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INTRODUCTION

THE PRESENT REPORT is based on a collection of 526 specimens of birds obtained by the senior author and his wife, Margaret Tifft Gilliard, during the period from November 16, 1958, to February 15, 1959, in the Whiteman Mountains region, New Britain. The expedition was a continuation of the exploration of the Melanesian subregion in which the American Museum has been engaged for more than three decades.

HISTORY OF COLLECTING IN NEW BRITAIN

The Whiteman Mountains are situated in the heart of the main body of the island of New Britain. This range was virtually unknown prior to the present expedition and was, in fact, named as recently as 1922. Mr. E. R. Stanley, geologist of the Commonwealth Scientific Expedition of that year, named the range for Mr. S. Whiteman, a merchant of Rabaul, who had in 1914 given information to Australian authorities which led to the capture of the German ship "Komet" which had been hiding in a small bay on the north coast of New Britain. It was in this same bay that Mr. Stanley made a triangulation of many coastal islands and of points on this high mountain range inland from the bay (H. W. West, personal communication; Stanley, 1922; Mackenzie, 1939). The Whitemans had, so far as we can ascertain, been climbed only once previously, in 1955 by William M. Kaula who was engaged in a topographic survey for the United States Army Map Service. Kaula and two natives climbed the main peak from the north, setting out from Linga Linga Plantation, and spent most of a week on the crest.

In 1909 the Hamburg-South Seas Expedition crossed New Britain within a few miles of the western flank of the Whiteman Range. The crossing was from the mouth of the Pulie River on the south coast to the north coast at Rein Bay. This expedition then crossed back again from Borgen Bay to the south coast near Cape Bushing. In 1920 a District Officer at Gasmata crossed from the Pulie River to Iboki, following pretty closely the route of the 1909 expedition. Neither of these crossings penetrated into the Whiteman Mountains (see fig. 1).

In 1926 an Australian anthropologist opened new country behind Moewe Harbor, and since then Australian Government officers have made a number of trips to this region and other neighboring ones far inland but probably not to heights much above 3000 feet. Therefore, the high parts of the Whitemans had remained virgin territory. Although the island of New Britain had been well surveyed ornithologically in the tropical areas, collections had never been made at high altitudes in any of the mountain regions.

A history of the early ornithological exploration of New Britain can be found in Reichenow (1899) and Dahl (1899). The first collection in the present century was made by O. Heinroth, on the Deutschen Südsee Expedition of Bruno Mencke, in the Blanche Bay area of the Gazelle Penninsula in February, 1901 (Heinroth, 1902, 1903). These birds are deposited in the Zoologisches Museum, Berlin. Then about 1906 Father Otto Meyer observed and collected on Watom (Uatom), a small inland just north of the Gazelle Peninsula. He observed at least 87 species. Most of his specimens were mounted and were sent to the convent of the fathers of the Heart of Jesus in Hiltrup, Germany, where E. Hartert saw them. Notes were published by O. Meyer (1906, 1933, 1934, 1936, 1937).

The next comprehensive collection was made by Albert F. Eichhorn, who collected in the region of the Talasea Peninsula in January, February, and March of 1925. The Eichhorn party reached an altitude of some 3300 feet on a high spot of the Talasea Peninsula, but failed to penetrate into the Whiteman Mountains as had been originally planned. Lord Walter Rothschild, the sponsor of the expedition and the person for whom the birds were being collected, was primarily interested in obtaining a sampling of the mountain fauna, since he considered it highly likely that a distinct mountain fauna existed on New Britain, and that it might very well include unknown species of such families as

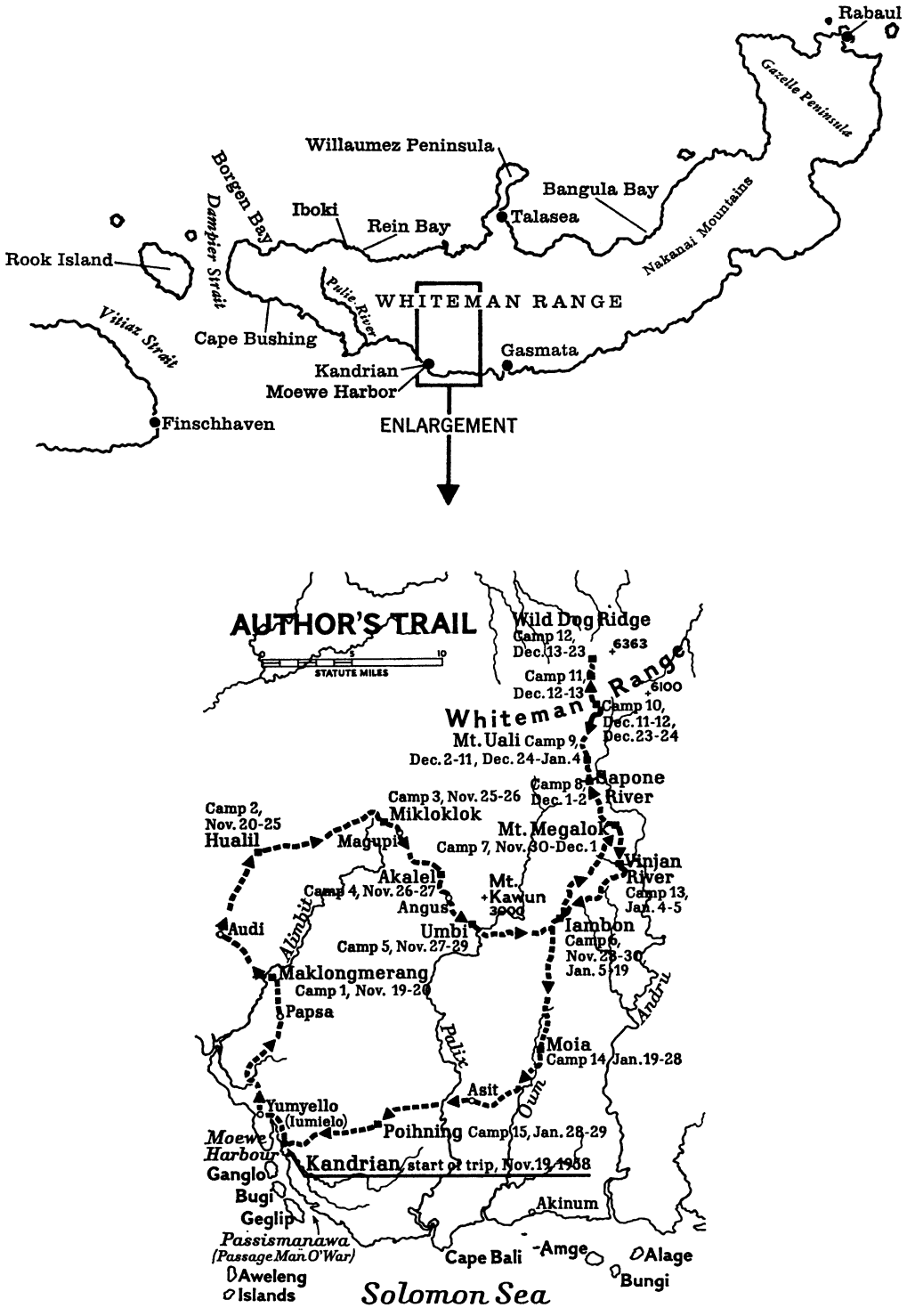

FIG. 1. *Top:* Map of New Britain, adapted from a map in the "National Geographic," for February, 1961. *Bottom:* Enlargement, showing routes and camps of the expedition; from the "National Geographic," for February, 1961. Both reproduced by special permission.

the birds of paradise and bower birds, both widespread in New Guinea just to the south of Vitiaz Strait but both unknown in New Britain. The Eichhorn expedition did obtain many new and interesting birds, including the new species *Accipiter luteoschistaceus* and *Turdus talasea*, but no true mountain birds and no birds of paradise or bower birds.

In 1932 and 1933 the Whitney South Sea Expedition sent William F. Coultas, accompanied by Harold and John James, to New Britain. Although this group worked for 19 months on New Britain, no trace of a mountain avifauna was discovered. It had been the hope of the expedition directors at home that the high mountains of the main body of the island would be surveyed and that this survey would conclude the ornithological survey of the island. To everyone's disappointment, the mountain survey was unsuccessful. In the Gazelle Peninsula the expedition failed to reach altitudes sufficiently high for the sampling of such an avifauna. In the Timiope Mountains, Coultas encountered difficulties, which made it impossible for him to conduct a high-altitude survey. Later, in the Nakanai Mountains, which Coultas visited alone, conditions were too dangerous for collecting.

