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REGION, NEW GUINEA

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NATURAL HISTORY EXPEDITION TO
NEW GUINEA IN 1953-1954

E. THOMAS GILLIARD AND MARY LECI OY

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*RESULTS OF THE AMERICAN MUSEUM OF NATURAL
HISTORY EXPEDITION TO NEW GUINEA IN 1953-1954*

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INTRODUCTION

AT THE DEATH OF E. Thomas Gilliard, on January 26, 1965, the present report existed in rough manuscript form. The notes on each species are published as they were originally extracted by Gilliard from his field journal, and persons referred to in these extracts are E. Thomas and Margaret Gilliard, who made up the expedition in the field. The junior author was not a member of the expedition but assisted Gilliard in the laboratory with this collection. She has edited the report with regard to laboratory work and has compiled the present short introduction from notes left by the senior author.

The species herein reported comprise a collection of some 400 study skins and 65 pickled specimens obtained during the period from December 1, 1953, through March 3, 1954, on the middle Sepik River, New Guinea (see fig. 1).

ITINERARY

December 1	Kopar village, mouth of Sepik River
December 2	Kopar village to Marienberg
December 4	Marienberg to Angoram
December 10	Angoram, Yuarama, Kambrindu to Krinjambi
December 11	Krinjambi, Kanduwanam, Tamberum to Timbunki
December 12	Timbunki to Kanganaman
December 12 to February 27	Kanganaman village, base camp
January 16	Palimbai
January 18	Soatmeri
January 25-27	Aibom and Kararau
January 28-29	Malingai
February 8-9	Gaikarobi
February 27	Kanganaman to Mindabit
February 28	Mindabit, Timbunki, to Yuat River and Branda village
March 1	Branda to Angoram
March 2	Angoram, Marienberg to Kopar
March 3	Kopar to Wewak

Ten years later, April 11-15, 1964, during a canoe trip down the Sepik from Ambunti (approximately 300 miles from the delta) to Kanganaman and then to Angoram, ornithological observations were made by the senior author, but no specimens were collect-

ed. Some of these observations are included in this report.

COLLECTING LOCALITIES

Kanganaman village, the base camp of the 1953-1954 expedition, is situated in riverine forest on the north bank of the Sepik River, 190 miles from the mouth, and is on ground only inches above that covered by the Sepik in its normal high-flood stage in April. Swamplands behind Kanganaman are flooded in the wet season from December to April, and paths, which are foot paths during the dry season, are at this time navigable by native canoe. Mosquitoes present a terrible problem; they are always present in tremendous numbers, with daily peak periods just after dusk and at dawn. A collector in this area must be supplied with a netted house of the very finest weave and with a sufficient supply of insect repellent.

Palimbai village was visited by the expedition many times. This village is across the Sepik and is situated on the banks of a long, narrow *baret* (a more or less permanent channel through floating vegetation; sometimes called a *barad*) leading southward from the main Sepik River. This village and Kanganaman are two of the several villages upon which Gregory Bateson's book "Naven" (1936) was based. At another time, one day was spent at Malingai village, which is reached via the same *baret* and Malingai Lake.

Soatmeri village, 205 miles from the Sepik delta and one hour and 40 minutes by motorboat upstream from Kanganaman, was the farthest point from the mouth of the river visited by the expedition.

A three-day trip was made to Aibom and Kararau. Aibom is reached via Kamalio *baret* on the south side of the Sepik River and downstream about 40 minutes by motor dinghy from Kanganaman. Kamalio *baret* opens out into Chambri Lake in which float masses of water lilies and rafts of grass, up to one-half mile in diameter. Aibom is near the banks of this large lake and is the focal point of pottery making on the Sepik. Kararau was visited on the return to Kanganaman. It is on

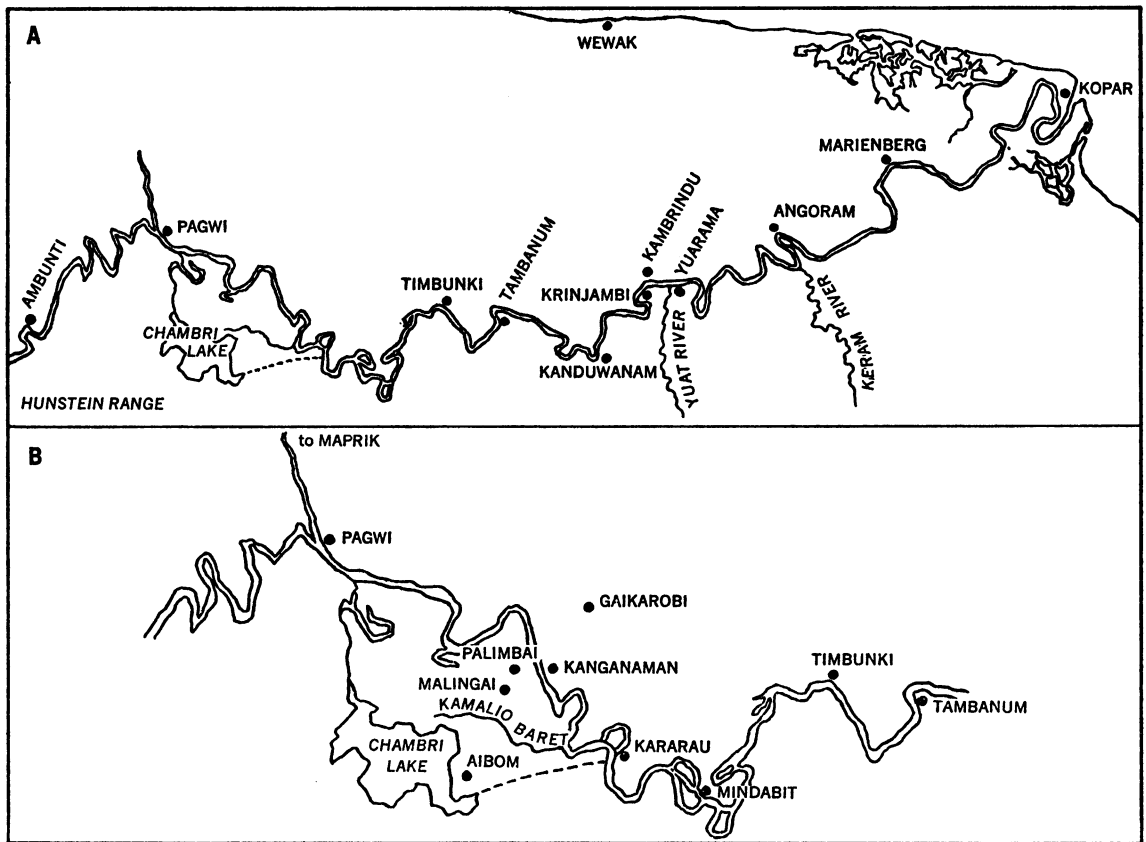


FIG. 1. A. Sepik River, showing the total area covered by the expedition. B. Enlargement of the area between Tambanum and Pagwi, showing the main collecting localities.

the north side of the river, about 40 minutes downstream from Kamalio *baret* and about 6 miles from the main channel, on the banks of an old channel.

Gaikaorobi village is situated north of Kanganaman on the edge of the swamplands which separate the riverine forest from the middle Sepik grassland plain (for a more complete account of this area, see Reiner and Robbins, 1964). It is well concealed and is reached by paths cleared by natives or by dugout canoe. In February, with the Sepik within 2½ feet of overflowing its highest banks, the paths were usually so flooded that the entire distance could be traversed by dugout (a five-hour trip). During the dry season (June to November) the entire region, except perhaps some of the grassland immediately north of Kanganaman, can probably be walked over. As a matter of fact, drinking

water may be very scarce. Gaikaorobi is a trading vaillage which supplies many villages with *sak-sak*, a starch staple. In return the river-edge villages supply fish to Gaikaorobi.

During the descent of the river in February, a short side trip was made up the Yuat River, on the south side of the Sepik, to Branda village, where navigation ceases for all but small boats.

Angoram and Marienberg were stopovers on the lower Sepik, during both ascent and descent of the river. Each is situated on a heavily forested ridge approximately 200 feet high rising along the north bank of the river. Between these localities (about 7 miles above Marienberg) is the Marienberg Mission logging camp of Mamber. This area is covered with original forest of first quality, and these three localities comprise the only high ground along the Sepik from its mouth to Ambunti

(some 300 miles) at the head of the main river. They are also the only villages that have European settlements.

In 1964 ornithological observations were made by the senior author on the Sepik between Ambunti and Angoram. At this period, near the end of the wet season, the river was in high-flood stage. At Kanganaman, in December, 1953, the expedition camp had been placed on a bank 17 feet above the river surface. In April, 1964, this bank averaged 3 inches above the surface. Birds were scarce, perhaps because the river was overflowing its banks and most perching areas were covered with water. About 100 floating islands (varying in size from 10 feet in diameter to about 150 feet long by 30 feet wide) were observed in the rapidly flowing water. Very few birds were observed on such islands.

HISTORY OF COLLECTING ON THE SEPIK RIVER

The first ornithologist to visit the Sepik region was Karl Hunstein, who, as a member of the first German expedition to the Sepik, collected on the lower and middle Sepik in 1887. He ascended the Sepik to approximately the location of Ambunti and also collected in what is now called the Hunstein Range, south of Ambunti. His specimens are in the Zoologisches Museum der Humboldt-Universität, Berlin.

The next ornithological collection was made by L. Schultze-Jena in 1910. He collected in western Kaiser Wilhelmsland (now Territory of New Guinea), but apparently many of his specimens were lost. The remainder are in Berlin.

In 1912 and 1913, Bürgers made a comprehensive collection of 240 species (3100 specimens) mostly on the middle and mid-upper Sepik, although some were collected on excursions into nearby mountains. These specimens are also in Berlin. (For an account of this collection, see Stresemann, 1923.)

In May, 1929, the Crane Pacific Expedition (W. A. Weber and F. C. Wonder) visited Marienberg and the Keram River and obtained a small collection of birds. These are in the Chicago Natural History Museum (see Mayr and Camras, 1938).

In February, 1930, the Eichhorn brothers collected specimens in the middle Sepik

region. A few of these specimens are in the American Museum of Natural History.

Since the American Museum expedition herein reported, there have been two other ornithological surveys in the area. The Division of Wildlife Research of the Commonwealth Scientific and Industrial Research Organization in collaboration with the John Curtin School of Medical Research, Australian National University, has made four collections in the middle Sepik region near Maprik and Pagwi and along the main river. Mr. W. B. Hitchcock has most kindly supplied the following information concerning this survey. The dates and collectors are as follows: May and November, 1962, W. B. Hitchcock; May and June, 1963, K. Keith; October and November, 1964, W. H. Ewers; April and May, 1965, W. B. Hitchcock. In all, 73 species were obtained; these are deposited in the Division of Wildlife Research, Commonwealth Scientific and Industrial Research Organization.

In 1963, Philip Temple made a survey of the avifauna of the Sepik Valley for the Bernice P. Bishop Museum, Honolulu.

ACKNOWLEDGMENTS

The Gilliards were extended many courtesies by numerous people in New Guinea. In particular, Sir Donald M. Cleland, the Administrator of Papua and the Territory of New Guinea, by his personal interest and his cooperation and aid, contributed much to the success of the expedition. Mr. Alan Roberts, then Acting Chief of Government Services; Mr. Sydney Elliott-Smith, District Commissioner; and Mr. Jock McGregor, Patrol Officer at Angoram, were also very helpful. Those assisting with transportation were Mr. Les Ingle, captain of the M. V. "Kulau"; Mr. Johnnie Young of the M. V. "Glenidol"; Mr. George Elias of the M. V. "Poppy"; and Father Jilek of the M. V. "Marova." Others who helped in various ways were Mr. N. D. Bartlett; Mr. Hugh C. ("Shanghai") Brown; Mr. Claude Champion; Mr. Fred Eichhorn; Mr. and Mrs. Peter England; Dr. Charles Haszler; Mr. Don Henderson; Father Kowalski; Mr. Lee, Chief of Customs, Port Moresby; Mr. Chu Leong; Mr. Nicholas Minster; Mr. and Mrs. E. D. Robinson; Father Otto Shelly; Mr. Thomas Warburton;

and Mr. Peter Wenkie, Assistant District Officer, Ambunti. The assistance of these friends and of others too numerous to mention is hereby most gratefully acknowledged.

