in Java, but it prefers higher altitudes, is common at 1500 m above sea level and also occurs considerably higher. It is less shy and wary, more familiar with people and human habitations than other *Cacomantis* species, so that it is the most frequently recorded of the genus.

It needs some experience to distinguish the call. It consists of a monotonous series of notes of the same pitch, like "hiet-hiet-hiet-hiet-hiet" often repeated *ad infinitum* and "cracking" in the final phase. A second loud whistle like "pie-wie-iet . . . pie-wie-iet" in an ascending tone, is also produced.

Many brood hosts are known but only four, *Rhipidura javanica*, *Muscicapa banyumas*, *Pycnonotus goiavier* and *P. aurigaster*, are residents in the reserve. Other hosts include *Enicurus velatus*, *Rhipidura phoenicura*, *Culicicapa ceylonensis*, *Muscicapa hyperythra* in primary forest and one, *Cettia fortipes*, in alpine plains over 2500 m above sea level which clearly demonstrates the extremely wide range of this small cuckoo (Bartels 1929, Sody 1926).

B 133. CHRYSOCOCCYX MALAYANUS ALBIFRONS Junge

Malay Cuckoo

Only one certain record in the reserve. On December 27, 1938 one was seen in open scrub jungle along one of the Niur pastures quite close to the sea, a typical habitat. There was a second, doubtful record from the same area on November 11, 1951. Probably not resident.

General remarks. Little is known of this small cuckoo; it is scarce in the lowlands, and is not known to exceed elevations of 1500 m. There are not many places in Java where its call can be heard

regularly. On account of its secretive habits and its preference for tidal forests, which are often difficult of access it may be more common than the rare records would indicate.

Its high-pitched, melancholic "tieuw-tieuw-tie-tieuw" is one of the less frequently heard calls and it is perhaps only uttered by male birds in the mating season.

The only known brood host is the Mangrove Flycatcher *Gerygone fusca* which is also known from Ujung Kulon (Bartels 1925).

B 134. EUDYNAMYS SCOLOPACEA MALAYANA

Cabanis & Heine

Koel.

Resident in the reserve, it can be found almost everywhere provided densely leafed tall trees are available, but it is less common in the heavily wooded central hills. Most observations were of calling birds, for it is very elusive and very rarely evident when it does not call, as is the case during the greater part of the year. In this area calling birds were recorded from September to January and most sight records are from this period.

General remarks. Despite its large size and the conspicuous black plumage of the male, this cuckoo succeeds in remaining well concealed amid the dense foliage of tall trees or epiphyte-laden shorter ones, even after it has been located almost exactly. It is certainly more common than the fairly rare sight records suggest. It is a lowland bird not ranging above 800 m. and occupying the habitat of the smaller cuckoos mentioned above. It does not like primary forest although it may penetrate fairly deep when feeding conditions are attractive. It apparently does not like to fly and if it is forced to do so its flight is of short duration, but perhaps it is more active by night.

Its call is so striking that it cannot be mistaken; it is a far-carrying "too-wowww . . . too-wowww" perhaps only produced by the male. A second, quite different song, probably originating from the female sounds like "tjoolik-oolik-oolik", an often repeated "kwiel-

kwiél-kwiél" or "kliék-kliék-kliék". From these different calls two vernacular names are derived.

Both *Corvus* species (No. 231, 232) are known as fosterparents in Java, but only one, *Corvus enca*, seems resident in the reserve (Bartels 1925, 1929, Hoogerwerf 1967, Sody 1926).

B 135. *CENTROPUS SINENSIS BUBUTUS* Horsfield

Crow-Pheasant or Coucal

Unlike the cuckoos discussed hitherto, this and the next four are nonparasitic.

Rather common in the reserve, although considerably less abundant than one would expect when considering the extensive areas of suitable habitat. Almost exclusively an inhabitant of wildernesses of bamboo, rotan, Zingiberaceae and other parts covered with almost impenetrable undergrowth where it can hide in a mass of vines or foliage, also regions under a closed canopy where hardly any sunshine reaches the ground. More terrestrial than arboreal although occasionally it may be found in tall trees, especially epiphyte-laden ones or those covered with vines. The call frequently betrays the bird's presence, but even then it is often extremely difficult to see it for more than a moment.