The details of this expedition, which discovered several new species, are as follows: the party first surveyed the lowlands and low mountains of the Gazelle Peninsula south of Rabaul (Rabaul, Toma, Taulil, Malabunga, Katowi, Latromat, Lamassa, and Wunga) from February through August, 1932. In the second survey (October 1 to December 6) the collectors visited the north coast in the Nakanai Mountains region, spending most of the time in the lowlands near Bangula Bay (Tarobi, Possusu, Kaiama, Walo, Segi, Gaigeki, Lobi, and Sida) and also explored mountains to Malutu (2500 feet), Bangella, Kaiko, and Ti. The latter survey conducted by Coultas from the lowlands to Ti and return took the expedition to its highest point, 6200 feet. The round trip, plus collecting time in the highlands, covered only the period from October 10 to 17; and there was not sufficient time to survey the mountain avifauna.

The third general area of survey was the lowlands and hills on each side of Wide Bay. Headquarters were at the Tol Plantation from December 17, 1932, until June 1, 1933. Collections were made at Tol and along the nearby Mavola River, in the Baining Mountains (Balayang, Andamang, and Karlip) to a maximum altitude of 2500 feet, and then in the southern part of the Gazelle Peninsula and in the Timiope Mountains (situated in the northeastern tip of the main body of New Britain adjacent to Wide Bay) to an altitude of 3500 feet. This area was explored from April 19 to May 12 with rather poor results. No mountain species were collected.

The fourth area surveyed was the lowlands of the Usiwit River region of the north-northwestern tip of the Baining Peninsula (July 13 to August 2) where only a few species were collected.

The fifth area visited was the Talele Islands just off the northwest tip of the Gazelle Peninsula, visited for two days (July 27–28). In all, 127 species were collected.

After the Whitney South Sea Expedition, no one ventured to New Britain to collect birds. Then in 1953, while sailing between the Huon Peninsula of New Guinea and New Britain, the senior author was struck by the closeness of the two land masses, which lie barely 50 miles apart and are visible one from the other. He was aware of the fact that birds of paradise, so numerous on the Huon Peninsula, and also many other groups of birds, including the bower birds, had apparently never succeeded in crossing the strait, although many of the groups, including the birds of paradise, had crossed wider water barriers to Australia, the Moluccas, and to such satellite islands of New Guinea as the Trobriands, the Louisiades, and the Aru Islands.

It was after this trip that the senior author learned that the Whitney South Sea Expedition had not succeeded in adequately surveying the high mountains of New Britain, and that Lord Rothschild, among others, had believed that some day representatives of these families would be found in the high mountains of New Britain. In effect, despite all the collecting that had gone before, the main mountains of New Britain were still almost a virgin collecting territory.[1]

[1] Subsequent to the expedition herein reported, the Danish-sponsored Noona Dan Expedition, led by Finn Salomonsen, collected at Valom village in the mountains

A list of the land and fresh-water birds from New Britain, including species collected for the first time in 1958–1959, are given in the Appendix.

ACKNOWLEDGMENTS

The Gilliards received many courtesies during their stay in New Britain. In particular, thanks are due to the then District Commissioner, Mr. J. R. Foldi, and to the Australian Government for its cooperation and especially to Patrol Officer David Moorhouse for his invaluable assistance and warm friendship in the field and for reading the first draft of this manuscript and checking various details. Financial assistance was provided by the National Geographic Society, the Explorers Club, and the American Museum of Natural History; their generous support is gratefully acknowledged. The National Geographic Society also very kindly permitted use of the map of routes and collecting localities first published in the "National Geographic" for February, 1961.

The junior author wishes to express her appreciation for all of the assistance she has received in preparing this manuscript for publication after the death of Dr. Gilliard. In particular, thanks are due to Mrs. Gilliard for reading the Introduction and adding remarks from her own notes, and to Dr. Dean Amadon, who has spent many hours reading the original manuscript and has given much advice and many helpful suggestions. She is also grateful to Mr. H. W. West, now District Commissioner of the New Britain District, and the Project Section of the Department of District Administration for the extensive research they did in order to find the origin of the name of the Whiteman Mountains, and to Mr. Hobart M. Van Deusen of the Department of Mammalogy of the American Museum for information given in this paper on the mammals collected by Margaret Gilliard.

THE EXPEDITION

The expedition in the field consisted of the senior author and his wife. Patrol Officer David Moorhouse accompanied the expedition to the summit. The following notes on routes and collecting localities were taken with only slight alteration from the senior author's field notes, and references are to the field party.

ITINERARY

November 16, 1958–February 15, 1959	Kandrian, Base Camp	Sea level
November 19–20	Maklongmarang, Camp No. 1	400 feet
November 20–25	Hualil, Camp No. 2	600 feet
November 25–26	Mikloklok, Camp No. 3	900 feet
November 26–27	Akalel, Camp No. 4	1100 feet
November 27–29	Umbi, Camp No. 5	1400 feet
November 29–30	Iambon, Camp No. 6	1500 feet
November 30–December 1	Mt. Megalok, Camp No. 7	2000 feet
December 1–2	Sopone River, Camp No. 8	1800 feet
December 2–January 4	Mt. Uali, Camp No. 9	3000 feet
December 11–12	Wild Dog Mountain, Camp No. 10	2500 feet
December 12–13	Wild Dog Mt., Camp No. 11	3700 feet
December 13–23	Wild Dog Mt., Camp No. 12	5200 feet
January 4–5	Vinjan River, Camp No. 13	800 feet
January 5–19	Iambon, Camp No. 6	1500 feet
January 19–28	Moia, Camp No. 14	1000 feet
January 28–29	Poihning, Camp No. 15	600 feet
January 29–February 15	Kandrian, Base Camp	Sea level

ROUTES AND COLLECTING LOCALITIES

The village of Kandrian is situated on spectacular Moewe Bay. Upon first entering the bay, one is amazed by the curious conformation of the land, which appears as though it had been pulled from a waffle iron. The walls of the bay are formed of half-mile-

of the northern part of the Gazelle Peninsula from May 6 to 26, 1962; on Urara Island, northwest of Cape Liguan, Gazelle Peninsula, on May 21; and near Lake Hargy, inland from Apapulu, north of the Nakanai Mountains, in July.

long, coffin-shaped hills rising uniformly 300 feet above the sea. These are sharply cleft with narrow water channels or mere valleys, separating the long ridges. Between two of these, near the center of the bay enclosed within, lies the main entrance (to westward) of the harbor; to northward lies another wide entrance. This curious fortress-like formation is probably in reality an elevated atoll, and the bay itself is large enough to enclose a fleet of ships. Kandrian had a non-native population of 14 in 1959.

Government officers in Kandrian felt that it would be impossible for the expedition to obtain carriers for the trip into the Whitemans at any place other than Hualil (see fig. 1). Therefore we made a long detour northward. Accompanying us on the expedition was Patrol Officer David Moorhouse, who had previously been inland as far as Hualil.

The trail from Kandrian to Maklongmerang led through native gardens at sea level and through cool forest rich in lowland birds. Maklongmerang is a village of about eight native houses approximately 200 feet above the rushing Alimbit River. It has a "house kiap" (native house for visiting Australian officers) and a "house sick" (hospital under the direction of a trained native assistant).

On leaving Maklongmerang, we crossed the Alimbit River on a rope bridge and moved into tall open forest, which in places appears to be second growth. Farther on, the trail became very wet as we moved upward into tall original forest. Collecting at Hualil proved very difficult owing to heavy daily rains.

The trail up from Hualil was a rough one, and in places machetes were needed to open the trail. After about three hours of alternate climbing and descending into gorges, we reached a good trail at the site of an abandoned garden and followed it to Lais, a single native house on a spur of high land between an unnamed river and the Alimbit. From Lais we descended into a gorge, crossed the unnamed river, and headed northward. Soon we came upon an unusual terrain feature which our guides said was the head of the Alimbit River. We were 40 feet above a pool, below which were rapids and a good-sized river. All of the water issued from a large square hole in a rock face. A dull roar could be heard underground quite a distance from the opening through which the river emerges. From this feature our trail went up a steep hill and along a ridge in dripping forest to an area of second growth. Here we made camp in the abandoned garden called Mikloklok.