Financial support for this expedition was generously furnished by the National Geographic Society, the American Museum of Natural History, the C. R. Vose Exploration Fund of the Explorers Club, and the Frank M. Chapman Memorial Fund.

The junior author wishes to thank all those persons who have helped in the preparation of this manuscript for publication, after the death of Dr. Gilliard. In particular she wishes to thank Mrs. Gilliard for reading the Introduction and adding information from her notes and for her support and encouragement. To Dr. Dean Amadon special thanks are due for the many hours he has spent on the original manuscript; without his help this paper would not have been possible. She also wishes to thank Mrs. Margaret Hanson for her help in the preparation of the manuscript.

NATIVE ASSISTANTS

The team of native assistants was composed of seven men from the village of Kanganaman: Rambur, Mava, Avaran, Tsimbat, Pono, Kranchungo, and Matasava. These men were trained in expedition hunting methods and in the technique of skinning birds. They proved very capable, and some accompanied the senior author on several subsequent expeditions to New Guinea and New Britain.

DISPOSITION OF SPECIMENS

All specimens that were collected are in the American Museum of Natural History except that one example of each species is deposited with the Department of Agriculture, Stock and Fisheries, Port Moresby, Papua, in accordance with the terms of permits issued to the expedition by the Department of Customs of Papua and the Territory of New

Guinea. Small collections of mammals and of reptiles and amphibians were turned over to the appropriate departments of the American Museum for identification.

LIST OF SPECIES REPRESENTED BY PICKLED SPECIMENS

*Phalacrocorax melanoleucos melanoleucos*¹
Notophox picata
Egretta intermedia plumifera
Dendrocygna guttata
Megapodius freycinet affinis
*Rallina tricolor tricolor*¹
Actitis hypoleucos
Chlidonias hybrida fluviatilis
Ptilinopus coronulatus quadrigeminus
Megaloprepria magnifica septentrionalis
Goura victoria beccarii
Micrositta pusio beccarii
Probosciger aterrimus stenolophus
Ninox connivens assimilis
Podargus papuensis
Dacelo gaudichaud
Tanyptera galatea meyeri
Merops philippinus salvadorii
Hirundo tahitica frontalis
Coracina papuensis papuensis
Todopsis cyanocephala doheriyi
Gerygone magnirostris affinis
Rhipidura leucothorax leucothorax
Rhipidura rufiventris gularis
Rhipidura leucophrys melaleuca
Monarcha alecto chalybeocephalus
Pitohui ferrugineus ferrugineus
Aplonis metallica metallica
Mino dumonti dumonti
Oriolus szalayi
Cracticus cassicus cassicus
Dicrurus hottentottus carbonarius
Seleucides ignotus auripennis
Paradisaea minor finschi
Nectarinia sericea sericea
Nectarinia jugularis frenata
Xanthotis chrysolis philemon
Lichmera alboauricularis olivacea
Philemon novaeguineae jobiensis
Lonchura grandis ernesti

¹ No study skins.

ANNOTATED LIST OF BIRDS OF THE MIDDLE SEPIK RIVER

VERNACULAR ENGLISH NAMES are given for each species, and native names are given after a semicolon. All measurements are in millimeters and weights in grams unless otherwise indicated. The names of species observed but not collected are enclosed in brackets. In a few cases, specimens were collected at Wewak on the north coast of New Guinea and are so noted in the accounts of the relevant species.

CASUARIIDAE

[*Casuarus unappendiculatus* ssp.?]

SINGLE-WATTLED CASSOWARY; AMIAH

In April, 1964, a pet of this species was observed at Kanganaman village. It was brown, approximately 3 feet tall, and had the naked portions of the head pale yellow. A single pallid wattle about $\frac{1}{2}$ inch long hung from the fore neck. This bird had been taken at Gaikarobi six to eight months before, when the adult accompanying two chicks through the forest was shot.

PODICIPIDAE

Podiceps novaehollandiae incola Mayr

LITTLE GREBE; GONYAV

Weight: Male, 199.

Not uncommon on inland lakes. Reported by Sepik natives to nest on mounds of floating vegetation in Chambri Lake from December through February. *Podiceps novaehollandiae* is readily distinguishable from *P. ruficollis tricolor* by the smaller bill and darker, less extensive patches on the neck.

PHALACROCORACIDAE

Phalacrocorax sulcirostris (Brandt)

LITTLE BLACK CORMORANT; MAN

Wing: Male, 249; females, 236, 240.

Abundant in the middle Sepik region, at least between December and March. In April, 1964, this species appeared much rarer.

About 8:00 P.M., January 21, at Kanganaman, a black cormorant crashed into the coconut trees which grew around our skinning tent, a few feet from the river's edge. After changing its perch several times and crashing about, it landed within the superstructure of our shed (a covering of morata palm built

over our netted tent) and was there caught by hand. Akus, who made the capture, informed me that cormorants frequently fly to lights at night and that it is common practice on the Sepik for the natives to build large fires along the shores to attract the cormorants. When conditions are right they are said to fly directly into the flames. Not 10 minutes after Akus had made his capture, Avaran appeared in camp with another live cormorant which, he said, had just flown into his house, drawn there by his kerosene lamp. This recalls the use of fires to lure in and catch *Pterodroma hasitata* in the mountains of Hispaniola (Wingate, 1964, p. 154).

Phalacrocorax melanoleucos melanoleucos
(Vieillot)

LITTLE PIED CORMORANT; MAP-MA

Pickled specimen.

Several flocks of up to 18 individuals were observed flying over the Sepik River at sunset.

ANHINGIDAE

Anhinga rufa papua Rand

AUSTRALIAN ANHINGA OR DARTER; GIRAN

A not uncommon, solitary species in Chambri Lake and in lagoons bordering the Sepik River.

ARDEIDAE

Notophox picata (Gould)

PIED HERON; KOWHAT

Weight: Male, 247, approximately 280; female, 225, 242.

This was the commonest heron in the middle Sepik region. It was often seen on grass islands and logs that drifted past our camp at Kanganaman, and sometimes it occurred along the river in flocks.

Egretta alba modesta (Gray)

GREATER EGRET; SOWOUN

Fairly common along the grassy edges of inland rivers and swamps.

Egretta intermedia plumifera (Gould)

LESSER EGRET; SOWOUN

Iris palest yellow to yellow; bill golden

yellow; feet black; skin on face citron yellow. Molt: Medium general (one); heavy general (one, testes enlarged).

Common. Often encountered alone or in small flocks along the edges of the swiftly flowing Sepik or just back from the river along the *barets* and on rafts (*congo*) of buoyant vegetation. Rambur reported that this species nests in large rookeries near the villages of Soatmeri and near Tambanum. Solitary birds hunting at the edge of the river when disturbed by a motorboat are apt to fly up repeatedly from the water, go ahead 100 yards or so, then land at the edge of the water.

Nycticorax caledonicus hilli Mathews

RUFIOUS NIGHT HERON; MAMOW

Fairly common in isolated swamp trees well back from the river bordering lagoons and small waterways.

Dupetor flavicollis gouldi (Bonaparte)

BLACK BITTERN; PERU

Common along the edges of the smaller waterways, ponds, and swamps bordering the middle Sepik.

ANATIDAE

Dendrocygna arcuata (Horsfield)

WHISTLING TREE-DUCK; YAR

Common in shallow, grassy lagoons and marshes bordering the middle Sepik River, but much less numerous than *D. guttata*.

Dendrocygna guttata Schlegel

SPOTTED TREE-DUCK; MA MINE

Abundant in shallow, grassy lagoons and marshes bordering the Sepik and in Chambri Lake. Johnnie Young, a veteran hunter-trader of the Sepik region, informed me that this species occurs in "countless millions" in the Sepik Valley. According to native informants, the Spotted Tree-duck nests in holes high in trees near water during the time of high water. In late afternoon large flocks were often seen flying over the Sepik River. Not infrequently during the day one or two birds flew in from the river to land 30 to 60 feet up on the main limbs of a large clump of trees growing 30 to 150 yards in from the

Sepik near our base camp. In late December and January at least six live *Dendrocygna* ducklings were seen in the hands of Kanganaman village children, who valued them as pets.

Anas superciliosa pelewensis Hartlaub and Finsch

BLACK DUCK; DOBA

Wing: 214, 226. Our birds agree in size with the smaller *pelewensis* from northern New Guinea (see Amadon, 1943, p. 4). The male with wing measuring 214 is probably not fully adult.

Apparently widespread but thinly distributed in one's, two's, and three's in marshes, ponds, and lakes bordering the middle Sepik River. The smaller specimen was one of three swimming confidently among water lilies in a small pond in which three native women were washing sago pulp.

Nettapus coromandelianus coromandelianus (Gmelin)

COTTON PYGMY GOOSE; KANDUKARAT

Common in January in flocks of from two to 10 swimming among the water lilies of lagoons and shallow lakes cluttered with floating vegetation of the middle Sepik region.

Rand (1942a, p. 293) found a curious paucity of ducks on the extensive marshes of the middle Fly River (two tree-ducks only). A similar situation prevails on the middle Sepik where we found four species only (two tree-ducks, the Cotton Pygmy Goose, and the Black Duck).

ACCIPITRIDAE

Haliastur spheonurus (Vieillot)

WHISTLING KITE; AMBOCAPI

Common in river-edge trees bordering the Sepik. Usually in small groups which tend to converge over burning cane-grass fields, but also observed in flocks of up to 10-15 feeding on floating carrion and insect larvae (chiefly mayflies) in the vicinity of Kanganaman.

On the trip to the Sepik region on November 19, 1953, at Lae, the senior author described the flocking and hunting characteristics of this species as follows: "Prior to our departure from the Lae wharf, we watched

some 35 Whistling Kites as they soared about the ship in search of refuse. The species is a skilled flyer. Frequently a soaring bird would dive toward the water from 50 feet, wings furled, then open the feathers in the nick of time, a foot above the sea. With deft motions the yellowish feet were then thrown far forward so that the bared claws could be swung backward to grasp a floating target as the bird swept by. Rarely was the object missed. Then with a few powerful sweeps of the wings the kite ascended 50-70 feet upward, there to soar again with seeming effortlessness. Now with almost blasé casualness, the head would be lowered, reach back to the suspended feet, and then while the kite soared in perfect balance, the capture would be methodically pulled apart and eaten. The head remained down and almost inverted for seconds at a time, busy at one task while the business of flying seemed to take care of itself.

"There can be no doubt that *Haliastur sphenurus* derives a major part of its food from the water in the form of floating carrion. Northeast of the Lae wharf 400 yards, in a stand of tall trees hugging the water's edge, I noted about 35 birds roosting. When the wind moderated or there was little food being tossed from the ship, all of the kites in the vicinity settled in these tall trees. Although chiefly a bird of the seacoast, shores of lowland lakes and rivers, particularly near grassland, the whistling Kite also occurs over the manmade grasslands of the Wahgi Valley."

On the way to New Britain in 1958 the senior author again visited Lae, where he made the following observations of this species, October 23: "Flock of about 10 Whistling Kites were seen in the early-morning light perching on dead tree limbs and spires of the forest edge just inside the forest of the bay edge. At 7:30 A.M., following a very wet night, the birds seemed as adverse to flight as wet vultures on a windless day. These birds have long been numerous about the Lae wharf, where they feed on refuse, much of it from ships.

"October 29: A flock of 34 Whistling Kites was observed circling over the forest edge of the Lae Botanical Gardens at 6:45 A.M. Circling with them and hunting in the same way were two other species of kites, one *Milvus migrans* and one *Haliastur indus*.

Watching through glasses I noted that the birds would soar several hundred feet, often in a circle or S course, and then flap the wings. Often the course was peculiarly erratic, and each bird was frequently seen to bring the legs forward from their usual riding position up against the under tail coverts. Sometimes they dangled slightly and were then tucked back again, but usually they were shot forward like pistons to a position under the chin. Next the head went down and the bill cut into something held in the feet. After watching for some minutes I concluded that the flock of 34 birds which flew over the juncture of field and forest edge was catching and eating flying insects. Both the birds and the insects were presumably riding on an updraft caused by the vegetational wall.

"October 30: At about 8:00 A.M. in beach-edge forest near the Lae wharf we found a concentration of 24 Whistling Kites perched so close together in the top of a vine-shrouded tree that a 15 by 15 by 20 foot cage would have enclosed them all. They sat very quietly 20 to 30 feet up, their mouse-brown-colored plumage blending well with the shadows. First we saw four birds, then more were seen, the number 14 was entered in my notes, then 19, and finally Margaret carefully studied the flock, moving about a bit to see better into the shadows, and counted 24 birds. The protective coloration of the flock is as excellent as their choice of perches. Their notes are high-pitched, wavering whistles of not much volume. As we were leaving the area, the flock appeared near the wake of a steamer docked at Lae wharf. The birds now often flew down to the water's surface and delicately touched it with extended legs in order to snare floating food which they pulled apart and devoured in flight."