General remarks. The abundance of suitable habitat in Java today may account for its wide range which extends from sea level to at least 1500 m. It is found in suitable places both in the cultivated parts of the island, often quite close to human habitations, and in wild country bordering well forested regions; it even penetrates primary forest.

It produces a very impressive, far carrying and hollow call sounding like "woot-woot-woot" or "boo-boo-boo". Several individuals may join in this performance.

The nest is a fairly loose, untidy, globular structure composed of coarse, chiefly grass-like plants; it has a rather small side-entrance to the nest-chamber and is generally not far above the ground (Hoogerwerf 1946, 1964a).

B 136. *CENTROPUS BENGALENSIS JAVANENSIS* (Dumont)

Lesser Crow-Pheasant or Coucal

In the reserve this small coucal sometimes shares its habitat with the preceding species when pastures or other clearings grown with tall scrub jungle borders the forest, but usually it is almost exclusively found in open, sunny places covered with tall, old lalang-grass or similar ground cover. Its pronounced preference for lalang-grass may explain its frequent occurrence in the Tjidaon-Tjidjungkulon region, the only place during the author's working period in the reserve where this plant existed in extensive monotypic stands. More often seen than the preceding species, it is flushed more easily and it likes to perch on the tops of low shrubs or clumps of lalang-grass, especially in the early morning and after persistent rain.

General remarks. Perhaps more common in Java than the preceding species. It occupies the same altitudinal range with a more pronounced preference for the lower parts of it, and it favours open sunny country where it prefers lalang-grass wildernesses, whether these be in the remotest parts of Java or in cultivated areas. It is also a regular visitor to the ricefields, even when these are close to human habitations.

The call is quite different to that of the preceding species and it does not carry far; it sounds like "hoot-hoot-hoot....tooteloot-tooteloot" "doot-doot-doot-doodoot", often followed by "tjerrok-tok-tok-tok" and "tjuuulk-tjuuulk". Occasionally frightened birds utter a repeated "tak-tak-tak-tak".

Nestsite and nest resemble those of the preceding species but the nest is smaller, often placed in dense lalang-grass or in ricefields when the crop has reached a height of at least 100 cm. (Hoogerwerf 1964 a).

B 137. *CENTROPUS NIGRORUFUS* (Cuvier)

Sunda Island Crow-Pheasant

The status of this dark-winged coucal and the red-winged one (No. 135), in the reserve, was rather confused because of the rare sight records of this species and the difficulty of distinguishing their calls.

At first it was supposed that the Sunda Island Crow-Pheasant was restricted to the tidal forests and immediate environments, inclusive the extensive stretches of swampfern (*Acrostichum aureum*), but later it became evident that the species occurs well outside the mangrove, even in the interior of the reserve at some distance from the sea.

In 1941 a single bird was thoroughly observed from a blind when waiting for banteng along the Tjikarang river, approximately half a mile from the coast. I believe that the greater part of this area is occupied by *C. sinensis*, but that the tidal forests and surroundings and also the greater part of the northern coastal plains belong to the range of this species. A thorough ornithological survey of the entire area south of the Tjihandeuleum up to the boundary of the reserve south of the Tjisimping, an area almost entirely composed of tidal forest, may prove it considerably more common than the fairly few records suggest.

General remarks. Not many particulars are available from other parts of Java; until recently it was known only from the Tjitarum estuary, close to Djakarta, and it was thought to be restricted to the mangrove and surroundings, but around 1930 it was also recorded in teak forest in Central Java. In view of the enormous stretches of tidal forest bordering almost the entire island it is reasonable to suppose that further investigations will prove this coucal considerably wider spread.

Its call partly resembles that of the red-winged coucal (No. 135), it is a booming "boo-oo-oo-oo-oo-oo" or a gloomy "doot-doot-doot", but occasionally a quite different song is uttered, an often many times repeated "kwak-kwak-kwak-kek-kek-kek-kok-kok-kok", finally dying away and resembling a cackling hen.

Little is known of its breeding habits, nestsite and nest; the nest is said to resemble that of *C. sinensis* (Hoogerwerf 1948 b).