The following morning we left Mikloklok and followed a very difficult and wet trail through dripping forest where everything was covered with a sheathing of green moss and lichen, such as one might expect on a mountaintop but not so close to sea level. We crossed many streams, most of which had milky water, and were surprised to find so much water along a limestone track. Here we were on territory never before visited by a white man, but it had been known to the natives of the interior for so long that the trails connecting their villages are traced by limestone rocks actually worn smooth by their bare feet. However, the trail was not everywhere rock; in fact, it was mostly deep mud with spiny palms along the edge. A few pandanus palms were seen, and tree ferns were fairly common. We reached Akalel, where we camped, early in the afternoon. It is a small garden area of coconut and betelnut trees, sugarcane, and bananas, surrounded by virgin forest.

From Akalel we went south and then eastward over a trail composed of red clay and water-worn limestone. After about three hours of walking, we reached an east-west ridge top in a notch of limestone through which a constant draft was blowing, and about 10 minutes farther on we reached a rushing spring (Kumbu Spring), from which issued eight to 10 gallons of water per minute. The area around this spring is ideal for camping and collecting. The land is flat and well drained, and the vegetation is lush and tall. From here we passed through Angus village and northeast through a forest of rattan, climbing bamboo, and tree ferns, in which leeches abounded, to Umbi where we camped.

From Umbi we set out in the direction of Iambon, and after much hard walking and crossing many rivers we reached a very well-kept road which we found led from Iambon to Kandrian, three days distant. It was on this road that we would return to Kandrian on our trip out.

From Iambon we were led upward by an

old man, Selselio, who was said to have climbed Mt. Uali when he was young. After three days of climbing over dangerous trails, we reached Mt. Uali and set up our base camp for the high-mountain phase of the expedition. This camp was above a thousand-foot cliff in a splendid hardwood forest of tall, slender trees and a papery floor of heather-like plants. Looking to the southwest, we were able to see the ocean on clear days. For the first few days after setting up camp at Mt. Uali, we experienced such torrential rains that we were only able to carry on our photography and skinning by covering virtually the entire encampment with great sheets of clear polyethylene. At strategic spots we set up copra bags with polyethylene linings and caught gallons of rain water, which we kept in reserve. This system worked fine for a while, but gradually the rain ceased. The days were still foggy and damp, but no rain fell. Then we were hard-pressed to find drinking water from any source. After obtaining water for a while from the nodes of bamboo plants, we found a small water seep and were able to catch enough water for drinking purposes.

From Mt. Uali to our summit camp on Wild Dog Mountain the trail had to be pioneered and cut. We had to swing westward to avoid a large waterfall and the deep gorge in which it was situated. In order to enable us to reach the summit more rapidly, Margaret remained in Camp 9 and took charge of food and supplies to be sent up to us on the summit. In all, 10 days were spent in the summit camp. On three of these days Patrol Officer Moorhouse was present, and Margaret spent four days there.

We named the ridge on which we placed our summit camp "Wild Dog Ridge" after a pack of wild dogs, which we heard howl on several occasions. The local natives are afraid of these dogs and say that they belong to wild men who supposedly inhabit these mountains. They are, however, probably the progeny of animals that escaped into the mountains following the murder of their native owners several years before our arrival. The highest ridge, perhaps 200 feet higher, we named North Ridge. This is probably the true summit of the Whiteman Range.

The rainfall on these ridges is tremendous, amounting to some 300 inches per year, but, even so, there is very little water available in permanent streams. Owing to the porous nature of the limestone, the water sinks immediately into the ground and flows in deep underground channels, inaccessible from the surface. Therefore we had to rely on the water that we caught during the downpours. Several days without rain, however, again put water in short supply. Then we discovered that the older bamboo plants, which are moss-covered, contain water, whereas the younger plants do not. Thus one may survive indefinitely in the summit forests by obtaining water from these older plants. But this amount of water is never sufficient for boiling pots of rice for the native helpers—a real problem, as rice is their staple on such a trip away from native garden supplies.

We found many birds in these high forests that are, on New Guinea, restricted to the lowlands—for example, the Hornbill. This rather surprising fact indicates the presence of unfilled niches on New Britain into which the lowland birds may move. It may be that these vacant niches are seasonal and perhaps not very large owing to the lack of continuous high mountains in New Britain.

Our descent was in vivid contrast to the entrance trip, when we were exploring for a route and cutting a tunnel through thick vegetation. In two hours we had descended to the highest spot at which we had found standing water on Wild Dog Mountain (about 4500 feet). Here I had planned to set up Camp 13, but the water was reduced to a stagnant pool in a partial stream bed, and we pressed on, stopping only briefly at Camp 11 and in seven hours we reached Camp 10, where we spent one night. This is an ideal campsite and would be a first-class field site for some future expedition. It is in tall forest (100 feet), with everything from water to game and large areas of workable terrain in the vicinity.

On our return from the summit we spent another 11 days collecting, making photographs, and surveying the general area of Camp 9.

From Mt. Uali we retraced our way through Megalok (Camp 7) and camped for one night at the Vinjan River. This had been a large river when we ascended the range 35

days before but was sandy and dry upon our return. We found one waterhole, apparently permanent, about ¼ mile upstream. The following day we returned to Iambon to spend an additional two weeks collecting at our Camp 6.

From Iambon we took the road, mentioned above, that leads directly to Kandrian. We next stopped at Moia, a small village not far from the River Oum, where we stayed nine days. Here we had a marvelous opportunity to make photographs and films of a pig festival and native battle dress, and were also able to increase our scientific collections.

On January 29, 72 days after we left it, we returned to Kandrian. There we spent two weeks waiting for a chartered boat to take us back across Vitiaz Strait to Madang, New Guinea. This boat developed trouble and was unable to come for us; so we arranged to travel on the M.V. "Maimuna" along the south coast of New Britain, east to Rabaul. It was a five-day trip and gave us an opportunity to comprehend New Britain and its problems more fully. From Rabaul we flew west the full length of the island, passing directly over the Whiteman Mountains, and arriving in New Guinea in a few hours.

Methods and Procedures

All specimens made into study skins were sexed by dissection by the senior author. Labels were prepared by Margaret Gilliard, who recorded date, locality, altitude, native name, perishable colors (bill, feet, naked parts of face, wattles, iris, and other such parts), molt analysis, weight, and measurements before skinning. Margaret also dealt with the natives, treating them with medicines and trading with them for the various specimens that they brought in. In addition, she was in charge of mammal traps and made a collection of nearly 200 mammal skins. She also managed the camp so that the senior author was free to explore, collect, and record his notes. At the base camp on Mt. Uali, Margaret was in sole charge for eight days and sent provisions to the Wild Dog Mountain camp, so that all of the time available might be spent surveying the high-mountain avifauna.

Photographs, films, and tape recordings were made whenever possible. Some of these photographs, together with an account of the expedition, have been published (see Gilliard, 1961).

Native Assistants

Natives of the Sepik River region in New Guinea, who had been with the senior author on two previous expeditions, also accompanied the expedition to New Britain. Their names are: Rambur, Mapa, Bowie, Pono, and Tesaku of Kanganaman village. They proved again to be of exceptional assistance under difficult circumstances. Local natives were of some help to us as far as native lore concerning the birds was concerned. Although they were familiar with the animals near their own villages, their knowledge was surprisingly circumscribed as compared with that of the New Guinea natives we have encountered. In fact, the amazing thing about the people of the interior is the extreme localness of their interests and the very limited knowledge that they have of anything beyond the boundaries of their own "country." They were quite unaware, for example, of the existence of places such as Hualil, through which we had passed on our way to the Whitemans.

Selselio of Iambon was our guide to Mt. Uali. He was said to have climbed the mountain as a young man and was the only native who had. In fact, our Mt. Uali camp became something of a tourist attraction after our carriers had returned to Iambon and told of the extensive view to be had from atop the 1000-foot cliff on which our camp was situated. They had been looking up at this cliff all their lives but had never before dared to climb to its top. The natives had no knowledge whatever of the area beyond Mt. Uali. It was called "Yakin," the place of fire. There have been no active volcanoes here in thousands of years, so the origin of the name remains a mystery. But, according to Pamonly of Iambon, we were the first ever to climb this range, and the carriers who came up with food returned home with greatly heightened prestige.