It would be interesting to compare the ecologies of the three Kites, *H. sphenurus*, *H. indus*, and *Milvus migrans*, in areas where they overlap or meet. Thus, in Queensland, we are told by D. Amadon, *migrans* seems to be found in drier areas, *sphenurus* in moister areas inland, and *indus* on the immediate coast and on the coastal islands. This report does not coincide with what we found in New Guinea. In the Philippines, where the other two species are absent, *indus* ranges well inland.

***Milvus migrans affinis* Gould**

BLACK KITE; AMBOGAVI

Apparently rather uncommon along the Sepik River. Seen only a few times. A specimen was shot as it flew low over our Kanganaman camp again and again, apparently attracted by a tethered *Paradisaea minor*.

***Accipiter novaehollandiae leucosomus* (Sharpe)**

GRAY OR WHITE GOSHAWK; PIAM-PIAM

Fairly common in the forests and forest edge bordering the Sepik River.

Accipiter fasciatus polycryptus

Rothschild and Hartert

AUSTRALIAN GOSHAWK; PIEM PIEM

Reputed to take chickens from Kanganaman gardens, also small ducks.

***Haliaeetus leucogaster* (Gmelin)**

WHITE-BELLIED SEA EAGLE; GOWIE

Not uncommon in the middle Sepik region and reported by native hunters to nest in tall trees bordering Chambri Lake. Usually encountered alone or in pairs flying over the river or perching for long periods in the tops of living or dead trees overlooking water. Natives reported that the White-bellied Sea Eagle feeds on fishes, snakes, small crocodiles, and even on river-borne carrion, including the corpses of men.

My first sight of this species in New Guinea was on November 19, 1953, when I found one perched 60 feet up in the bay-edge forest at Lae. On October 23, five years later, I watched a solitary bird flying over the Huon Gulf near Lae only to have it turn shoreward and land to perch for a long while in virtually, if not the same, tree, and some days later presumably the same bird was still present.

On March 13, 1954, beneath the sea cliffs of the town of Wewak, I filmed a sea eagle which carried a 3-foot snake, probably a sea snake, in its claws for some five minutes. During this period it flew along the coast, landed for a minute or so in a tall, dead, beach-edge tree, then, seeming to lose its balance, it fell off into flight and flew on with the snake still dangling. Sea snakes are a staple food of this eagle in some areas.

MEGAPODIIDAE***Megapodius freycinet affinis* Meyer**

COMMON SCRUB HEN; SIROQUA

Abundant in the swamp forests bordering the middle Sepik River and encircling the village of Kanganaman. From the center of the village and from our camp at the river's edge, scrub hens could be heard calling day and night. Mounds, each the prized property of a Kanganaman resident, were scattered throughout the swamp forests. Some were situated within 100 yards of the village. These mounds were jealously guarded possessions, and the local residents of Kanganaman made it clear that no birds were to be killed anywhere near the mounds, all of which were being systematically cropped for eggs.

Calls heard at 3:45 P.M., February 21, were carefully recorded, as follows: Male(?), "kok, nyacal, nailleue" (ascending to a high screech). Female (?), a stutter delivered in duet with the peal of the male and beginning just after the male began and continuing throughout the call—"nu-nu-nu-nu-nu." These duetted calls were heard at all hours of the day and night, but were most prevalent on moonlit nights. Often at night the birds called within 200 feet of my tent (which was just outside the forest and about 150 feet from an occupied mound) and from sound orientation I determined that the birds kept closely together in pairs. In fact, it was only rarely that the call of the female seemed to emanate from a distance of more than 10-20 feet from that of the male. Most times, the sounds seemed to come from birds standing almost side by side.

According to usually reliable native lore, the Common Scrub Hen lays throughout the year except during periods when the river overflows its banks, flooding the swamp forest (often in February and March). Rambur said that the birds, after laying the egg and covering it, return many times each day to straighten the nest, and to add material which is scratched backward by both birds to the mound. I have watched the scratching motion very closely from a blind. The bird stands on one foot and, with the other, makes repeated long scrapes from front to back, its back and shoulders sawing with each stroke. Then, having examined the cleared area for

food, it stands on that area and scrapes with the other foot, again repeatedly.

The eggs are laid in holes which are sometimes 4 feet deep. Sometimes two or even three pairs of birds lay in a single long mound, but usually only a single pair occupies a mound. A mound can be used immediately after its construction; one that is left undisturbed will be used for many years.

The "owners" of a mound remain in the vicinity most of the day. If they go off to feed in the morning, they return by noon, then feed, then return two or three times during the rest of the day. If the male or female is killed, a new mate appears in quick time and work continues on the mound, sometimes within the month. If the male and female are killed, a new pair arrives in the mound area, usually within the year. The female lays about one egg every two or three weeks.

On February 23 at noon I visited a nest mound just behind Kanganaman base camp and there saw one of a pair of birds (Rambur saw both) which had been clearing ground and fixing the mound. Limbum palms and tall swamp trees formed a canopy over the mound, which was 12 feet in diameter and about 3 feet high.

Talegalla jobiensis longicauda Meyer

BROWN-COLLARED BRUSH TURKEY; WALING

Weight: Males, 3 pounds, 6 ounces; 3 pounds, 8 ounces.

Iris brownish red; bill and naked portions of neck dark rose; naked portions of face deep sooty red; legs and feet bright orange-red; nails flesh. The immature has the iris dark brown.

According to native lore these birds build a small mound, but sometimes put their eggs in a mound of *Megapodius freycinet* (in the narrow area where the ranges of the two species overlap). Fairly common on the floor of original forest on higher ground well back from the Sepik. Their food is chiefly surface or subsurface invertebrates of the forest floor.

RALLIDAE

Poliolimnas cinereus minimus Schlegel

WHITE-BROWED RAIL; SOOWAY

Found in grass bordering swamps and lakes, especially in "pit pit" cane grass where

they walk on bent stems as well as on the ground. According to native lore, usually in pairs.

Rallina tricolor tricolor Gray

RED-NECKED RAIL

Two badly shot specimens were preserved in spirits.

Gymnocrex plumbeiventris plumbeiventris
(Gray)

BARE-EYED RAIL; KUNDIAKUT

Native informants at Kanganaman told me that this is a common but very shy species of swampy and marshy grasslands bordering the Sepik River. Rambur reported that it usually occurred in pairs and that it nests during the period of low water, building a nest of grass on the ground in which it lays white eggs.

Amaurornis olivaceus moluccanus (Wallace)

RUFOUS-TAILED MOORHEN OR
GALLINULE; YAMBA

Iris reddish brown to rusty brown; maxilla brownish above, with light greenish yellow below; mandible yellow-green to jade green; feet yellowish tan to gold-yellow.

Reported by the natives at Kanganaman village to be quite common in grass bordering marshes and swamp forest, and to place its nest in such grass, just above the ground. The stomach of one specimen contained many small green (grass?) seeds.

Gallinula tenebrosa neumanni Hartert

DUSKY MOORHEN OR GALLINULE; DACK-DACK

Male: Wing, 170; tail, 61; culmen from rear of forehead shield, 42; tarsus, 57. Female: Wing, 161; tail, 61; culmen from base of forehead shield, 43; tarsus, 53.

Iris dark brown; bill red, with yellow on tip; forehead shield orange; "legs" yellow-red, with gray or brown lineations; toes orange and brown or yellowish gray.

Apparently the Dusky Gallinule is fairly common in marshy vegetation bordering lagoons and lakes on both sides of the Sepik River in the vicinity of Kanganaman.

These specimens show a strong trend in the direction of smallness and brighter pigmentation of the bill and forehead shield. If supported by additional material it will become

necessary to name the Sepik population. In the meanwhile we consider our birds to represent an eastward extension of the range of *neumannii*, a race known heretofore only from Sentani Lake.

***Porphyrio porphyrio melanopterus* Bonaparte**

PURPLE SWAMP HEN; UNDA-MAYLEE

The Purple Swamp Hen is rather common in the middle Sepik region. My first encounter occurred as we breasted the 3-knot current above Tambanum. Taking advantage of the calmer waters near shore, we skirted the shore rather closely. Not infrequently the large blue-purple birds with their scarlet frontal shields and scarlet legs, climbed up out of tall grass and bushes, clung clumsily 6 to 10 feet up and watched us fearlessly as we passed. This species was observed on floating mats of vegetation fringing the main river, on islands floating down the river, on vegetation fringing inland lagoons, in native gardens bordering the Sepik, and in stands of cane grass and swamp bushes. I observed it to swim with ease when cornered. If the calls the natives attribute to this species are correct, it is very noisy at night, especially on bright nights.

In 1964, during a period of high water, this species seemed much less common.

JACANIDAE

***Irediparra gallinacea novaeguinae* (Ramsay)**

JACANA; CHIRIS

Weight: Male, 94; female, 149.

Iris pale yellow to pale tan, bill white, with a black tip; crest flesh shading to yellow at the head (female), purplish rose with pale yellow near bill (male); ring around eye sky blue (female); feet medium gray to yellowish gray.

Common on the floating vegetation of lakes, *barets*, and marshes. Usually in small flocks. Once observed on a pond within the town limits of Madang. There a single individual was seen moving slowly over the swamp vegetation. As it progressed it lifted one foot and appeared to wave the toes in front of itself, then put the foot down, as though this were some sort of hunting mechanism.

In flight this brownish bird appears generally black, with a yellow head and shoulders. Its legs hang in a sagging position, and the rapidly fluttering bird usually drops into the short grass out of sight after flying a short distance.

CHARADRIIDAE

***Lobibyx miles* (Boddaert)**

MASKED PLOVER OR LAPWING; GRAIN-GRAIN

Iris lemon yellow; bill pale yellow, with brown tip on the maxilla; wattles bright yellow; feet grayish pink, with gray scales.

Fairly common in flocks of from three to 10. A large flock was observed and photographed as it fed in short grass bordering the ocean at Bogia near the mouths of the Sepik-Ramu rivers. At Kanganaman the sharp cries of this species flying over the grassy edge of the river were often heard, particularly on bright nights, and occasionally a night-traveling Masked Plover became ensnared in an expedition net set for bats. One that I liberated stood quietly as I attempted to touch it, then suddenly it hammered my hand with a flurry of rapid wing movements. To my surprise, I found myself bleeding from several deep punctures the little bird had made with its sharp wing spurs.

***Pluvialis dominica fulva* (Gmelin)**

PACIFIC GOLDEN PLOVER

Common in flocks of from four to eight or more in short grass at the edge of Wewak airport. Observed in November at Lae, and in March and April at Nondugl (at 5200 feet; see Mayr and Gilliard, 1954, p. 336). A migrant.

SCOLOPACIDAE

***Actitis hypoleucos* (Linnaeus)**

COMMON SANDPIPER; NUM-BUNG-GANJA

Fairly common on islands of vegetation drifting down the Sepik during the wet season. Usually solitary. Of seven birds seen during a two-hour walk along the Wewak shore, one was on the beach proper while the others were on mud islands in the edge of mangrove swamp. Of four specimens collected, two were from Wewak. This species is a migrant.

LARIDAE***Chlidonias hybrida fluviatilis* Gould**

MARSH TERN OR WHISKERED TERN; GANJA

Common. At low water large flocks are sometimes seen hunting insects, particularly mayflies, over the river. Often perch on sticks close to water. According to native lore these birds do not nest in the middle Sepik River valley.

On a canoe trip between Ambunti and Kanganaman in April, 1964, during a period of very high water, concentrations of this species were encountered in areas of disturbed water where the Sepik took sharp turns. They flew in circles 5 to 40 feet above the whirling water and dropped suddenly to the surface to capture food. In areas where there was no flotsam or trees these terns were observed perching on the seed heads of pit pit grass.

COLUMBIDAE***Ptilinopus coronulatus quadrigeminus* Meyer**LITTLE CORONATED FRUIT DOVE;
COO-GOO-ROO-IT

Wing: Males, 105.5, 110, 111, 112; female, 109. Weight: Males, 74.5, 83, 90; female, 69.