B 138. *PHAENICOPHAEUS JAVANICUS JAVANICUS* Horsfield
Red-billed Malkoha

Probably widely distributed in the reserve, although not often seen due to its elusive habits and soft call. Most observations are from the Tjigenter area, but the species was also noted around the Njewaän and Tjidaon pastures. Chiefly found in epiphyte-laden trees or among similar tangled vegetation, enabling the birds to remain well hidden when slipping along branches and stems. From time to time the birds utter a remarkable, soft call which is only audible at close range.

General remarks. This species has a wide altitudinal range from sea level to at least 1500 m. but it is uncommon and local with a decided preference for lower elevations. It is difficult to observe because it prefers rough country with many scattered trees and shrubs, the fringes of heavy jungle and similar surroundings, especially deserted agricultural plots grown with young secondary forest and an abundance of epiphyte-laden trees and vines. It avoids cultivated areas and human habitations. It gives the impression that it dislikes flying large distances and it generally only uses its wings to volplane from the crown of one tree to that of another.

Its call is a soft "tjok-tjok", "tok-tok-tok", "ko-ko-ko-ko-ko-kerrr" or "tû-tû-tû-tû-tûrrrr" which does not carry far.

Almost nothing is known of its breeding habits, nest and nest-site in Java. The nest is said to be a small platform of twigs, resembling a pigeon's nest, well concealed among the foliage of epiphytes, climbers etc.

B 139. *PHAENICOPHAEUS CURVIROSTRIS CURVIROSTRIS*
(Shaw) Chestnut-breasted Malkoha.

More common and more widely distributed in the reserve than its smaller counterpart, perhaps also less particular in habitat, for it was observed in the coastal areas, the adjacent lowlands and the heavily wooded hills of the interior. It is less covert in habits although it too prefers trees covered with rotan and similar climbers, clumps of

bamboo and other places where a tangled vegetation or thick undergrowth make it possible to remain well hidden. When disturbed it slips with great agility and speed along branches and stems until it disappears among the dense foliage of the canopy or it glides to a neighbouring tree.

General remarks. More common in Java than the preceding species on account of its wide habitat use.

Its call resembles that of the preceding species but is louder. It is a rather inconspicuous "tok-tok-tok" which does not carry far.

The well-concealed nest is a fairly large platform composed of small sticks and twigs, resembling a dove's nest but usually more compact, and often high above the ground.

Family CAPITONIDAE

B 140. MEGALAIMA JAVENSIS (Horsfield) Black-banded Barbet.

All barbets can be recognized even blind-folded by their calls which are so characteristic that they cannot be confused.

This is one of the most widely distributed barbets in the area, found around the pastures, anywhere else in the belt of secondary vegetation, and in primary forest in the central hills. It prefers the latter region, frequenting the thick foliage of tall trees where it stays well concealed and it is usually only heard calling.

General remarks. One of the less common, or less frequently observed, barbets in Java, almost exclusively restricted to well-wooded parts of the island, including primary forest. It also frequents remote cultivated areas with a preference for deserted clearings provided tall trees are available. Although it has a wide range, and is known to altitudes of at least 1500 m, it prefers the lower parts of its range.

Its call is a very monotonous "tooloong-toompook", often preceded by a softer "kook-kook-kookkook".

It nests in holes in trees, generally high above the ground and hacks them out itself. The nestholes of barbets differ from those of woodpeckers by being rounder, less oval. Except for some wood-mould there is no lining.

B 141. MEGALAIMA AUSTRALIS AUSTRALIS (Horsfield)

Little Barbet.

Perhaps the most common barbet in the reserve, occupying the same habitat as the preceding species with a pronounced preference for the parts surrounding the heavily wooded interior, including the tidal forest where it may share the habitat of both the following species. Although when calling it may be found on an exposed perch, it more often calls from tall leafy trees.

General remarks. Up to at least 1500 m. this is one of the most common barbets outside the cultivated parts of Java. It inhabits wild country frequenting the fringes of primary forest and other remote parts of its range, especially where scattered tall trees arise from new clearings, for tall trees are essential for its well-being. In behaviour it does not differ much from the preceding species but it is less covert in habits and is more frequently seen perching in the open. Usually seen singly but in fruiting trees many may flock together, often calling simultaneously.

Its call is a far carrying, monotonous "tû-ûr-tû-ûr-tû-ûr", "tirrrrritet-tirrr" or "tjüüülk-tjüüülk-tjüüülk", often repeated *ad infinitum*.