With Patrol Officer Moorhouse were two native members of the New Guinea constabulary: Lance Corporal Mandina from the Sepik River area and Police Boy (later Constable) Mawei. These men were of inestimable value for their diligence, reliability,

and genuine friendship. Mandina in particular proved to be one of the most outstanding men we had met in the course of many expeditions.

Results of the Expedition

A total of 526 bird skins were prepared (see the Annotated List). Eighty-three birds, of the following species, were preserved in formalin:

Casuarius bennetti bennetti
Anas superciliosa pelewensis
Megapodius freycinet eremita
Ptilinopus rivoli rivoli
Ptilinopus sp.
Ducula pistrinaria vanwycki
Gymnophaps albertisii albertisii
Chalcophaps stephani stephani
Charmosyna rubrigularis rubrigularis
Micropsitta sp.
Cuculus saturatus horsfieldi
Centropus violaceus
Centropus ateralbus
Hemiprocne mystacea mystacea
Tanysiptera sylvia nigriceps
Rhyticeros plicatus dampieri
Lalage leucomela falsa
Coracina sp.
Dicrurus hottentottus laemostictus
Phylloscopus trivirgatus moorhousei
Rhipidura dahli dahli
Rhipidura rufiventris finschii
Monarcha verticalis
Pachycephala pectoralis citreogaster
Artamus insignis
Aplonis metallicus nitidus
Mino dumontii kreffti
Nectarinia sericea corinna
Myzomela erythromelas
Myzomela cruentata coccinea
Vosea whitemanensis
Philemon novaeguineae cockerelli
Dicaeum eximium layardorum
Zosterops minor hypoxantha

Disposition of Specimens

All bird specimens are in the American Museum of Natural History except one example of each species, which has been deposited with the Department of Agriculture, Stock and Fisheries, Port Moresby, Papua, in accordance with the terms of the permits issued to the expedition by the Department of Customs of Papua and the Territory of New Guinea.

Mammal specimens collected by Margaret Gilliard have been assigned to the Archbold Collections in the Department of Mammalogy at the American Museum. According to information supplied by Mr. Hobart M. Van Deusen, this is an important collection containing several rare and little-known species, with 358 items catalogued. Of this number 133 are "trophy skulls" (mandibles only). The remaining 225 specimens are skins or skulls, or both, and alcohol specimens of 27 species. A group of drawings was made of many of the mammals, especially the Chiroptera, showing details of the heads of even the smallest specimens. These were made with the aid of a magnifying glass before the specimen was skinned.

In all, there are 15 species of Chiroptera. Nine of these are Megachiroptera, including *Melonycteris*, which is new to the Archbold Collections, and possibly a new species of *Pteropus*. There are six species of Microchiroptera, including a large series of *Kerivoula*.

Of marsupials there are four species: *Phalanger*, a cuscus; *Petaurus*, a flying squirrel; *Echymipera*, a bandicoot; and *Thylogale*, a wallaby.

There are eight species of rodents represented, including two rarities: two specimens of *Uromys neobritannicus*, and one specimen of *Hydromys neobritannicus*.

Small collections of reptiles, amphibians, and invertebrates were turned over to the appropriate departments at the American Museum. An account of the frogs collected was published by Zweifel (1960).

PHYSIOGRAPHY AND CLIMATE OF NEW BRITAIN

New Britain is the largest island in the Bismarck Archipelago, with a length of some 300 miles and a maximum width of 90 miles (average width, 60 miles). It has an area of 14,600 square miles, around which extends a coastline of about 1000 miles. The eastern end, or Gazelle Peninsula, which is of recent volcanic origin, is attached to the geologically much older mainland by a neck of land only 20 miles in width. There are many active volcanoes, particularly on and at this neck of land. Southwest of the Gazelle Peninsula begins the 250-mile-long main body of New Britain which is but little known and is

sparsely settled along its narrow coastal fringes. Inland no white man lives.

The south coast of New Britain is made up of raised coral terraces and offshore reefs, and there is evidence that this part of the island is undergoing uplift. In some places several raised beaches can be seen, and rivers flowing southward maintain a steep gradient almost to the coast. In at least one instance a fairly large river pours from its underground channel over a cliff directly into the ocean (Noakes, 1942). Offshore, there is an area undergoing subsidence at present (the Planet Deep).

The north coast shows evidence of subsidence at the present time. It is in general an area of lowlands and slowly meandering rivers. Scattered areas of volcanic activity have relatively recently increased the area of New Britain by repeated eruptions. For example, the entire Willaumez Peninsula has been built up from such eruptions. Most of this area is forested, except near Mt. Talawe where there is some open grassland.

The central mountains are structurally related to the mountains of the Huon Peninsula of New Guinea and to the other ranges north of the Ramu-Sepik-Mamberamo gulch which reaches from McCluer Gulf in the West to the Huon Gulf in the east. The outermost islands in the New Guinea area (the Ninigo Group, the Admiralties, the Solomons, and the New Hebrides) are, like New Britain, analogous in morphology to the northern New Guinea ranges. All these islands are, in fact, of continental origin, and New Britain was in former times more closely connected to the mainland, although it does not at present lie on the continental shelf of Australia.

On New Britain the central mountains are lower than the central ranges of New Guinea, averaging about 5000 feet, with a few peaks as high as 7000 feet. They are composed of a series of separate ranges, some of which cross the island in a north-south direction, with broad valleys intervening. Exact information concerning large sections of the main ranges is lacking, since little exploration has been carried out in these areas. The Whiteman and Nakanai ranges have a core of pre-Tertiary metamorphic rocks covered by younger sedimentary layers (probably Miocene and later) which have been much broken by earth movements and dissolved and eroded by the heavy rainfall. These younger strata comprise the bulk of the mountains although, according to Carey (1938), the metamorphic rocks outcrop on some of the highest peaks in the Whiteman Range. Where limestone is on the surface, as it is in the area covered by this expedition, the topography is highly dissected, and surface travel is difficult and unpleasant, particularly since solution holes and knife-edged fragments of limestone are covered by thickly matted vegetation which often gives way under a man's weight.

The mountains are covered with heavy timber, most of which is virgin forest. The expedition discovered, on the summit of the Whiteman Range, an area of true moss forest, hitherto unreported on New Britain. Moss forest in New Guinea does not extend so low, so that it is surprising to find it at 5000 feet on New Britain. In this forest there is much rhododendron, and large stands of bamboo are common. When young, the bamboo grows free of moss and lichen and is almost invariably devoid of water. There are large mosquitoes on the floor of this bamboo forest. There is also a tall pandanus palm growing in the moss forest. Natives said it was of the edible variety, but no composite seeds were seen.

The climate of New Britain is one of extremes, corresponding to the prevailing winds. The northwest monsoon blows from November to April and causes heavy winds and rains along the north coast and in the northern watershed. From April to November, when the southeast trades blow, the situation is reversed, with the south coast having even heavier rainfall in its rainy season than the north coast, since there are no land areas to the southeast to deflect any of the rainfall. The average rainfall on the south coast is about 225 inches and falls mainly between April and December. July, August, and September are the wettest months. Most of the rainfall records are from coastal regions, and it may be that in mountain areas farther inland rainfall averages higher than the highest recorded average (276 inches at Ring Ring).

The arrival of the expedition in the Whitemans corresponded to the onset of the dry season in the southern watershed, the change-

over being about a month late in 1958. In this period of changeover the weather is very uncertain and treacherous. The most striking feature of the weather on the lower slopes was the wind. Dry, hurricane-force winds blew over expedition camps for days without diminution, broke limbs from trees, damaged native houses, and parched the ground and vegetation. On many of the trees evidence of forest fires could be seen, and it is credible that a forest fire started at the height of the dry season could burn almost the entire southern watershed unabated. Water is very scarce, even early in the season, with large rivers completely dried up and the beds sandy. In fact, according to native lore, some of the mountain natives lick the dew from the leaves of plants in order to obtain moisture during the dry season.

Rainfall on the summit of the Whitemans was still an almost daily occurrence but this was probably, in part, spill-over from the northern side of the range. Even with rain, water was a problem, owing to the very porous nature of the limestone that comprises the summit.

One earthquake occurred during the time the expedition was in the Whitemans. It occurred on December 25 at 5:55 P.M. at 3000 feet on Mt. Uali. During a driving rain the whole mountain shook for about three seconds, so violently that water splashed from water buckets. In about five places nearby, parts of the cliff have tumbled down within, at most, the last century; and doubtless each slide was triggered by an earthquake.