Iris gold to yellow; bill yellow-green to olive green; eye ring yellow; skin on face gray-green to pale green; feet dull rose to wine red; cere gray-green.

A nest with one egg was found January 3, 50 feet inside swamp forest at the edge of the Sepik River. It was a frail platform of sticks laid on the top of a limbum-palm frond 5 feet above muddy ground in an area of tall open forest with a rather solid undergrowth of limbum palms. An adult with a pink and yellow forecrown was seen on this nest several times, and efforts were made to photograph it on the egg. However, on January 9, a gusty wind shook the palm frond as we sat in the blind, and the egg tumbled out. It held a well-advanced embryo.

This is a common species about Kanganaman.

***Ptilinopus iozonus jobiensis* Schlegel**

ORANGE-BELLIED FRUIT DOVE

Weight: 98, 116.

Iris yellow; bill greenish yellow or gray and yellow; cere dull gray-green; skin around eye gray; feet dark rose.

***Ptilinopus aurantiifrons* Gray**

ORANGE-FRONTED FRUIT DOVE; CO-GOUR-LUVIT

Weight: Males, 157, 173; female, 148.

Iris red-orange, red-orange with yellow around pupil, or yellow-orange; bill yellow to greenish yellow; cere red to wine red; skin around eye yellow; feet dull rose to wine red.

Common. A nest with one egg was found January 26 in Kanganaman village. It was a frail structure of sticks in a thorny bush some 8 feet up in the substage of fairly open tall forest. A color photograph of an adult with the orange-yellow forehead was made as it sat on the nest.

***Megaloprepria magnifica septentrionalis* Meyer**

MAGNIFICENT FRUIT DOVE; CHANGUMAI

Weight: Male, 192; female, 161.

Iris scarlet to ruby red; cere red; skin around eye yellow-green to pale gray washed with yellow; bill yellow to yellow washed with green; feet green or gray washed with yellow.

Probably a very common species. The Magnificent Fruit Dove, being a bird of the true forest where it usually is encountered alone, seems much less common than it actually is. Three nests were found in the vicinity of Kanganaman. At each an adult was observed incubating a single egg. December 16: Nest far out on a heavily leafed limb 25 feet up in tall swamp forest at edge of forest-floor pond. December 20: Nest, a frail structure of sticks balanced on the top of sago-palm frond 10 feet above ground in a thick sago-palm grove. January 25: Nest, a platform of twigs balanced on the central shaft of a limbum-palm frond 12 feet above dry ground in a tall limbum-palm forest.

***Ducula spilorrhhoa spilorrhhoa* (Gray)**TORRES STRAIT IMPERIAL OR
NUTMEG PIGEON; SATNAMIO

Very common in pairs or small flocks in the forest and forest edge bordering the Sepik River. According to native lore this species nests at all seasons of the year. One occupied nest, Palimbai, January 21: A fairly substantial platform of twigs placed 45 feet up on a flat fork of a solid limb, 20 feet out from trunk of a large, heavily leafed *kapiak* tree partially overhanging the Sepik River. An adult

gawked over the side of the nest and shifted position as we walked under the nest.

Ducula muelleri aurantia (Meyer)

MÜLLER'S IMPERIAL PIGEON; NAMIO

Very common in the tops of forests and forest edges fringing the middle Sepik River. According to native lore this species nests at both the high- and the low-water periods. One occupied nest, Kanganaman, December 26. The nest, a frail structure, was 20 feet up in open forest near the trunk of a large tree and overlooking a narrow channel of water. Nearby, but some 20 feet above, was an occupied nest of *Dicrurus hottentottus carbonarius*.

Ducula pinon jobiensis (Schlegel)

PINON IMPERIAL PIGEON; NAMIO

Common.

Ducula zoeae (Lesson)

ZOE IMPERIAL PIGEON; KAIN BU NAMIO

Iris white; eye ring dark gray; skin under eye flesh; bill dark brown; feet bright rose to deep red-violet.

Chalcophaps indica chrysochlora (Wagler)

GREEN-WINGED GROUND DOVE; URIQUAK

Weight: Male, 118; female, 114.

Iris chestnut brown; bill orange, with brown tip, maroon, with orange tip; cere rose-brown, dull rose; eye ring and gape dark rose; feet dark maroon rose to dull brownish rose.

Probably common but rather elusive in its niche, which is on the floor of original forest. This record extends the known range of *chrysochlora* westward from Astrolabe Bay.

Chalcophaps stephani stephani Pucheran

STEPHAN'S GROUND DOVE; URIQUAK

Weight: 129.

Iris brown; bill orange-red; cere dark rose; eye ring rose; feet dark rose.

Apparently rather common but not easily seen. Kanganaman natives apply the same name to this species as to *C. indica chrysochlora*, and they say both have the same ecology.

Henicophaps albifrons albifrons Gray

WHITE-CAPPED GROUND PIGEON; OLIQUAK

Bill dark gray, lighter toward tip (one);

maxilla dark brown, mandible reddish gray (one); skin around eye gray; feet light rose to purplish rose.

Kanganaman natives report that this species is common on the floor of the rain forest far back from the Sepik River. They say it goes about alone or in pairs and that it feeds on fallen fruit, grubs, and insects.

Goura victoria beccarii Salvadori

VICTORIA CROWNED PIGEON; KANGI

Fairly common except in the vicinity of native villages, in flocks of two to 10 on the floor of wet swamp forest or on or near the floor of muddy sago forests. When flushed, the flocks fly noisily up to nearby perches. There, 10 to 15 feet above ground, they balance themselves clumsily and gawk down at passersby. One stomach contained round, red, marble-sized berries. Despite the ban against killing these birds, Europeans and natives alike take a heavy toll.

PSITTACIDAE

Trichoglossus haematodus intermedius

Rothschild and Hartert

RAINBOW LORY; PAGIT

Apparently not very common during the period of our stay. Flowering trees were not numerous. Our specimen was one of a pair observed feeding 60 feet up in the crown of the flood-plain forest near Kanganaman village. The second bird was captured and photographed in life (for a photograph of this bird, see Gilliard, 1955, p. 473).

Lorius lory salvadorii Meyer

WESTERN BLACK-CAPPED LORY; QUALOO

Skins of this species are often worn by the natives of the middle Sepik River as dance ornaments.

Charmosyna placensis subplacensis (Sclater)

YELLOW-FRONTED BLUE-EARED LORY; BASANGI

Weight: 42.5.

Iris orange; bill bright rose; cere dull rose-orange; skin near eye dark gray; feet dull rose-orange.

Not common. Our specimen was shot in a casuarina tree beside a small grove of coconuts, between the forest and the river. Usually found in pairs or small flocks.

Micropsitta pusio beccarii (Salvadori)

BUFFY-FACED PYGMY PARROT; PILLAIN

Weight: 12.

Iris tan; bill medium gray; skin on face tannish gray; feet light pinkish gray.

Very local or very uncommon. This species was shot in the upper limbs of flood-plain forest bordering the Sepik. The stomach contained tiny black seeds and yellow fruit flesh.

Probosciger aterrimus stenolophus (van Oort)

PALM COCKATOO; MIENGO

Iris rusty brown; skin around face and inside of mouth rosy red; bill brownish black; feet black.

Common but thinly distributed in the tropical rain forests. Apparently usually alone. This great, shaggy-crested cockatoo emits a shrill, rapidly repeated, grating cry: "white, white, white." See Forshaw (1964) for habits in Queensland.

Cacatua galerita triton Temminck

WHITE COCKATOO; WAMA

Common in pairs or small bands in the rain forest, forest edge, and in isolated trees. The ear-splitting screams of this cockatoo are as characteristic of the New Guinea forests as they are of those in western Australia. A naked nestling about three weeks old was purchased from a native boy at Kanganaman January 9.

Lorius roratus pectoralis (P. L. S. Müller)

RED-SIDED ECLECTUS PARROT; SALA

Iris bright red (males), yellow (female); maxilla red-orange to red with yellow tip, mandible black (males); bill all black (female); eye ring black (one male); gape yellow (one male); skin under throat pale yellow (one female); feet black.

Abundant in the crown of the forest and in fruit trees everywhere.

Geoffroyus geoffroyi minor Neumann

RED-CHEEKED PARROT; TAWAIN

Weight: Males, 114-141; female, 153.

Iris pale yellow (three), lemon yellow, with dark yellow near pupil (one), tan (one); skin on face olive gray to dull yellow; maxilla red-orange to red, with brown tip, mandible

brown (two); bill rose-brown, with yellow tip (one), dark brown (two); feet blue-gray to olive gray.

Found in pairs or small flocks of three to five in the crown of original forest and forest edge. One specimen was shot while feeding in the top of a limbum palm.

CUCULIDAE

Cuculus saturatus horsfieldi Horsfield and Moore

ORIENTAL CUCKOO; SAMBANGAN

Aibom: One male, January 23. Kanganaman: One male, January 5.

Wing: 197, 199. Weight: 87, 115.

Iris tan-red; bill black, one with yellowish base, one with yellowish gray at base of mandible; gape yellow; eye ring yellow; feet corn yellow.

There can be no doubt that these specimens are the race *horsfieldi*, the winter visitor from northern Asia and Japan, and not *saturatus*, the race wintering in the Papuan region from breeding areas in southern Asia, because in the latter the wing does not exceed 192. The stomach of the heavy specimen was crammed with caterpillars, one of which was yellowish and about 2 inches long.

Cacomantis variolosus infaustus

Cabanis and Heine

GRAY-BREASTED BRUSH CUCKOO

Weight: 33.

Iris russet; bill dark brown with inner two-thirds of mandible lighter; eye ring yellow; gape and inside of mouth vermilion; feet gold-yellow.

Apparently this cuckoo is very uncommon in the middle Sepik region.

Chalcites malayanus poecilurus (Gray)

MALAY BRONZE CUCKOO

Weight: 20.

Iris light brown; bill dark brown; eye ring reddish orange; gape yellow; feet dark gray.

Apparently this shy species is uncommon in the Kanganaman region.

Scythrops novaehollandiae Latham

CHANNEL-BILL CUCKOO; TIMA

Iris red to ruby red; bill light brown to brownish gray, with whitish tip; skin on face rosy red; feet lavender to gray.

Uncommon. One had stomach full of whole seeds and fruit flesh.

Centropus menbeki menbeki Lesson

GREATER COUCAL; MI QUITE

On January 1 a fledgling about two days out of the nest was brought to camp by a Kanganaman native who had found it on the ground. Later this bird uttered some cooing notes, then began an almost incessant chattering. It readily ate small frogs and grasshoppers. This is a very noisy species of the sago, limbum, and swamp forests bordering the Sepik River. The call is a deep, resonant cooing, beginning with two or three short coos followed by resonant, descending coos that seem to reverberate long distances through the forest.

Centropus bernsteinii bernsteinii Schlegel

BERNSTEIN'S COUCAL; SOA QUITE

According to native lore, not uncommon but very shy. Our only specimen was flushed from grass at the edge of the forest and shot from a perch 30 feet up in a bamboo clump between the Sepik River and a belt of high swamp forest.

The immature plumage is very different from that of the adult (which is generally oil green to blackish) and perhaps heretofore undescribed. Our immature specimen has the upper parts profusely barred with rufous; the wings and tail narrowly barred with buff to pale chestnut brown; the throat whitish; the neck all around marked with chestnut brown; the central abdomen gray, with dark bars; and the rest of the under parts blackish brown, with narrow pale barring.

TYTONIDAE

Tyto alba meeki Rothschild and Hartert

BARN OWL; JATMARA

Kanganaman: One female, February 23. Wing, 292; tail, 114.

According to native lore this is a common but very secretive bird in the middle Sepik region. The natives say it enters native houses at night to catch rats and that it sometimes lives in the garrets of house tamborans—large, men's houses that dominate all the Sepik villages. The above specimen awakened me about midnight when it cried from a tall,

slender casuarina tree overhanging the Sepik River immediately in front of my tent. The cry was drawn out and sounded like escaping steam. With a torchlight, I was able to see and then shoot at the white spot (with eyes that reflected a strong gold color) which proved to be this owl. This species, which is an important totem in the culture of the Iatmul people, is said to nest in tree cavities during the time of low water.

This is a little-known species in New Guinea. This record appears to be a westward extension of range from southeastern New Guinea, although it occurs on islands bordering the north coast that lie nearly as far west (Manam and Karkar) as the Sepik River, and an owl, possibly this species, is reported to occur on Biak Island (Ripley), but remains uncollected.