Nestsite and nest resemble those of the preceding species but the entrance to the nest-chamber is narrower, and generally underneath a horizontal branch.

B 142. MEGALAIMA ZEYLANICA LINEATA (Vieillot)Dull Barbet.¹

More often seen than either of the preceding ones, for it avoids forests with a closed canopy and frequents open terrain with scattered tall trees or palms, the pastures and their parklike environments being extremely suitable. It is also a less shy bird, often leaving the foliage and feeding in thinly leafed trees and shrubs, sometimes fairly low above the ground. Calling birds are often seen on exposed points.

1. Or Lineated Barbet. Ed.

General remarks. Rather common in many parts of Java's uncultivated lowlands, generally not above 1000 m, though occasionally also found up to 1500 m. New clearings in remote corners of cultivated areas are very attractive and it penetrates quite far into old cultivated country, but densely populated areas are avoided as is primary forest.

Its call is a typical far carrying "bool-tok" often repeated many times; the author once heard it 80 times within 5 minutes.

Nestsite and nest do not differ much from those of the other members of the family.

B 143. MEGALAIMA HAEMACEPHALA ROSEA (Dumont)

Coppersmith Barbet.

Fairly commonly seen in the reserve but less frequent than is generally the case in the cultivated areas in many other parts of the island. Most records are from the open pasture and environments and from the coast where tall *njamplung* trees are a favourite habitat.

General remarks. The most common barbet in Java with a very extensive range, from sea level to at least 1500 m. perhaps most frequent in the lower parts of its range. It inhabits cultivated areas including villages and towns, provided tall trees are available. It also frequents the remote corners of the cultivated plains where it may occur with *Megalaima zeylanicus* and *M. australis*. Although it often seeks the seclusion of leafy treetops, it is more frequently found in the open than any other member of the family, except perhaps the Dull Barbet.

Its extremely monotonous and boring call usually uttered from a high point sounds like "koot-koot-koot-koot", "took-took-took" or "tùrrrr-tùrrrr" which sometimes is repeated 150 to 200 times or even more, once 120 calls were counted within one minute. This call makes one sleepy when heard during the hottest hours of the day, as often is the case.

Nestsite and nest resemble those of the other barbets; as with *Megalaima australis* the nest is usually underneath a horizontal branch.

Family PICIDAE

B 144. *PICUS VITTATUS VITTATUS* Vieillot

Bamboo Green Woodpecker.

One of the commonest woodpeckers in the reserve, to be found almost everywhere except in real forest. A regular visitor to the pastures and open parklike surroundings, more often seen hopping on the ground or chopping in rotten tree-stumps than in tall trees. Most observations are from the Tjigenter area where for years a pair was regularly seen without breeding being proved.

General remarks. Fairly common in the lowlands of Java, scarcer above 500 m, and perhaps not occurring above 800 m. It inhabits open, well wooded country, including cultivated areas, villages and towns, often feeding on or low above the ground.

Its far carrying call, often heard from frightened birds sounds like a penetrating "kie-ef . . . kie-ef".

Nestsite and nest resemble those of all members of the family; nestholes of this species are often found in coconut-palms.

B 145. *PICUS MINIACEUS MINIACEUS* (Pennant)

Banded Red Woodpecker.

Rare in Java, and Ujung Kulon is no exception. There is only one certain record, a bird seen on September 3, 1937 in the margin of an extensive area of tidal forest near the Tjisimping in Handeuleum Bay. Mangrove is probably the favourite habitat for this species and a thorough investigation of the many tidal forests of the reserve may prove it not so rare as the author's experience would indicate.

General remarks. Beyond the reserve this woodpecker was only rarely recorded by the author and exclusively in jungle-covered wasteland bordering freshwater swamps or tidal forest. It is a lowland bird unknown at altitudes exceeding 800 m. and perhaps more common than the few records would suggest because of its quiet habits and its preference for remote places which are often difficult of access.

The bird's call and breeding habits are not known to the present author.

B 146. *DENDROCOPOS MOLUCCENSIS MOLUCCENSIS*

(Gmelin)

Lesser Pigmy Woodpecker.