ORIGIN OF NEW BRITAIN BIRDS

New Britain lies close to the northeastern shore of New Guinea, being chiefly separated from it by Vitiaz Strait, a notoriously rough waterway 29 miles wide. New Guinea, with some 570 species of breeding land and fresh-water birds, has perhaps a richer avifauna than any other area of similar size in the world. New Britain, on the other hand, has an impoverished avifauna of about 130 species of breeding land and fresh-water birds (see Appendix). This is surprising because heavily forested New Britain would seem to offer many ecological opportunities for colonization.

Of the 98 species collected by this expedition, all are breeding species except one sea bird and seven migrants (list 1). Of the remaining species, 45 are wide-ranging (list 2), and 23 are species that are endemic in the Bismarck Archipelago (list 3), leaving only 22 species that have close relatives in either the Solomon Islands or in New Guinea. It is to these species that we can look for information concerning the origin of the New Britain avifauna. We found that 18 of the 22 (approximately 82%; list 4) have the eastern limits of their range in the Bismarck Archipelago and thus their closest affinities with New Guinea; whereas only four species (approximately 18%; list 5) have their western limits in the Bismarck Archipelago. It is evident, therefore, that the abundant bird life of New Guinea is the primary source of the birds of New Britain, but that there has also been some colonization from the direction of the more distant Solomons.

Degree of Endemism of New Britain Birds

Of the 90 breeding species collected, 30 (about 33%; list 6) represent species that have the same subspecies in the Bismarck Archipelago as that present in New Guinea or the Solomons, or both. Thirty-seven (about 41%; list 7) represent species, with one or more subspecies, that occur only in the Bismarck Archipelago, and 23 (approximately 26%; list 3) represent endemic species and one endemic genus. If the endemic genus, species, and subspecies are added together, 60 of the 90 species (about 67%) represent birds that have been geographically isolated in New Britain sufficiently long for differentiation to have occurred. From an examination of these birds, it is apparent that the duration of speciation affecting the various species has been very different. Side by side with very old endemics are poorly marked races as well as populations in which speciation has not yet occurred to a point worthy of taxonomic recognition.

This variability indicates that overseas dispersal is the process by which the New Britain avifauna has been acquired, that this process has been in operation for a very long time, and that it is still functioning, with the species arriving one by one in a sequence that is purely fortuitous but affected by such

factors as social behavior and prevailing winds. The strength of the water barriers that colonizing species must cross is to a large extent dependent on two reciprocating winds, the southeast trades which blow over the Solomon Island chain to New Britain in a northwesterly direction from April to November, and the northwest monsoon which blows in the opposite direction from November to April. These winds are strong and they undoubtedly impede the dispersal of birds between islands lying at right angles to their paths (as, for example, between New Guinea and New Britain), whereas at the same time they must favor dispersal between islands in their path. The fact that the New Britain species that have their closest relatives in the Solomons are social seems to reinforce the conclusion that dispersal from the Solomons to New Britain is passive.

List 1: Sea Birds and Migrants[1]

*Pluvialis dominica**
*Numenius phaeopus**
*Actitis hypoleucos**
*Heteroscelus incanus**
*Sterna hirundo**
Sterna bergii
*Cuculus saturatus**
*Myiagra cyanoleuca**

List 2: Wide-ranging Breeding Species

Podiceps ruficollis
Demigretta sacra
Nycticorax caledonicus
Dupetor flavicollis
Anas superciliosa
Aviceda subcristata
Haliastur indus
Accipiter novaehollandiae
Pandion haliaetus
Falco severus
Megapodius freycinet
Amaurornis olivaceus
Ptilinopus superbus
Ducula spilorrhoa
Macropygia amboinensis
Chalcophaps stephani
Gallicolumba beccarii
Gallicolumba jobiensis
Caloenas nicobarica
Trichoglossus haematodus
Micropsitta bruijnii
Larius roratus
Cacomantis variolosus
Eudynamis scolopacea
Scythrops novaehollandiae
Collocalia spodiopygia
Collocalia esculenta
Collocalia vanikorensis
Hemiprocne mystacea
Alcedo atthis
Ceyx lepidus
Halcyon saurophaga
Halcyon chloris
Eurystomus orientalis
Rhyticeros plicatus
Coracina papuensis
Coracina tenuirostris
Coracina lineata
Dicrurus hottentottus
Phylloscopus trivirgatus
Rhipidura leucophrys
Pachycephala pectoralis
Aplonis metallica
Mino dumontii
Nectarinia jugularis

List 3: Endemic Bismarck Archipelago Genus[2] and Species

Accipiter luteoschistaceus
Rallus (Habropteryx) insignis
Ptilinopus insolitus
Ducula finschi
Ducula melanochroa
Reinwardtoena browni
Charmosyna rubrigularis (also Dampier Island)
Loriculus tener
Centropus violaceus
Centropus ateralbus
Tyto aurantia
Ninox odiosa
Ceyx websteri
Halcyon albonotata
Ortygochicla rubiginosa
Cichlornis grosvenori
Rhipidura dahli
Monarcha verticalis
Monarcha hebetior
Artamus insignis
Myzomela erythromelas
Vosea whitemanensis*
Dicaeum eximium

List 4: Species with Eastern Limits in the Bismarck Archipelago

Casuarius bennetti
Ptilinopus rivoli
Gymnophaps albertisii
Macropygia nigrirostris

[1] The migrants are indicated by an asterisk.

[2] Marked with an asterisk.

Lorius hypoinochrous
Charmosyna placentis (extends to Bougainville)
Cacatua galerita
Micropsitta pusio
Tanysiptera sylvia
Lalage leucomela
Corvus orru
Rhipidura rufiventris
Monarcha alecto
Nectarinia sericea
Myzomela cruentata
Myzomela eques
Philemon novaeguineae
Zosterops minor

List 5: Species with Western Limits in the Bismarck Archipelago

Ducula pistrinaria (found on outlying islands in the New Guinea area but not on the mainland)
Ducula rubricera
Columba pallidiceps
Geoffroyus heteroclitus

List 6: Species Undifferentiated in the Bismarck Archipelago

Podiceps ruficollis
Demigretta sacra
Dupetor flavicollis
Anas superciliosa
Haliastur indus
Pandion haliaetus
Falco severus
Megapodius freycinet
Amaurornis olivacea
Ptilinopus superbus
Gymnophaps albertisii
Columba pallidiceps
Chalcophaps stephani
Gallicolumba beccarii
Gallicolumba jobiensis
Caloenas nicobarica
Lorius hypoinochrous
Trichoglossus haematodus
Charmosyna placentis
Micropsitta pusio
Geoffroyus heteroclitus
Scythrops novaehollandiae
Hemiprocne mystacea
Alcedo atthis
Halcyon saurophaga
Rhipidura leucophrys
Monarcha alecto
Aplonis metallica
Mino dumontii
Nectarinia jugularis

List 7: Species Racially Differentiated in the Bismarck Archipelago

Casuarius bennetti
Nycticorax caledonicus
Aviceda subcristata
Accipiter novaehollandiae
Ptilinopus rivoli
Ducula pistrinaria
Ducula rubricera
Ducula spilorrhoa
Macropygia amboinensis
Macropygia nigrirostris
Cacatua galerita
Micropsitta bruijnii
Larius roratus
Cacomantis variolosus
Eudynamis scolopacea
Collocalia spodiopygia
Collocalia esculenta
Collocalia vanikorensis
Ceyx lepidus
Halcyon chloris
Tanysiptera sylvia
Eurystomus orientalis
Rhyticeros plicatus
Lalage leucomela
Coracina papuensis
Coracina tenuirostris
Coracina lineata
Dicrurus hottentottus
Corvus orru
Phylloscopus trivirgatus
Rhipidura rufiventris
Pachycephala pectoralis
Nectarinia sericea
Myzomela cruentata
Myzomela eques
Philemon novaeguineae
Zosterops minor

ANNOTATED LIST OF THE BIRDS OF THE WHITEMAN MOUNTAINS

VERNACULAR ENGLISH NAMES given for the species follow Rand and Gilliard (in press) in cases in which the same species also occurs on New Guinea. In others, the names come from the literature; a few are original. Native names follow the English vernacular names after a semicolon; some are in the native language, and some are in pidgin. These are, for the most part, valid, but in some cases there may be a confusion of species, e.g., *Halcyon chloris*, *H. albonotata*, and *Ceyx websteri*. Weights are given in grams, and measurements are in millimeters.