STRIGIDAE

Ninox connivens assimilis

Salvadori and D'Alberty

BARKING OR WINKING OWL; WUDGUD

Kanganaman: Two males, two females, one sex?. Wing: Males, 256, 260; females, 244, 244; sex?, 252.

We found this owl quite common, for an owl, in the open forests near Kanganaman. The natives say it also hunts in gardens and grasslands and that it usually is found in pairs. One stomach examined was filled with large black beetles.

These records comprise the western limits of the species in New Guinea, an extension of range from the Ramu River on the mainland and from Manam Island at the mouth of the Sepik River.

PODARGIDAE

Podargus papuensis Quoy and Gaimard

GREAT PAPUAN FROGMOUTH; YATMALI

Iris scarlet; bill brownish tan (female), grayish or grayish brown (males); inside of mouth yellow; feet tan to grayish tan. An immature specimen differs by having the iris yellow, the maxilla brownish, and the mandible tan.

This species is probably common, but the observer is not apt to encounter it because of its crepuscular and nocturnal habits. However, in the Laloki River region at Hombron,

I once watched it fly from one tree to another in a sparsely treed savanna. It flew with the sky still glowing from a vanishing sunset, and I saw the bird perch on a moderately large limb like an ordinary bird. By day I found it sleeping near the center trunk in a thickly leafed tree growing in a grain field.

A nest with adult on it, November 23, 400 yards south of Madang Hotel, Madang, in a tall shade tree overhanging main roadway. Autos and trucks passing under the nest seemed not to bother its occupant, and a noisy household 100 feet from the nest tree also was of no apparent bother. This nest was placed 45 feet up in a substantial crotch in the main limbs. It was a platform of sticks. On November 23 and 24 during four visits totaling about an hour of observation, an adult remained mostly immobile on the nest. Its body usually sloped upward and its head was often held at an odd angle so that the nest and bird together resembled a broken limb projecting upward from the tree crotch. Photographs (color and black and white; still and motion) were made of this adult on the nest. While being filmed, the unusually immobile bird several times directed its face slowly toward me, opened its large eyes (in the daylight) and stared at the motor-driven camera I was manipulating, then blinked the eyes tightly shut and assumed the stick position again.

The young male with the yellow iris has much white in the upper parts, and below it is mostly cottony white, with some narrow dark shaft streaks. It was purchased from a native on January 13, about a week after fledging.

APODIDAE

Collocalia vanikorensis granti Mayr

LOWLAND SWIFTLET; PELIPELI

Weight: 10.5, 11.5.

I shot one of these specimens from a flock of six to 10 which was found circling above tall riverine forests and forest edge bordering the Sepik River in very dull light at 6 P.M. in front of an approaching storm. The mouth and stomach of this specimen were crammed with small, red, flying ants. I suspect that this species may fly at night. Occasionally I saw very large flocks of swifts over the river

and neighboring forests which I took to be this species. The natives of Kanganaman seem to know nothing of the nesting habits of this species, and therefore I suspect that it does not breed in the flatlands of the middle Sepik region.

ALCEDINIDAE

Alcyone pusilla laetior Rand

LITTLE KINGFISHER; BOYSIT OR MBALSEEK

Weight: Males, 11, 14; sex?, 13.5, 15.5.

Iris dark brown; bill dark brown to black; feet medium brown to black.

We found this species to be not uncommon in the middle Sepik region where it was usually found alone flying along the edge of smaller waterways somewhat back from the river. A number of times I saw it perching on sticks in and projecting from the forest edge close to mudbanks at the side of *barets* and shaded streams. Yet apparently the Crane Pacific Expedition (Mayr and Camras, 1938) did not encounter it, and Bürgers succeeded in obtaining only two females (at Malu; Stresemann, 1923, p. 35). One of our specimens was trapped in a Japanese silk net set just above the river bank and 18 feet above the surface of the broad Sepik River. One specimen autopsied had eaten a number of large beetles (up to 15 mm. long).

Halcyon torotoro torotoro (Lesson)

LESSER YELLOW-BILLED KINGFISHER; MASAY

We found this species alone or in pairs in the depths of the flood-plain forest where it was rather common. According to the native lore of Kanganaman, the "masay" nests during the time of high water in a cavity in a termite nest where it is often trapped (a pole is laid against the hole) by the local natives. The bird's head is then cleaned and mounted on a stick for use as a dance ornament to be worn like a big stickpin in the hair.

Two males matched birds from the Hollandia-Idenburg River region.

Dacelo gaudichaud Quoy and Gaimard

RUFIOUS-BELLIED GIANT KINGFISHER; KISASA

Weight: Male, 137.

On February 1, a nest hole was found in a large, arboreal termite nest situated about 11

feet above ground on the side of the trunk of a tall tree facing a clearing at the edge of Kanganaman village. At least one young was in the nest being fed by an adult. As I made stroboscopic pictures of the adult flying to the nest with food, the young could be heard periodically uttering a rasping chatter within the nest. Sometimes when the adult landed on the side of the nest the young came close enough to the opening to be seen. Young, collected at other nests by native boys, were brought to our camp on January 5 and 7.

This is an abundant species of the flood-plain forest and forest edge. According to native lore, it feeds chiefly on large insects and an occasional small frog.

Tanyiptera galatea meyeri Salvadori

COMMON PARADISE KINGFISHER; BAMBOOSA

Wing: Six males, 105–108; females, 101, 103.

Males: Iris brown to dark brown; bill scarlet to orange-red; feet grayish yellow to olive tan. Females differ by having the bill brown, in some cases with orange on the mandible; immature specimens have the feet gold to pale yellowish gray.

This species was very common in the sub-stage of the flood-plain forest, where it is almost always found alone. One that I observed in the Astrolabe Bay region returned on a number of days to hunt near a bower that I had under observation. It flew quietly to a perch 2 to 5 feet above ground in the tangled forest or forest edge, then sat quietly for periods of up to 10 minutes, turning its head slowly and occasionally flicking its tail up and down. It appeared to be watching the ground for prey.

January 28: A nest containing one or more noisy young was found on the side of a limbum-palm tree in tall, flood-plain forest 100 feet from the north bank of the Sepik River near Kanganaman village. The forest was tall and fairly open, with a lower tier moderately congested with limbum palms and the floor muddy from the periodic floodings of the river. The nest was situated 14 feet up in a termite nest which formed a large bulge on the trunk of the palm. It was in a cavity which was entered by a tunnel in the side of the termitarium.

An adult was observed feeding the young, and on January 29 I made prolonged efforts to photograph this operation, using a spot stroboscopic light set 35 feet away synchronized to a 400-mm. telephoto lens. More than five hours were required to make satisfactory photographs of the adult flying in with food. During this period a small lizard(?) and insects, including armored centipedes, were fed to the young.

MEROPIDAE

Merops philippinus salvadorii Meyer

BLUE-TAILED BEE EATER; QUA-QUA-LA WEE

Wing: Male, 129; female, 123.5. Weight: Male, 37.

Male: Iris red; bill black; feet dark gray.

Apparently rather uncommon in the vicinity of Kanganaman village. An occasional specimen was observed in shrubbery along the Sepik River on the trip in, and in the Palimbai region where extensive open areas with spaced-out trees and bushes occur, the species is probably common. According to native lore this species nests in deep burrows in the earth banks bordering the Sepik River during the season of low water.

On October 25 from the Markham River bridge behind Lae I had occasion to observe the feeding and flight characteristics of this race. Quite a number of birds were seen, usually in pairs, flying out from bushes and small trees bordering the river and growing on islands formed by the braiding of the river. The birds fed by "hawking" flying insects. They left their perches, flew sharply upward, then sailed on their peculiarly sharp-tipped, square-fronted wings, in long swoops. They opened wide, then partially folded the wings, to cause the deeply undulating swoops, after which they sailed back, often to the same perch. In the air the birds seemed to keep up a constant low chatter.

CORACIIDAE

[*Eurystomus orientalis* ssp.?]]

DOLLAR BIRD

During a canoe trip between Ambunti and Kanganaman in April, 1964, several solitary rollers were seen on high exposed perches. Once at dusk two individuals of the species were seen in rapid flight 5 to 20 feet above the

Sepik River at Kanganaman. They were apparently hunting insects.

BUCEROTIDAE

Rhyticeros plicatus jungei Mayr

PAPUAN HORNBILL; CHIPUT OR KUKUMO

Male: Iris light red-brown; bill ivory, basal fifth reddish brown; skin on face white; eye ring flesh; skin around eye bluish white; feet dark gray.

Abundant alone, in pairs, or in small to medium-sized flocks in the tall flood-plain forest and rolling forests well back from the Sepik River. Apparently only occasionally visits the forests around Kanganaman near the edge of the Sepik River.

The Papuan Hornbill is one of the most important totems of the Iatmul cult, and wood carvings of the head and bill of this bird are frequently to be found in the house tambarans and even crowning spires above the buildings as high as 66 feet above ground. The Iatmuls say that the hornbill feeds on fruits, but Rambur told me that it also nips off the colorful heads of fruit pigeons. He said that the admiration of the Iatmul headhunters stemmed from this alleged fact. Rambur knew that the species nested in holes in large trees, but he could not tell me anything about the imprisoning of the female during the nesting season. Since there are no monkeys and very few arboreal predators in the New Guinea forests, I wonder if the Papuan Hornbill builds a barricade such as it does on the west side of Wallace's line?

On October 25, 1958, near sea level behind Lae in the forest edge, I had an unusual opportunity to observe the extraordinary flight characteristic of the species when a hornbill flew directly over me, bucking a stiff wind, near the Markham River. Because it was flying only slightly faster than the wind, I was able to follow it with 8-power glasses for a considerable period of time as it struggled along about 60 feet overhead. I could see that the powerful "box-tearing" sounds were produced during the downstrokes of the wings by a long, slender feather—a primary. I saw this whiplike feather emerge from the solid wing with each downward stroke. It seemed to spring out about half an inch from the solid wing along most of its length, and when

this happened, to serve as an instrument for the production of sound during the downstroke. However, modifications of wing or feather structure are not apparent in the dried specimen and exactly which primary is responsible for these mechanical sounds could not be ascertained.

On July 2, at about 1000 feet in mountain rain forest of the Finisterre Mountains near Keku, I recorded the following observation of a wild bird feeding in the crown limbs of the forest: "At 10:17 A.M. a solitary male hornbill flew in very noisily and landed in the tree I had under observation. Immediately upon landing it became silent and still. For about one minute it remained nearly frozen as I held it in sharp focus in my binoculars. Its only action was to slowly turn the head until the bill was almost facing backwards. The whitish blue of the throat and the naked area around the eye were clearly discernible. After this it turned back, opened the bill and flipped out a big brown berry which it then deftly caught about two or three inches from the tips of the mandible. It then flipped the berry several times, always deftly catching it between the mandibles. This was less of a juggling act than it sounds because the berry stayed nearly still in space while the bill parts clamped open and shut around it. When the plum-sized tree fruit was apparently sufficiently softened by these manipulations, if this indeed was the purpose, the bird bounced the fruit once on the lower mandible and caught it in the throat."

PITTIDAE

Pitta sordida novaeguineae Müller and Schlegel

BLACK-HEADED PITTA; WARACRY

Weight: Female, 77.

Iris darkest brown; bill blackish brown; feet grayish rose.

Although known to inhabit the forests about Kanganaman, this species seems to have been seen by only a few of the villagers. This may be a measure of its ability to hide, or its rarity. Rambur, a superb native naturalist, said that it breeds during the period of high water, which would seem to be confirmed by the presence of an egg nearly ready for laying in our only specimen, a female collected on December 22.

HIRUNDINIDAE

Hirundo tahitica frontalis Quoy and Gaimard

PACIFIC SWALLOW

Wing: 100, 105.5, 106, 109. Weights: Five, 11.8–15.2.

Common in and around Wewak, where the Pacific Swallow was found in considerable numbers in March along the beach and on buildings at the edge of the airport. On October 30, 1958, I noticed a large concentration of these swallows on wires and buildings between Lae and the Lae wharf. Not observed in the region of the middle Sepik River.

CAMPEPHAGIDAE

Edolisoma melan melan (Lesson)

BLACK GRAYBIRD

One female from Gaikarobi.

Coracina papuensis papuensis (Gmelin)

PAPUAN GRAYBIRD; FAYO OR PAYO

Very common in trees of the forest edge and the edges of the Sepik River. We often saw flocks of three to five chasing through the crown of trees of the forest edge or bordering ponds and *barets* back from the Sepik.