Within the reserve, which is very poor in woodpeckers, this Pigmy Woodpecker may be considered the most common though no woodpecker is truly common. It has a pronounced preference for the open coastal regions including tidal forest. Although it cannot thrive without tall trees it dislikes forest with a closed canopy. Usually solitary.

General remarks. Although perhaps less common than *Dendrocopos macei*, which strangely enough was never seen in Udjung Kulon, this small species is fairly common and widely distributed in Java. It occurs from sea level to 1500 m. displaying a distinct preference for the lowlands, especially those bordering the coast including tidal forest. Like *Dendrocopos macei*, this species occurs in cultivated densely-inhabited country and avoids forest with a continuous canopy.

Its call is a soft "took-took" or a high-pitched more penetrating "kikikikiki".

Nestsite and nest do not differ from others of the family; the nest is often found in dead branches of mangrove trees.

B 147. *DINOPIUM JAVANENSE JAVANENSE* (Ljungh)

Golden-backed Three-toed Woodpecker.

One of the commonest woodpeckers in Java's cultivated parts, but certainly not so in the reserve. There are only four certain records, two of them in the Tjigenter area; in July 1955 one was shot in the Djaman region. Found in the park-like surroundings of the pastures, and rather conspicuous especially because of their striking call. Despite the paucity of records, probably resident in the reserve.

General remarks. One of the most common woodpeckers in Java occupying an extensive range in the lowlands, but rarely above 800 m. It may be found in almost all types of reasonably wooded country, but does not penetrate far into forests with a continuous canopy. It is very common in cultivated areas including villages and towns,

General remarks. Because of its habitat, heavy jungle with a continuous canopy and forest edge, it is restricted to uninhabited or thinly populated areas, this also is a little known bird in Java. It is known from sea level to at least 1500 m. but the highest parts are less frequently visited. It may be more common in arid regions, because it more frequently occurs in the arid parts of Central and East Java than in the damp forest of the western part of this island.

It is said to produce a penetrating and extremely far carrying call "tjèw-tjèw-tjèw-kekek-kekek-kekek", "tjèw-tjèw" or "ketèk-ketèk-tjèèw-tjèèw", alternating with a nervous "kerekekekekekek-kereke-kek".

Almost nothing is known of the breeding habits. A nest containing three eggs found by E. Bartels was 1000 m. above sea level in a tea-garden, about 8 m. above the ground in a dead tree which was about 100 m. from primary forest. Among the wood-shavings found on the ground below the nesthole there was one 8 cm. long (Bartels, E. 1931).

B 150. SASIA ABNORMIS ABNORMIS (Temminck)

Malaysian Rufous Piculet.

This may be more common in the reserve than the few observations would suggest. Because of its small size, elusive habits and inconspicuous voice, it can be easily overlooked so that the three records, all from before the war, perhaps do not reflect the real situation. It was seen in forest and secondary growth with a wealth of creepers and epiphytes where the birds were in low shrubs only a few metres above the ground, behaving like other woodpeckers, hammering on twigs and stalks of Zingiberaceae etc., but occasionally their behaviour was quite different, stalking quietly about, seeking their prey in an upright position. It is assumed to be a permanent resident in the reserve.

General remarks. Despite the above, it is almost certainly rare in Java as a whole. It is known from sea level to about 1500 m. but it probably prefers the lowlands where it frequents secondary forest, clearings in primary forest and forest edge, especially if tangled with vines where it can seek the seclusion of the undergrowth.

The only call ever heard by the author was a soft "trrrr-trrrr-trrrr"; from Sumatra it is reported that its call is so soft that it is hardly audible.

Nestsite and nest are said not to differ from those of the other members of the family; in Sumatra nestholes were found both in clumps of bamboo and in trees, generally low above the ground.

TO BE CONCLUDED.



Fig. 1. Little Black Cormorant, *Phalacrocorax s. sulcirostris*, at nest in tidal forest in East Java.



Fig. 2. Pygmy Cormorant, *Phalacrocorax pygmeus niger*, at nest in tidal forest on a coral island along the north coast of Java.



Fig. 1. Booby or Brown Gannet, *Sula leucogaster plotus*; a semi-adult photographed on Gunong Api.