CASUARIIDAE

CASSOWARIES

Casuarius bennetti bennetti Gould

BENNETT'S CASSOWARY; MURUK

Cassowaries are apparently quite common in the forests of the Whiteman Range, but they are so stealthy that they are rarely seen. Cassowary "beds" and droppings were common on all of the ridges. A cassowary "bed" observed on the summit of Mt. Uali, December 11, was beneath a thick forest 60 feet in height. The floor was covered with slender trees and plants resembling small rhododendrons. The "bed" itself was composed of dead leaves. It was 18 inches wide by 2 feet 6 inches long. Nearby were two piles of droppings containing large numbers of peanut-sized seeds.

PODICIPEDIDAE

GREBES

Podiceps ruficollis collaris Mayr

RED-THROATED LITTLE GREBE; YE-GO-HAM, YEK-WA-HAN

Wing: Male, 104; female, 104. Weights: Males, 208 (subadult), 301; females, 190, 214.

Adult female: Iris blood red; bill black; feet olive, mottled with black; soft skin at dorsal base of maxilla and eye-ring black; soft skin at gape and base of mandible pale yellow. Adult male: Like adult female, but with the pale nude areas of the gape and basal sides of mandible cream-colored. Two specimens (one male, one female) had the primaries and secondaries in sheath and were completely flightless. Mayr (1945, p. 2) noted that two specimens collected on Bougainville in early March were in a similar state.

Four specimens, January 20–23, constitute the first record of this species from New Britain. Previously the species had been known in the Bismarck Archipelago only from the island of New Ireland (Mayr, 1945, p. 1). The New Britain specimens were taken in a forest pond known locally as Palugia, which is on the upper Oum River about 10 air miles from Kandrian. Large numbers of small shrimps were found in the stomachs.

FREGATIDAE

FRIGATE BIRDS

[**Fregata ariel ariel** (Gray)]

LEAST MAN-O'-WAR

Three frigate birds were observed flying very high over the Kandrian Patrol Post at 10 A.M., February 11. After passing rapidly over Moewe Harbor, they went southwest over the sea. According to local residents, not uncommon.

ARDEIDAE

HERONS AND BITTERNS

Demigretta sacra sacra (Gmelin)

REEF HERON; GNAY-WUS

Weights: Male, 341; female, 370.

Four specimens in the gray plumage.

Nycticorax caledonicus mandibularis Ogilvie-Grant

RUFOUS NIGHT HERON; KOR-KA-KA

Iris gold in subadult female, yellow ringed with gold-brown in adult female; maxilla black, with long stripe of greenish yellow; mandible greenish, with black cutting edge; skin on face greenish yellow; eye-ring black; feet bright yellow-green.

Two Kandrian specimens were taken in the tops of mangroves bordering Moewe Harbor. One from Mt. Uali was first seen on a log beside a small forest stream (altitude about 2000 feet).

Dupetor flavicollis gouldi (Bonaparte)

BLACK BITTERN

Weights: 280, 309, 322, 336.

Iris gold washed with brown or tan ringed with yellow at pupil; maxilla dark brown; mandible dark brown, cutting edges shading to tan at base; skin on face brown to dark brown; feet dark brown to greenish brown.

Stomach contents: A small, colorful fish; grasshopper. Taken at Kandrian.

ANATIDAE

GEESE AND DUCKS

Anas superciliosa pelewensis
Hartlaub and Finsch

BLACK DUCK; VEE-YOU

Two females: Wing: 220, 220. Weight: 465.

These specimens fit the measurements given by Amadon (1943, p. 4) for *pelewensis*. The Black Duck was fairly common in pairs or small flocks on the Oum River in the vicinity of Moia.

ACCIPITRIDAE

HAWKS

Aviceda subcristata bismarckii Sharpe

CRESTED HAWK; GEK-SON, TAA-WOO

Kandrian: One female(?). Iambon: One male, two females. Moia: One male.

Weights: Males, 306, 310; females, 273, 320.

Iris lemon yellow; bill black, with base gray; skin around bill gray, one greenish yellow; eye-ring black in three, yellow in two; cere gray, one washed with yellow; feet dirty white to pale gray washed with yellow.

The Crested Hawk is a common, solitary species of the forest canopy, where it is usually encountered on an exposed perch over a forest glade. Four specimens had eaten large green, amber, and blue insects; one had what appeared to be small tree fruits in its stomach.

Haliastur indus girrenera (Vieillot)

WHITE AND RED EAGLE-KITE; PWLA OR POLA

Common alone or in pairs over the forests and beaches fringing the coast near Kandrian.

Accipiter novaehollandiae dampieri Gurney

RUFOUS-BREASTED HAWK; KA-WIWI

Weights: Males, 175, 178, 197; females, 304, 365.

Iris dark brown to dark maroon; bill black; feet, gape, cere, and skin at base of mandible bright yellow-orange; skin around eye dull yellow to olive; eye-ring black.

Common along the borders of streams, over native gardens and villages, and in open lowland forests and coconut plantations. Stomach contents: A snake 9 inches long, a lizard skull $\frac{3}{4}$ inch long, remains of a small bird, claws of *Megapodius*, insects.

Accipiter luteoschistaceus
Rothschild and Hartert

BLUE-AND-GRAY SPARROW HAWK; SI-AL-LI

Iambon: One subadult male. Moia: One subadult male.

Wing: 185, 186; tail: 143, 146. Weights: 215, 222.

Iris pale lemon yellow; bill black; feet dull egg yellow to yellow-orange; cere, eye-ring, gape, and skin on face yellow-orange.

Both examples were shot in tall, open forest, one as it stood on the ground and the other while it cried intermittently from a perch 25 feet up in the forest. One stomach contained a 6-inch lizard.

Pandion haliaetus melvillensis Matthews

OSPREY

Ospreys are thinly distributed along the coast near Kandrian.

FALCONIDAE

FALCONS

Falco severus papuanus Meyer
and Wiglesworth

ORIENTAL HOBBY; EVI-EVI

Female: Wing, 233; weight, 192.

One was observed flying over Poihning village January 28. The specimen collected had perched for 10 minutes on a dead limb 60 feet over a coastal mangrove edge.

MEGAPODIIDAE

MEGAPODES

Megapodius freycinet eremita Hartlaub

MEGAPODE OR WILD FOWL; DISIN, NEE-OCK, MULONG

Iris dark red-brown to brown; bill dull gold, two with olive base; feet dull greenish brown to blackish; naked skin on head bright brick red.

This species is encountered fairly commonly throughout the forests of the Whiteman Range, usually solitary on the floor of the forest. When flushed it sometimes flies to a limb about 10 feet up and perches quietly. Several were shot near the summit, and one was flushed from the forested bottom of a limestone crater. It flew up with a whining noise and sailed through the substage of the forest to a point some 50 yards away. While in flight it struck several saplings with its wings.

Although the expedition searched with great care, no nesting areas, old or new, were found. This subspecies, in contrast to the mound builders of New Guinea, incubates its eggs in holes in the ground in regions of volcanic activity (Reichenow, 1899). No signs of hot springs or other evidence of surface thermal activity were encountered in the Whitemans.

One bird shot November 28 near Umbi had four black, leechlike parasites in its lungs.

RALLIDAE

RAILS AND COOTS

Rallus (Habropteryx) insignis Sclater

PINK-LEGGED FOREST RAIL; TINGI

Wild Dog Mountain: Two females.

Wing: 139, 147.

In both specimens (dead for several hours before seen) the iris was blood red, the bill black, and the feet were rose-pink.

Stresemann (1932, p. 122), when he erected the genus *Habropteryx*, noted that *insignis* has the characteristics of a flightless bird (wing reduced, tail absent). Coultas wrote Mayr (Mayr, 1949, p. 12): "*Habropteryx insignis* is not flightless. I suspect that it can and does cover considerable distances on the wing." Gilliard never saw it fly.

Gilliard wrote in his field notes: "December 30, 1958: Two large rails were shot yesterday at about noon near Camp 11 (3700 feet). Three of my hunters were in the camp when they heard a series of calls about 100 yards off, which seemed to be coming from three or more birds. The three men immediately stalked the sounds and soon shot a *Habropteryx* on the floor of deep forest. Almost immediately after the shotgun report, a series of short, loud calls and some deep notes were heard. These came from the ground. The calling bird walked within range of one of the hunters who shot it. The other bird vanished."