MALURINAE

Malurus alboscapulatus tappenbecki (Reichenow)

BLACK-AND-WHITE WREN WARBLER; YENSHUAN

Apparently quite uncommon. Found in low bushes of the forest edge bordering the disturbed grasslands of the Sepik River edge.

Todopsis cyanocephala dohertyi

Rothschild and Hartert

BLUE WREN WARBLER; SANGRA

Kanganaman: Five males, one female, one [female], December 17 to January 7. Yamanumba: One male, one [female], January 12.

Wing: Six males, 58–61; three females, 57–59. Weight: Males, 12–16; females, 12–13.

Iris dark brown to blackish; bill dark brown to black; feet medium golden brown to black.

Dohertyi is differentiated from *cyanocephala* by darker rufous upper parts in the females. Our series matches a series of *dohertyi* from Takar and Hollandia in this respect, but both the males and the females have the bill

somewhat longer than either *dohertyi* or *cyanocephala*. The bill measurements of males and females of *Todopsis cyanocephala* are: Males: *cyanocephala*, 17–19.5 (9), average 18.55; *dohertyi*, 17–19.5 (10), average 18.25; Kanganaman birds, 19–19.5 (6), average 19.16. Females: *cyanocephala*, 16.5–19 (8), average 17.81; *dohertyi*, 17–18.5 (6), average 17.50; Kanganaman birds, 18.5–19 (2), average 18.75.

This species is a common inhabitant of the lower part of the forest and forest-edge situations.

SYLVIINAE

Megalurus timoriensis mayri Hartert

RUFIOUS-CAPPED GRASS WARBLER; MAMBUI

Weight: Male, 21.

This is a not uncommon but retiring species of the tall grass patches bordering the Sepik River.

Gerygone magnirostris affinis Meyer

SWAMP GERYGONE WARBLER; PIS

Weight: Twelve males, 6.5–9; three females, 7.5–9.5.

Iris red (one reddish brown); bill dark brown to black; feet dark gray to dark brown. A young bird had the iris brown, bill dark brown, feet light gray, and gape light yellow.

On January 16, at the edge of Palimbai village, a nest was found containing young, 15–18 feet up, overhanging water in a row of trees between a broad swamp stream and bushy grasslands subject to seasonal flooding. The nest was a pensile structure about 2 feet long, suspended pendulum-like from a single strand of vine hanging in shade from the canopy of a heavily leafed tree about 50 feet tall. It was composed of tendrils, bark strips, and leaves, and had the entrance near the bottom under an overhang which served to conceal the opening. In approaching the nest, the adult flew toward the bottom of the nest, then darted upward to cling in an almost inverted position to the lips of the entrance tube. It then climbed up the tube and remained out of sight for many seconds before emerging suddenly to fly off immediately.

This is an abundant species in the swamp-forest edge bordering the Sepik River, in trees of the swampy grasslands, in groves of coco-

nut trees lining the banks of the Sepik River, and in trees growing in and around native villages near waterways.

MUSCICAPINAE

Peltops blainvilli (Lesson and Garnot)

LOWLAND PELTOPS FLYCATCHER; KULIYAK

Weight: Males, 30, 31; three females, 28.5–30.5.

Iris red to reddish brown; bill and feet black.

Fairly common but thinly dispersed and usually solitary in the topmost limbs of the flood-plain forest and forest edge. Several times I found this species perched high up facing small man-made clearings inside the forest. One specimen frequently perched about 40–50 feet up on a dead shaft near a native house in the heavily treed part of Kanganaman village. The stomach contents of several specimens consisted of insect remains.

For a detailed discussion of the characters distinguishing this species from *P. montanus*, see Gilliard and LeCroy (1961, p. 51).

Rhipidura leucothorax leucothorax Salvadori

WHITE-BREADED THICKET FANTAIL; CHAMCHAM

Weight: Six males, 18–20; females, 11, 13.5.

Rhipidura rufiventris gularis Müller

WHITE-THROATED FANTAIL; TONCHIN

Weight: Three males, 13–13.5; female, 14.

We found this species usually in pairs in the middle and upper parts of flood-plain forest.

Rhipidura leucophrys melaleuca
(Quoy and Gaimard)

WILLIE WAGTAIL; SIKATKERRI

Wing: Males, 91.5, 99, 99.5; female, 91.5. Weight: Three males, 24–28; female, 25.

This confiding, friendly species is found all along the Sepik River from its mouth to about the elevation of Telefomin (4700 feet). In areas undisturbed by man it spends much of its time along river, stream, and swamp edges where fluctuations in water level continually disturb the ecology. In areas disturbed by man, such as gardens and villages in the middle Sepik region, it is common and,

during the period of our stay, it was found mostly in pairs. Two occupied nests were observed January 27 from our boat as we traveled near Chambri Lake to Aibom. Both were in trees in the swamplands.

On January 21 an adult was observed feeding young in the outskirts of Palimbai village. The nest was 25 feet up on a limb over the edge of a Sepik River inlet. On November 23, in the Madang Hotel grounds, 25 feet from a much-used building, I found a nest with eggs 18 feet up on a horizontal limb in a solitary ornamental tree. The nest was glued to the limb, and both parents took turns incubating the eggs. One had lost the entire tail, but it nevertheless seemed able to fly perfectly well.

One of the phrases of this species I wrote as "we, we, wheet, wheet, you," and I noted that the first two notes were plaintive, while the remainder were shrill. The food of this flycatcher seems to include all manner of insects of the forest edge, native gardens, villages, beaches, and cane-grass swamps, even including river-borne insects. This food is captured in flight, on the ground, or on the surface of the water. I once saw a group of Willie Wagtails forming a kind of flying circus over the Sepik River, some at least 150 feet out from the shore. Many times the flying birds splashed into the water, apparently to catch naiad mayflies which were emerging en masse from the river bottom.

See Gilliard and LeCroy (1961, p. 54) for comparative studies of Kanganaman birds with Telefomin birds, which reveal a decided increase in size with increase in altitude in this species.

Monarcha alecto chalybeocephalus (Garnot)

SHINING MONARCH FLYCATCHER; SUPRUNIKT

Weight: Three males, 20.5–25.5; three females, 23–25.5.

Iris brown to blackish; bill blue-gray; black tip on four; feet dark blue-gray to black; inside of mouth vermilion (two males).

Two nests with eggs were found on January 3 and January 25 at Kanganaman. Each was situated about 4 feet up in a thin, sparsely leafed sapling growing in the substage of tall open forest. Both of the nest sites were close to swamp ponds covered by the forest canopy, and the trunks of both the little nest

trees emerged from shallow water caused by seasonal flooding. The nests were neat cups in thin, vertical forks of the slender saplings. They were composed of vegetable fibers and some grass bound together with some spider silk.

Common but rather thinly dispersed in the lower half of the flood-plain forest, particularly in swampy places. Usually found in pairs during the period of our studies, which was probably the height of the breeding season for this species.

Photographs made of the January 3 nesting show both the male and the female incubating the eggs. The female, however, assumed most of the work. By bad luck the female was shot by one of our collectors, and thereafter the dark male became very attentive as he alone assumed all the duties of nest care.

***Arses telescopthalmus insularis* (Meyer)**

FRILLED FLYCATHER

Weight: Male, 16.

Iris brown; bill and feet blue-gray; eye wattles blue.

Apparently an uncommon species of the upper half of the rain forest.

***Poecilodryas pulverulenta pulverulenta*
(Bonaparte)**

WHITE-TAILED FLYCATHER

Weight: Male, 26.5; female, 20.

Our Kanganaman birds (which extend the known range of this species eastward from Humboldt Bay) have the upper parts slightly lighter, more clear gray, less smoke gray than typical *pulverulenta*.

PACHYCEPHALINAE

***Pachycephala griseiceps jobiensis* Meyer**

GRAY-HEADED WHISTLER

One taken at Kanganaman.

***Pitohui kirhocephalus senex* Stresemann**

VARIABLE PITOHI; COOK COOK

Gaikarobi: Two males, one female. Weight: Males, 68, 75; female, 77.

Closely similar to a series of *senex* from Regenber, Malu, and Hunsteinspitze, but with the under parts averaging slightly paler.

***Pitohui kirhocephalus brunneicaudus* (Meyer)**

VARIABLE PITOHI

Wewak: One male. Weight, 70.

Compared with *senex* from the upper Sepik and from Gaikarobi, upper parts darker, more deep reddish brown, less rich chestnut; under parts darker, more deep ochraceous, less buffy. In these characters our Wewak male nearly matches the most richly colored (darkest) skins in a small series of topotypical (Madang) *brunneicaudus*. Therefore, the range of this race is extended westward from the lower Sepik region to Wewak.

Common. This specimen was shot in the substage of the coastal forest. Stomach contents were small yellow seeds, red fruit flesh, and the head of a large mantis.

***Pitohui ferrugineus ferrugineus* (Bonaparte)**

RUSTY PITOHI; KUK KUK

Weight: Five males, 87–101; female, 101.

Our birds appear much paler than *holerythrus* [including series from the Idenburg River and the Hollandia region formerly separated as the race *heurni*], but they are not nearly so pale as *clarus* of eastern New Guinea. However, our series agrees so well with *ferrugineus* of the Vogelkop Peninsula that we have no alternative but to apply that name despite the checker-board range it implies. Rand (1942b, p. 492) found a similar situation in the upper Fly River region, and he adopted a similar solution.

This is an abundant species of the tropical rain forests. One specimen had eaten a large caterpillar.

ARTAMIDAE

***Artamus leucorhynchus leucopygialis* Gould**

Lesser Wood Swallow; Vitvit

Wing: Four males, 125–129; female, 128. Weight: Four males, 42–43; female, 41.

Iris dark brown; bill light bluish gray, with black tip; feet dark gray.

These specimens have the breast, abdomen, and sides of body pale neutral gray, not white as in typical *leucopygialis*; and the light area of the lower rump and upper tail coverts is somewhat more restricted and averages darker, more smoke gray, less white. If sub-

sequent collections support these differences, the Kanganaman birds may represent a new race of this species, which is otherwise little differentiated in New Guinea.

Rather common to somewhat local in the middle Sepik region where it is always found in flocks ranging over the forest edge where it borders the river, over the pit-pit grass strip and out over the river. The birds perch high up on dead limbs protruding from the forest edge, and they tend to gather in tight lines along particular limbs of trees usually standing alone in open areas. At night they congregate in compact knots to sleep. Their food consists of all kinds of insects caught in flight.

STURNIDAE

Aplonis metallica metallica (Temminck)

METALLIC STARLING; SOUI-MARI

Weight: Male, 66.

Iris orange to red.

This is the most abundant bird of the Sepik flood-plain forest, forest edge, and pit-pit swamps. It is a highly gregarious species, feeding, nesting, and sleeping in large to immense flocks. In the neighborhood of Kanganaman, flocks of a hundred or more (perhaps to 400) often rush through the forest just under the canopy, making a roaring noise as they surge by, oblivious of man. Natives carry throwing sticks for just such flocks and sometimes can kill up to eight starlings with a single throw. In the forest the roar of a passing flock is exceeded only by the roar of the hornbills in flight. Along the Sepik the Metallic Starling roosts in tall cane-grass (pit-pit) swamps. One such roost that I saw from the boat seemed to hold many thousands of birds.

The species nests in great concentrations in tall trees projecting above the roof of the forest, in the forest edge, or in tall solitary trees growing in swamp or savanna. So numerous and closely packed are the nests that their weight often breaks off large limbs. Near Kararau on January 25, for example, I found two such broken limbs on the ground under a nesting tree. About 40 pounds of nests were attached to the outer limblets in a nearly solid mass of nesting material. Blue egg fragments with cinnamon spots and many decaying nestlings were noted. The limbs had

split off from the lower part of the limb system some 60 feet overhead.

The following notes are from observations that I made near Lae in October (29–31), 1958, when I observed and photographed the nesting activities of this species. "At about 6 P.M. at starling tree no. 1, I counted about 80 nests. These were clustered closely together on the lowest limb of an 85–90-foot tree standing alone in a semi-cleared field near the Lae wharf. The lowest limb of this tree was 48–50 feet up; the lowest nest was about 40 feet above the ground, and the highest was about 8 feet higher. The rest of the big tree was thickly leafed. No vines grew on the relatively smooth trunk.