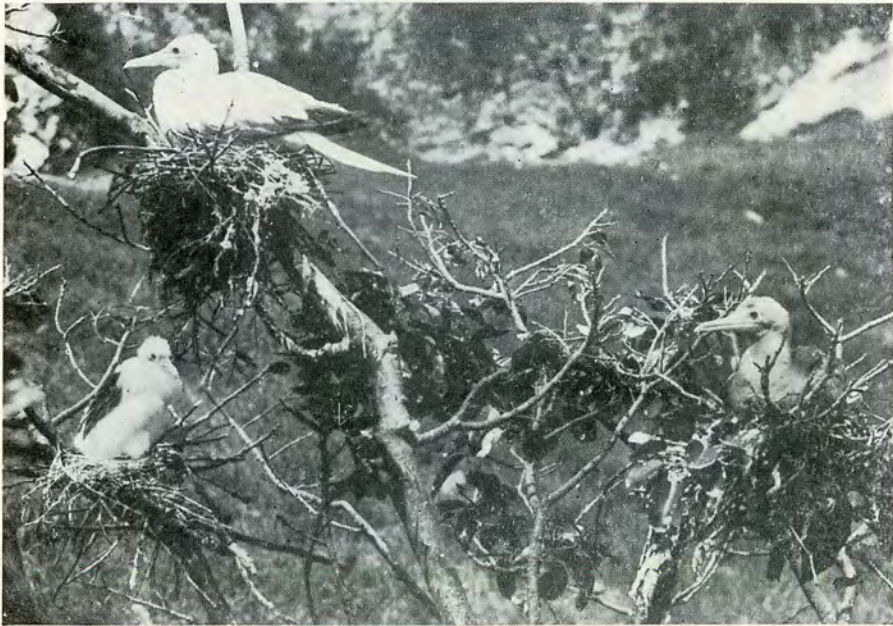


Fig. 2. Red-footed Gannet, *Sula sula rubripes*, (upper left: adult, lower right semi-adult) and Frigate Bird, *Fregata minor* (lower left: young) photographed on Gunong Api volcano, Moluccas, Banda Sea.



Fig. 1. Wood-Owl, *Strix selo-puto selo-puto*.

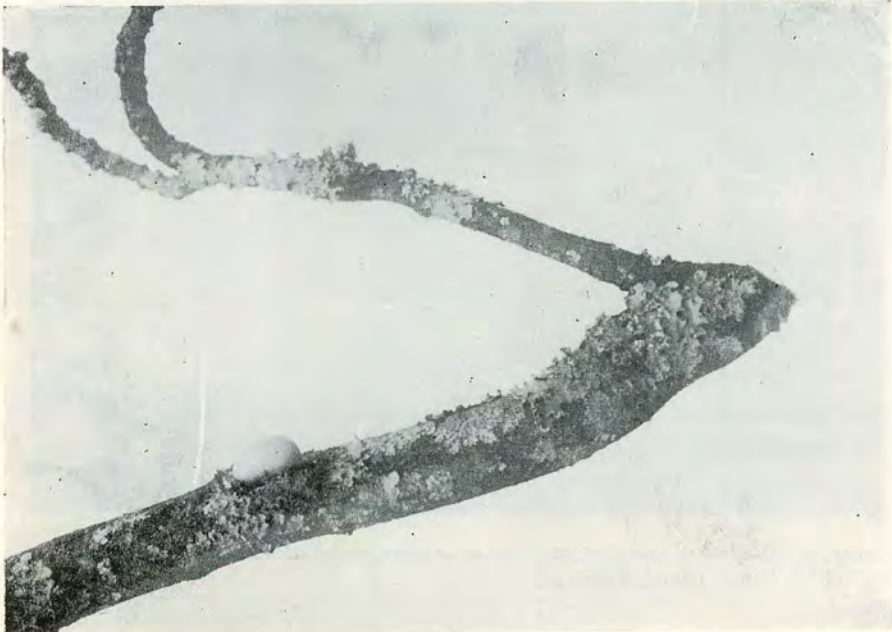


Fig. 2. The nest of the Crested Tree-Swift, *Hemiprocne longipennis longipennis*.



Fig. 1. Site of capture of pregnant female island rat, *Rattus remotas*, on floor of evergreen forest at Hinlad Waterfall, Samui Island.



Fig. 2. Habitat of ricefield rat, *Rattus argentiventer*, in rice field at Saket, Samui Island, Thailand.