Although this species is uncommon in collections, New Britain boys, who saw the two examples of *Habropteryx* being prepared, seemed to know this species very well. They say that it is not uncommon in the vicinity of Iambon village (1500 feet). Coultas (*in* Mayr, 1949, p. 12) informed Mayr that it is probably common throughout New Britain.

Somewhat reluctantly we follow Mayr (1949) in placing this large rail in the genus *Rallus*. In combining *Habropteryx* with *Rallus*, Mayr wrote (1949, pp. 11–12): "In spite of the apparent flightlessness of the species, I doubt whether it is wise to camouflage its obvious *Rallus*-nature by segregating it in a separate genus."

Stomach contents: Insects and pink seeds. One stomach was crammed with the remains of eight to 10 iridescent green beetles.

Amaurornis olivaceus nigrifrons Hartert

BUSH RAIL; KI-YUM-BEL, MOL-DAN-UH

Weights: Male, 179; female, 177.

Iris brown to brownish gray; feet dull gold to dull mustard yellow. A specimen in the American Museum collected in early September by William F. Coultas in the Baining Mountains carried eggs that were almost ready for laying. Other specimens collected by him in New Britain had the gonads moderately enlarged during the months of April, July, August, and September.

Apparently fairly common; very noisy, calling "ka-ka-ka." One of our specimens was one of a noisy pair found calling back and forth at dawn in grass along the muddy edge of a village clearing. The clearing was at an

altitude of 1500 feet, and it was surrounded by many miles of forest. Our second specimen was also reported to be one of a pair. It was taken in the edge of a native garden at an altitude of 1000 feet.

CHARADRIIDAE

PLOVERS

Pluvialis dominica fulva (Gmelin)

PACIFIC GOLDEN PLOVER; RA-BI

A small flock was observed in a stony field bordering mangroves fringing the bay at Kandrian.

SCOLOPACIDAE

SANDPIPERS, CURLEW, AND SNIPE

Numenius phaeopus variegatus (Scopoli)

WHIMBREL

Weights: Males, 356, 360.

Both specimens were shot on the rocky beach bordering Moewe Harbor.

Actitis hypoleucos (Linnaeus)

COMMON SANDPIPER; AY-NARIM, YA-RI

Fairly common along the edges of small inland streams and rivers.

Heteroscelus incanus incanus (Gmelin)

WANDERING TATTLER

Kandrian: Three females.

Weights: 104, 112, 116.

We find that *incanus* is rather easily separated from *brevipes* in the winter plumage by differences in the tail tips. In *incanus* the tail is completely or nearly clear gray, whereas, in *brevipes*, the distal third of the tail is indistinctly marked with narrow white spots and bars.

Mayr (1949, p. 34) noted that the Asiatic Tattler and the Wandering Tattler winter together regularly in northern Melanesia. He stated that the American form (*incanus*) is outnumbered by the Asiatic form (*brevipes*) by about 10 to one. It is interesting, therefore, that the three specimens encountered by this expedition (which worked for only a very brief time in coastal areas) should all have been the New World form. All were taken along the coral beaches of the protected Moewe Harbor. All were very fat and in medium-heavy molt.

LARIDAE

GULLS AND TERNS

Sterna hirundo longipennis Nordmann

COMMON TERN

Weight: Male, 128.

Fairly common in loose flocks on the coast facing the open sea.

Sterna bergii cristatus Stephens

CRESTED TERN

Weight: Female, 244.

One was shot from a flock of seven observed sitting together on an exposed reef just outside Moewe Harbor, facing the open sea.

COLUMBIDAE

PIGEONS AND DOVES

Ptilinopus superbus superbus (Temminck)

SUPERB FRUIT PIGEON; NEE

Weights: Males, 102, 111, 126; female, 105.

Iris yellow or greenish yellow (one ringed with yellow); bill olive (males), blue-green (female); eye-ring yellow to yellow-green; skin on face yellow-gray; feet bright to dark rose.

Fairly common in the lowland forests. Stomach contents: Pea-sized berries, seeds of a tree fruit, and large fruits of a *Ficus* vine.

Ptilinopus insolitus insolitus (Schlegel)

ORANGE-BELLIED FRUIT PIGEON; SA-KUL

Weights: Male, 162; female, 115.

Iris cream; bill olive, with tip and cutting edge yellow to greenish yellow; eye-ring gray to yellow-gray; cere bright rose-red to ruby-red; feet dull red-violet.

Ptilinopus rivoli rivoli (Prévost and Knip)

WHITE-CHESTED FRUIT PIGEON

Weights: Males, 138, 147; females, 132, 134.

Iris yellow (one with a red rim), yellow-orange, orange with a yellow inner ring, red-orange; bill olive to yellow; cere and skin on face yellow; eye-ring black to gray; feet dark rose. Stomach contents: Orange tree fig.

A common species of the mountain forest. The deep purple cap and white chest band are prominent field marks; nevertheless, the species is almost always difficult to see in the canopy of the mountain forest.

On December 15, a nest containing a single white egg was collected in a limestone gully covered with low forest on the summit of Wild Dog Mountain. Another nest, also with one white egg, was observed on December 13 7 feet up in the lower tier of a fairly open hill forest at about 3000 feet. A third nest, again with a single white egg, was reported on December 17.

Ducula pistrinaria vanwyckii (Cassin)

GRAY IMPERIAL PIGEON

Wing: 246.

Iris dark maroon; bill gray; skin on face gray; cere and eye-ring maroon; feet dull red-violet.

These birds are apparently confined to forest near the coast. The specimen taken was one of a pair in a tall tree bordering the mangrove forest.

Ducula rubricera rubricera (Bonaparte)

RED-KNOBBED DUCULA PIGEON; WUL-UUS

Weights: Males, 693, 705; female, 628.

Iris dark red to dark red-violet; bill dark brown to black; eye-ring gray; cere bright rose to ruby-red; feet dark rose.

Very common in the lowland forest where many specimens were taken for food at Hualil and at Iambon. The species was very uncommon at 3000 feet on Mt. Uali; above that altitude it appeared to be missing.

Ducula finschi (Ramsay)

BAR-TAILED DUCULA PIGEON; WUL-UUS, SANG-SISA

Weights: Male(?), 384; female, 308.

Iris ruby-red to rust-brown (female); bill black; eye-ring bright carmine to dark red; feet bright carmine to bright vermilion-rose.

Our only records of this species are from the canopy of the tropical forests, where it appears to be rare and usually solitary.

Ducula melanochroa (Sclater)

BLUE-BLACK DUCULA PIGEON

Iris red-orange to blood red; bill dark gray; eye-ring wine; feet deep wine.

This large, robust, blackish pigeon was fairly common throughout the mountain forests of the Whiteman Range and was often observed in sizable close-knit flocks flying above the highest forest. It was fond of sitting on exposed limbs overhanging rocky cliffs, where in sunlight the coral-red eye showed up vividly in contrast to the generally blackish body coloration. Once while descending to Camp 11 through an area some 5 miles long covered with tall forest containing trees more than 100 feet high, Gilliard several times noticed large trees near the trail in which six to 10 of these duculas were perched quietly on the highest limbs.

The deep "coo's" of this species were heard throughout the day. They form one of the most characteristic sounds of the forests.

Ducula spilorrhoa subflavescens (Finsch)

TORRES OR NUTMEG PIGEON; LANG-A-MA

Iris very dark brown to black; bill pale blue-gray, with greenish yellow tip; eye-ring pale blue-gray; feet blue-gray to slate gray.

This species was very common throughout the low and mid-mountain forests. A pair, the female with the ovary very much enlarged, appeared to be involved in nest building.

Gymnophaps albertisii albertisii Salvadori

CARMINE-FACED MOUNTAIN PIGEON

Mayr (1934, p. 5), comparing large series of this pigeon from New Britain and New Guinea, found that the New Britain population differs by having the breast averaging slightly paler, more whitish, with less pinkish buff, and the throat and upper abdomen more grayish; also by having the wing averaging slightly longer. He concluded that there was too much overlap in these characters to warrant recognizing the New Britain population. With fresh material at hand from both New Britain and New Guinea, plus specimens from New Ireland that Mayr did not mention, it seemed advisable to re-examine these birds.