"At the upper edge of the nesting zone the nests were separated and often basket-like, and situated among leaves. Several feet lower the nests became more concentrated and some were next to each other, while toward the middle and lower part the nests were built into each other so as to resemble large clusters of grass in which many side holes were to be seen. These entrances, which seemed relatively tiny, led into individual nest chambers. About the whole nesting area a concentration of birds, all of which appeared blackish in the dull light of dusk, was to be seen. Above, in the leafy areas, uncounted numbers of other starlings roosted or flew in and out in bands. The birds paid little attention to me (as I stood some 90 feet away), but once when I moved rapidly, about 70–90 birds took off, chiefly from the nesting area. This panic flight exploded out as one flock and at a distance of about 40–60 feet from the nest cleaved into two, going in opposite directions. Both wheeled and returned to the tree in less than a minute.

"A large number of birds had remained behind, on top of and about the nests. As the flocks returned these birds opened their mouths and fluttered their wings. The adults had relatively long, sharp tails, often showing two points in the folded position. The tail position of others was often canted upward as though the bird might be sitting in the bottom of a nest.

"During the period of 15 minutes (5:55 P.M. to 6:10 P.M.) of concentrated observation three crows flew noisily into the topmost branches. They were attacked by a Bell Mag-

pie (*Cracticus cassicus*) and eventually driven off. Also in the tree, but mostly concealed, was a Leatherhead (*Philemon novaeguineae*) which called periodically. After the Bell Magpie drove off the crows, it began emitting low growling notes which I at first mistook for the notes of the Papuan Mynah (*Mino dumonti*). It flared the tail as it made these notes and moved down among the starlings in the leafy upper third of the tree. When fully flared, the tail opened 180 degrees like a hand fan—quite spectacular. This bird was apparently contesting the encroachment of starlings in the upper part of the tree. I saw no actual encounter.

“October 30, 7:15 A.M.: Visited and carefully watched the colony for half an hour. Margaret counted 43 nests with binoculars. Approximately 287 adult birds were counted as they came and went from the nest during a five-minute period.

“The adults usually leave the nest area in groups of from three to 12. They dive steeply from the nest area when departing. A young bird that dropped from the leafy area to the top of an exposed nest near the upper edge of the colony was permitted to stand on a twig for several minutes and then was suddenly driven off by a black adult. The young flew out from the tree with the adult in hot pursuit.

“The retort-shaped nests are about 9 to 14 inches long. A tiny entrance tube is at the side. This is flexible and about the diameter of the head between the eyes of *Aplonis metallica*. To enter the nest the bird darts head first into it from a flying start or clings head up, breast out, and tail bent outward, but against the nest like a woodpecker. The bird then suddenly forces the head into the hole and wedges its way into the cavity with the hole virtually closing behind it. It emerges head first. Once I saw one adult chase another from a nest limb. Twice I saw pairs of adults come tumbling out of the nest area, pinwheeling down like two tethered balls, keeping up a fight during a vertical drop of 40 feet to the ground. In moving about, the many adults that cling to nests here and there (usually one or two to a nest, but sometimes in groups) execute little hops. They keep the tail downward as a rule and after each little hop sink back on it rather clumsily. One adult worked alone on a nest for many min-

utes, inserting the bill here and there and apparently adding material to the nest. It hung down head first on the side of the nest, its feet near the top. Its neck was stretched and frequently the head was shaken very drastically as the bill was in the strands of material (grass?).

“The adults seemed to be divided about equally into two classes, those that hung on the nest sides, occasionally on the bottom, or sat on slanting sticks, and rendered very active begging displays (with much wing fluttering and crying with the bill open), and those that moved about, paying little attention to these displays. The latter sometimes sat quietly by or flew in and out, landing close to the fluttering birds (males?).

“The first time I saw the following, I put it down to coincidence: A male had a large red berry in the opened tip of its bill. This berry was almost an exact match for its ruby red eye! The two red spots were very striking and queer to behold. Then, five minutes later, I saw it again. In the end of its bill an adult carried a red berry, which was oval and twice the length of the eye. With the bill partially open, this bird twice poked the bill into the upper part of the nest underfoot, forcing the bill in to at least the nostrils. For nearly a minute it played with the red berry and then the object disappeared, perhaps swallowed, or perhaps finding lodging in the structure of the nest. Later, I saw yet another male close its mouth over a red berry as though swallowing or hiding it.

“At about 7:35 the morning sun struck the nests full force and the many dark birds on them were suddenly transformed into glistening deep green, ruby-eyed ornaments. About half fluttered, holding their chests up, their heads high, and their bills in constant gobbling motions. All the while a rasping, scratchy crescendo was coming from the tree. It sounded much like that of a colony of European starlings (*Sturnus vulgaris*).

“At about 7:20 A.M. two large crows flew noisily into the top of the tall nest tree. One crow had pale bluish gray eyes and as it called raucously a long-drawn “caw,” flipping the wings with each surly note, I noted that its throat feathers were extended. Soon after the arrival of the crows the colony of starlings became silent, or virtually so, and within an-

other two minutes the 25 to 35 adults that had been clinging to the nests had *all* left. They slipped away in small groups so that I was not aware that a general exodus was going on, then I saw with some amazement that all of the nests were deserted, at least on their exteriors. However, before a couple of minutes had passed the birds began to filter back.

"October 31. Visited nest tree no. 1 at 7:15 A.M. Again I noted much berry carrying. One bird was photographed while, for more than a minute, it moved about close to a begging adult with a red berry in its bill. It went into the hole carrying the berry and then emerged head first, still carrying it. As the bird came out the red berry appeared first and then, when the two red eyes emerged also, the bird stopped, thus making an extraordinary spectacle. Very few young striped birds were seen; one or two in the leaves above the main nest clusters were all. Several were seen being chased down out of the tree as described before. One tumbling flight (down to ground) was observed."

The above observations agree in their main outline with observations of the behavior of *Aplonis brunneocapillus* made by Cain and Galbraith (1956, pp. 281-287) in the eastern Solomon Islands. It is interesting to note that *A. brunneocapillus*, the White-eyed Starling, shows a tendency toward holding objects in the bill—in this case a white fruit stone which it apparently regurgitates.

Mino dumonti dumonti Lesson

YELLOW-FACED MYNA; GOWCOLUCK OR GOKARAK

Weight: Females, 216, 241.

Iris dark brown, with pale gold spots; bill orange-yellow; facial wattles rich orange-yellow to orange; throat yellow; feet and nails yellow.

The Yellow-faced Myna is a fairly common species which, although rather evenly and thinly spaced out, is found everywhere, usually in pairs, from the treetops of the beach edge to the spire limbs of the tropical rain forest. At dusk it has the habit (in common with many species of fruit doves and leatherheads) of ascending to high, dead perches and of sitting for long periods of time. The calls of this species are features of the New Guinea lowlands; they are an assortment of hollow,

scratchy swallowed notes, chopping notes, a two-toned "pooo paaa," a rather clear "oh think of it," and a snapping "hick up"; also an ascending sequence of musical taps sounding like a boy playing a stick along the pickets of a fence.

We follow Rand (1942b, p. 495) in not recognizing the race *violaceus*.

ORIOLIDAE

Oriolus szalayi (Madarász)

BROWN ORIOLE; COCOMANCHE

Weight: Three males, 108-119.

Iris red, in one bird an orange ring around pupil; bill rosy brown to deep reddish brown; feet brown to blackish.

The Brown Oriole is fairly common in the crown of the flood-plain forest and in the tops of trees of the forest edge. Its call, as recorded at Astrolabe Bay in late June, is a rich, melodious series of whistles ("wa-ah-co-ca-waaow"), accompanied by bubbling notes. In June the birds were found in small flocks high up in forest-edge situations, but in late October in the rain forests behind Lae the species was observed alone. One that was closely watched was very active, moving quickly among and feeding on small sprays of berries in the crown of the forest.

CRACTICIDAE

Cracticus cassicus cassicus (Boddaert)

BLACK-HEADED BUTCHERBIRD; KAMBO

Weights: Three males, 153-178; females, 149-172.

Abundant in small groups in the canopy of high forest, forest edge, and in the tops of isolated trees. Song bugle-like and very impressive. Emitted from tops of tall trees. Especially noisy in the morning. One of the loudest birds in the Kanganaman region.

DICRURIDAE

Dicrurus hottentottus carbonarius Bonaparte

SPANGLED DRONGO; KENKENYU

Weight: Male, 87.

Iris carmine to red-orange; bill and feet black.

This is a common species of the flood-plain forests and forests edges, where it spends much time high up among the leaves and perches on limb tips atop the forest. On De-

ember 13 a cup type of nest under construction was found 35 feet up in the middle part of an open tree facing an open glen in the forest. This nest was apparently deserted, but when, on February 25, I went to collect it, an adult was found in possession and perching nervously close by.

On December 26, a second occupied nest, also of cup type, hanging from its edges from a slender, flat fork of the mid-forest, was discovered, 40 feet up in similar forest. Near the Markham River bridge behind Lae, October 26, an adult was discovered carrying food to its nest—a cup-shaped nest situated just inside the forest edge 60 feet up. The parent flew directly to the nest, landed on the lip of the cup, bent over young briefly, flew 10 feet to the perch, then disappeared. About three minutes later (another?) drongo flew in the same way, remaining about 45 seconds, rocking the tail in and out about every three seconds. Later, these drongos were seen to sit for long periods flicking the tail, then hopping across the limb, switching the tail, wiping the bill. *Dicrurus* flies jerkily, bouncing up on a flurry of wing beats, then dropping sharply. When it lands it swoops in and jerks the tail on landing.

I once observed a drongo hunting with much pugnacity. It dove onto the tops of a shelf of broad leaves, its body and feet going through, its wings and tail open and coming to rest against the leaves. After several seconds it flew out and resumed the chase fluttering, and partially hovered, bill aimed upward, under the same shelf of leaves.

On July 1 at Keku (1000 feet) as rain began falling I heard a drongo give two buzzing notes, then call "ka ka" (very loud), "kee kee" (shrill whistles). The bird sang high up, repeating the calls again and again, and with each sequence of notes the tail was partially spread and the wings slightly opened. The head was directed upward steeply, and with each phrase the mouth opened widely in the rain.

CORVIDAE

[*Gymnocorvus tristis* (Lesson and Garnot)]

GRAY CROW

In April, 1964, on a canoe trip on the flooded Sepik between Ambunti and Kanganaman, two pink-faced, gray crows were

seen flying together through and over the trees of the river edge.

PARADISAEIDAE

Manucodia ater ater (Lesson)

GLOSSY-MANTLED MANUCODE; QUATBON

Weight: Males, 218, 225; three females, 179–199.

Iris red, orange-red, red with yellow next to pupil, yellow veined with red.

A nest found January 2 was a firm, deep cup of multiple-coiled vines on a platform of a few large sticks and many broad leaves (with many leaves extending upward into the walls of the nest cup), lined with fine vines. Measurements: Exterior, 240 by 175; cup, 107 by 68. Placed 40 feet up in a thickly leaved, slender-trunked, wild mango tree growing in the lower stratum of the tall, open, tropical rain forest about 2 miles inland from the Sepik River at Kanganaman. Eggs ovoid whitish, with pale lavender, gray, and dark brown smudges and some slight lateral streaking, chiefly concentrated on the slightly larger half and end of the egg (measurements, 35–37 by 25 mm.).

This species seems to be relatively common but thinly dispersed through the tropical rain forest where it moves vigorously about in the upper limbs, never stopping very long. One of the six specimens was collected at Wewak. Three specimens had large, oval, black seeds and remains of berries (?) in their stomachs.

See Gilliard (1956) for a revision of this group.

Seleucidés ignotus auripennis Schlüter

TWELVE-WIRED BIRD OF PARADISE;
MAN OR KARAGAMBO

Weight: Nine males, 158–198.

Iris scarlet in birds showing any trace of adult plumage and red-orange, orange, and chartreuse-yellow in three males in female plumage; bill black; inside of mouth aqua-green except in one young bird in which it is chartreuse-yellow; skin around eye black; feet rosy flesh to fleshy yellow.

A nest discovered under construction on February 4 was a shallow, well-concealed cup composed of leaf (pandanus) strippings, bark strips, and vines, placed on a frail foundation

of sticks and leaves. It was lined with fine rootlets and plant fibers (inside of cup, 90 mm. wide, 35 deep; outside, 200 by 90) and was found 10 feet up among the leaf bases of a pandanus palm in the lower tier of tall, open swamp forest (with an understory of limbum palms, some pandanus, and many deciduous saplings, vines, and bushes growing in shallow pools of water), about 150 feet from the north bank of the Sepik River and about 50 feet inside the forest edge.

Another nest (discovered under construction January 13) was similar to the one previously described and was placed 12 feet up on the tops of several fronds where their shafts crossed, in a sago palm growing on dry ground close to a water channel in the edge of tall, flood-plain forest 100 feet from the banks of the Sepik River. One egg, found February 27, was cream color, with longitudinal rufous to grayish streaks concentrated chiefly at the larger end (measurements, 40.7 by 26.5 mm.).

Since a main objective of our expedition was to discover and photograph breeding birds of paradise in the wild, the finding and photographing of *Seleucides ignotus* at its nest was of much importance to us. It is the first of the "plumed" birds of paradise to have been photographed in the wild at its nest and only the second species of the Paradisaeidae to have been studied and photographed under such conditions. For the first record, see the photographs of *Cnemophilus macgregorii* which the late Wan Tho Loke (1957, p. 104) made at Mt. Hagen in 1952. For a photograph of *Seleucides ignotus*, see Gilliard (1955, p. 469).

From the day of our arrival at Kanganaman we offered high rewards for information concerning breeding birds of paradise. On January 13, Avaran succeeded in finding a nest under construction, but, to our dismay, it was promptly deserted. On February 4, he found another nest under construction about 200 yards distant from the first. This nest was not visited for such a long time that we thought it, too, was deserted. However, on the day we were due to leave Kanganaman (February 27), when we went to collect this "abandoned" nest, a female flushed from it and one egg was discovered. Since this important discovery was made so late, it was impossible to study the nesting behavior of

this species, but several spot stroboscopic photographs (with the lights 35 feet from the nest, using a 400-mm. telephoto lens) show the female on the nest, and several moving-picture sequences (in 16-mm. color) were made of the female arriving, inspecting, and settling down to incubate. After the pictures were made, a silk net was erected to catch the female (without success), and then the nest and egg were collected.

We found this species to be not uncommon in the Kanganaman forests but it was thinly distributed and not easily observed, except at the nest. A female that I observed flew in a straight line through the substage of tall, flood-plain forest. At and near the nest the female was very secretive. It always approached by flying through bushes and saplings about 3 feet above puddles and mud to the nest tree. Thus it arrived almost unseen by flying in the shadows of the forest floor. When near the nest tree, it swooped nearly straight up to land on the tops of the spine-edged pandanus leaves, about 2-3 feet from the nest, then, following a slight pause, it jumped to the nest, examined it, turned around, and then settled (with much shuffling of the wings and body) onto the egg. On January 28 near Kararau my boys called my attention to a male as it called from tall forest, understoried with nipa and sago palms very close to the banks of the Sepik. The sounds produced by this male reminded me of *Paradisaea*.

The stomachs of three specimens contained long, oval, blackish seeds, and one specimen contained yellowish fruit. According to native lore, this species eats the seeds of the sago palm and insects which it captures in the bases of pandanus and sago-palm leaf clusters.

***Paradisaea minor finschi* Meyer**

LESSER BIRD OF PARADISE; MAN

Weight: Six males, 192-234.

Iris lemon yellow; bill blue-gray; inside of mouth yellow-green to aqua-blue in the young males; feet gray.

In the middle Sepik River region, the Lesser Bird of Paradise is an abundant species of the rolling tropical rain forest (upper limbs and canopy) lying well back from the Sepik River, for example, about Gaikarobi.

It appeared uncommon to absent in the tall swamp and flood-plain forest bordering the main river. According to native lore, it nests during the wet season, but we were unable to find a trace of it despite special efforts. Two males trapped near Gaikarobi were photographed under natural conditions at Kanganaman (see Gilliard, 1955, p. 463).

For a discussion of the morphology and ethology of *P. minor*, see Gilliard and LeCroy (1961, p. 71).

PTILONORHYNCHIDAE

Chlamydera lauterbachii uniformis Rothschild

YELLOW-BREASTED BOWER BIRD;
GEN-NA-NA-GUN-GUN

Two specimens, one male and one female, were collected in 1954. In 1964, 10 specimens were collected by natives at Kanganaman.

Weight: Male, 133; female, 112.

Iris dark brown, bill dark brown to black, feet dull olive.

According to Rambur of Kanganaman, this species is fairly common in the bushy grasslands bordering the rain forest and in patches of cane grass bordering marshes. It is also found in the crown of the forest, sometimes well inside, where it feeds on tree fruits. It also eats insects.

We were unable to find the bower of this species, but Kanganaman natives had seen such structures in the grasslands near Kanganaman.

In 1964, the senior author learned from expedition natives that this species builds its bower in the vicinity of cane grass, usually at the foot of a bush or small tree, in May, June, and July. It decorates this bower with red, green, blue, black, and gray fruits of trees and hard berries. The red fruits wither to yellow in color. Much charcoal is used and sometimes stones, but since stones are few and far between in the Kanganaman region charcoal seems to be substituted. The period of bower building follows the period of high water.

The call of this bird is a hissing "kraaaaarr," according to the natives, and it is the same as that of the Aiome population. Incidentally, in 1959 in the Adelbert Mountains, Rambur immediately recognized *Sericulus bakeri* because its call is so much like that of *Chlamydera lauterbachii*. Because this is so, we suc-

ceeded in finding *S. bakeri*, even though all the local natives insisted that no such bird occurred.

Bowie says that, if a native garden is made in an area used for the bower, the species will move only a short distance to build a replacement. Year after year the bowers are placed in special areas so that old and new bowers can often be found near one another.

NECTARINIDAE

Nectarinia sericeus sericeus (Lesson)

BLACK SUNBIRD; MIKIS

Weight: Six males, 6-9.8; three females, 6-8.

This is a common species. At Gaikarobi it occurred about the flowers of trees in the forest-enclosed village, at Aibom and at Kanganaman in the forest edge, often in flowering coconuts, and in the midst of Lae we saw it feeding on frangipani and hibiscus flowers. One male and one female were collected at Wewak. Its call is a high-pitched "cheep."

Nectarinia jugularis frenata (Müller)

YELLOW-BELLIED SUNBIRD; MIKIS

Weight: Three males, 8.5-10.

This species was not found in the middle Sepik region, but at Wewak it was apparently not uncommon. In Lae in late October this species was by no means common. A pair was seen in a flame tree in the center of town, and one or two others were seen nearby in isolated trees in farmlands. One was seen 50 feet up in flight over a savanna. It flew in deep undulations, squeaking as it went.

MELIPHAGIDAE

Conopophila albogularis mimikae Matthews

RUFIOUS-BREASTED HONEYEATER; PIS

Weight: Females, 12, 14.5.

One specimen was shot 40 feet up in a casuarina growing among coconut trees beside the Sepik. Uncommon.

Myzomela eques primitiva

Stresemann and Paludan

RED-SPOT MYZOMELA

Weight: Male, 10.8.

Iris golden brown; bill black; feet dark gray.

Melilestes megarhynchus stresemanni Hartert

LONG-BILLED HONEYEATER

Weight: Males, 47, 52.

Iris red-orange, orange to yellow at pupil; bill dark brown; feet medium gray.

Xanthotis chrysothis philemon Stresemann

BROWN XANTHOTIS; LAPONGOSOU

Weight: Six males, 46.5–54; female, 40.5.

Very common in the forest, forest edge, second-growth formations and in native gardens. One stomach contained seeds, fruit flesh, and black insect wings.

Lichmera alboauricularis olivacea Mayr

WHITE-EARED HONEYEATER; DIPPMAHPINPIN

Weight: Twelve males, 13.5–19; females, 12.5, 13, 14.5

Abundant. Solitary, in pairs, or in small flocks in the tops of coconut and other trees of the river edge. Nests have been seen by Mava during both dry and high-water time. The nest is a small cup placed in a coconut tree.

Meliphaga analoga ssp.?

MIMIC MELIPHAGA; COCOMANTS

Wewak: One male, three females.

Wing: Male, 83; females, 75, 76, 78. Weight: Male, 26; three females, 19.8–23.

Iris gray to brownish gray; bill brownish black to black; gape bright yellow; feet gray. Molt medium on body, wings, and/or tail (four, one with testes enlarged, two with ovaries enlarged).

This series appears much more grayish on the abdomen than *connectens* from the Idenburg River. The race *flaviola* from Hollandia has the bill much longer.

Common in the forest, forest edge, and in trees in native gardens. One stomach contained small gray seeds, gray fleshy matter, and several legs of insects.

Meliphaga flavirictus crockettorum

Mayr and de Schauensee

YELLOW-GAPED MELIPHAGA

Weight: Male, 22.

It is probably significant that our only record of this relatively rare species from the middle Sepik region is of a bird that was taken in forests 20 miles distant from the

Sepik River, where relatively little collecting was done.

Philemon novaeguineae jobiensis (Meyer)NEW GUINEA FRIAR BIRD OR
LEATHERHEAD; CHAQUAK

Weight: Three males, 127–160; four females, 134–142.

Nest (Kanganaman, February 11) 45 feet up over canoe channel in heart of tall, open rain forest; a basket nest hanging in a slender lateral fork in the middle limbs of a tall *kapiak* tree; an adult appeared to be incubating eggs. On February 25, at this same nest, an adult was observed feeding young.

This is another abundant species that is found everywhere from the depths of the tropical rain forest (chiefly the upper limbs), forest edge, and second-growth formations, to sparsely treed gardens, villages, and towns. It goes in pairs or small flocks and is probably the noisiest bird in New Guinea. The leatherhead has a repertory of bugled notes that are so clownish they almost defy description. These are delivered very often from semi-concealed perches high up and commanding an extensive view. "Stik-ta-ba-co," rapidly repeated, is a common call; "ka-kek-ka-kek-ku" is another loud call, as is "yes-joe-joe-kup-kip-kup." Behind Bogadjim I confirmed what I had long suspected, that this species sings antiphonally; as I watched, one called "ki-kor-rik," to which another, directly overhead, added "queww." They did this a number of times. I would have taken the call for that of one bird had I not been standing where I was.

At Kanganaman the natives call this bird the "clock bird." Its calls can be heard all day and often at night, but they are loudest and most frequent in the early morning. One was heard at 4:35 A.M., October 29, in the middle of the town of Lae.

This species is usually observed in flight, because when it lands it usually swoops up, under, or behind leaves of the forest canopy where it is generally not so easily seen. However, at dusk, leatherheads move up usually in pairs to sit for long periods on high, exposed perches. A specimen that we autopsied had eaten small green insects.

I once saw a leatherhead fly out from a high perch, catch something in flight, and

then return to the same perching area. This species often fed among flowers in flowering trees. Its flight is direct, without undulations, and with steady wing flapping.

DICAEIDAE

Dicaeum geelvinkianum rubrocoronatum Sharpe

RED-CAPPED FLOWERPECKER; MEEGIS

Common but not easily observed in the middle and upper parts of the forest, or forest edge; also found in native gardens.

PLOCEIDAE

Lonchura tristissima calaminoros (Reichenow)

STREAK-HEADED MANNIKIN;
QUATENBU YENTCHAN

Weight: Male, 7.5; female, 8.3.

A solitary nest found in a forest-edge tree bordering a broad stream near the Sepik River at Kanganaman was said by native guides to be the nest of this species. It was 9 feet up, and ball-like, with a side entrance.

This species is common in fairly large flocks which occur in grass patches in open river-edge forest and forest edge.

Lonchura grandis ernesti (Stresemann)

GREAT-BILLED MANNIKIN; YENCHUAN

Wing: Males, 50, 50.5, 51, 53; females, 52, 53. Weight: Four males, 11.5–14; females, 13, 14. These measurements agree with those given by Stresemann (1921, p. 33) in his original description of *ernesti* (type locality: Serosensee, lower Sepik River) and are smaller than the average (54.1) given by Rand (1942b, p. 514) for *heurni* from the Idenburg River.

Iris red to dark red; bill whitish; feet gray to dark gray.

At Palimbai, January 11, I found eight nests, three, at least, and probably all, occupied, in a small patch of low, thick-leaved trees growing in swampy grassland at the edge of a pit-pit (cane-grass) swamp 100± yards in from the edge of the Sepik River. The nests were built of grass strips tightly intertwined among the small limblets and green leaves of the outer limbs. They were disheveled, ball-like structures with side entrances, separately built. Some were close together, some were 10 or more feet apart, placed 12 to 30 feet up.

This is a locally common species of the open grasslands of the middle Sepik region.

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