We found the slight differences mentioned by Mayr for New Britain birds to hold also for the New Ireland specimens. However, the tail is quite long in the two New Ireland specimens (see measurements). Future collections on New Ireland may show that this population should be recognized.

Hartert (1925, p. 120) thought the New Ireland population small-billed. We find that, although the bill averages slightly smaller than that of New Guinea birds, there is much overlap.

Measurements of the wing and tail, respectively, of females of *Gymnophaps albertisii* are:

New Guinea: (15) 195–206 (average 199.3); (17) 123–142 (average 132).

New Britain: (13) 195–214 (average 202.8); (11) 134–147 (average 139.4).

New Ireland: (2) 206, 210; (2) 148, 153.

The Carmine-faced Mountain Pigeon was encountered fairly commonly in the middle and upper tier of the mountain forest between Iambon and the summit of the Whiteman Mountains. In addition to the specimens collected (which were shot from the canopies of large fruiting trees) the senior author observed it frequently while traveling in the mountain forests. As in New Guinea, this species appeared always to keep together in flocks of from about three to 10 birds. When a bird was shot from such a group, the flock usually shifted only a short distance before settling down again.

It was a surprise to find this species at 1500 feet on New Britain, because in New Guinea it is apparently very rare below 5000 feet.

Coultas wrote on the label of a female collected in the Nakanai Mountains that the iris of this pigeon has three color rings: the outer scarlet, the center pale brown, and the inner yellowish brown.

Columba pallidiceps (Ramsay)

GRAY-HEADED PINK AND BLACK PIGEON; WULUS-SAVIUN

Weight: Male, 459.

Iris yellow ringed with orange; bill (including soft basal portions) red-violet, with outer one-third pale blue-gray; eye-ring carmine; feet yellow-orange. Stomach was filled with pale green tree fruits and some brown seeds.

Apparently uncommon. Only one specimen was encountered by the expedition. It was shot by Corporal Mandina in the crown of a tall thick tree at the edge of a native garden near Iambon.

Macropygia amboinensis carteretia Bonaparte

AMBOINA CUCKOO-DOVE; YON-GAL

Weights: Males, 147, 150, 178; four females, 131–160.

Iris gray ringed with rose; feet bright rose to grayish rose.

The few birds observed by the senior author were either solitary or in pairs on high branches bordering native clearings or natural gullies which form semi-open areas in the original forest.

A number of the specimens had eaten small tree fruits with hard pits.

Macropygia nigrirostris major van Oort

BLACK-BILLED CUCKOO-DOVE; YON-GAL

Weights: Male, 75; female, 88.

Iris color appears to be quite variable in this species. The males may have the iris red through orange to dull yellow, but one had brown, one had red with a thin white inner circle, and one had three bands of color: inner, white; middle black; outer orange-yellow. The females showed exactly the same range of colors, even in possessing the three rarer iris variations listed for the males. Subadult specimens had the iris brown to brownish red, and Gyldenstolpe (1955a, p. 44) listed a nestling as having the iris blackish.

Van Oort (1907, p. 174) described birds from New Britain and Duke of York Islands as a subspecies, *major*, on the basis of their larger size and more slender bill. Mayr and Rand (1937, p. 39) examined specimens from southeastern New Guinea and eastern New Britain (Baining Mountains) and concluded that *major* is a valid, though slightly differentiated, race on the basis of its more slender bill and, on the average, paler under parts. Measurements showed much overlap, although the tail of Baining specimens averaged longer. The coloration and barring on the inner secondaries mentioned by van Oort were found by Mayr and Rand to show much individual variation and not to be diagnostic.

Since our New Britain specimens are from the western part of New Britain, in an area between the localities considered by Mayr and Rand, it seemed advisable to re-examine skins from the entire range of the species in order to determine the subspecies occurring in our area.

We found, as did Mayr and Rand, that there is much individual variation in color. Although birds from the Bismarck Archipelago may average very slightly paler, there are birds from the Vogelkop as pale as the palest bird from the eastern end of the range.

Nor did we find any consistent difference in the amount of barring on the inner secondaries, as suggested by van Oort in his original description. Gyldenstolpe (1955a, p. 44) suggested that Vogelkop males tended to be of a "darker chestnut-purple on the occiput and nape" than birds in the Western Highlands. However, with the large series at our disposal, this proved also to be individual variation.

Mayr and Rand called attention to the fact that a male from the Baining Mountains in New Britain has a longer tail than any from New Guinea. Our male from the Whitemans also has a long tail (see table 1), but, as Mayr and Rand pointed out, this difference is not decisive, since there is so much overlap with measurements of New Guinea birds. Measurements of wing and culmen (see table 1) did not show any consistent differences. Thus the Bismarck Archipelago birds cannot be separated on the basis of size. There does, however, seem to be a slight increase in tail length from west to east.

Rand (1942, p. 444) mentioned that material from the Snow Mountains indicated an

TABLE 1

MEASUREMENTS OF *Macropygia nigrirostris*

	Wing	Tail	Culmen from Base
Japen			
Three males	139–143	140–155	18–20.5
Three females	140–142	147	18–19.5
Vogelkop			
Five males	145–157	148–159	19–20
Four females	141–144	149.5–156	18–19.5
Weyland Mountains			
Two males	147.5, 150	149, 162	19, 19.5
One female	141	154	20
Snow Mountains			
Two males	148, 155.5	158, 175	19
Five females	141–148	153–160	19–20
Mt. Goliath			
One male	150	163	20.5
Mt. Wilhelm			
One male	147	161	19
Astrolabe Bay			
Eight males	142–153	151–171	18.5–21
Five females	136–144.5	141–151	18.5–20
Southeastern New Guinea			
Eleven males	144–152	148.5–163	19–21
Six females	141–148	143–162	18.5–21
Fergusson Island			
One male	150	170	20
Whiteman Mountains, New Britain			
Two males	147, 153	180	19, 20
One female	141	158	20
Baining Mountains, New Britain			
Four males	145–151	166–181	18.5–20
Two females	138, 147	154.5, 165	19, 19
New Ireland			
Three males	145–147	157–169	17.5–19
Two females	138.5, 145	166, 169	19, 19
New Hanover			
One female	144.5	174	18
Tabar Island			
One female	145	163.5	18.5

increase in size with increase in altitude. Our data from other areas are not sufficiently detailed regarding altitude for us to comment on this point except that, in the light of the large individual variation and west-east cline in tail length, birds from 4000 and 5000 feet in the Astrolabe Bay area did not differ significantly in size from specimens from Madang at sea level. The female from an altitude of 50 meters listed by Rand as having a wing length of 139 is a subadult specimen that possesses all the characters listed below as indicating the subadult condition. Individual variation would account for the other differences in wing length that were noted by him.

We did find one consistent character by which birds from the Bismarck Archipelago may be separated from those of New Guinea and the D'Entrecasteaux Islands. The more slender bill which Mayr and Rand mentioned for New Britain birds holds true for birds from New Ireland, Duke of York, New Hanover, and Tabar islands as well as for birds from the Whiteman Mountains.

When we studied our large series of specimens, it became evident that there is a distinct and easily recognizable subadult plumage, similar in males and females. Subadult birds are superficially similar to adult females; the most striking feature of the subadult plumage is the irregular barring on the tail and tail coverts. Instead of the pronounced horizontal barring present on the adult, the pattern is broken down. The barring on the central tail feathers runs parallel to the edge of the feathers for at least the distal third, and the barring of the proximal two-thirds is very broken and irregular. All the rectrices show this pattern to some extent—in some cases only on the outer vane, the inner vane lacking bars. The tail coverts have a scalloped appearance, since the bars follow the edge of the feather instead of crossing the feather horizontally.

Subadult birds also show a rufous band around the outside of the secondaries, and there may be a second rufous bar inside of this and parallel to the edge, giving the secondaries a longitudinal striped pattern. In addition, some of the feathers on the sides and top of the head and on the upper back may be tipped with very light tan rather than rufous, but such is not invariably the case.

This species was encountered in the higher forests of the Whiteman Range where it was apparently rather uncommon.

Reinwardtoena browni (Sclater)

LONG-TAILED BLACK-AND-WHITE PIGEON; WIL-I-PUNG

Weights: Males, 306, 306; female(?), 279.

Iris yellow to orange; bill red-violet, with outer one-third black to brown; naked skin on face, eye-ring, and cere red-violet; feet red-violet to pink.

This species was observed only in the tall forests in the foothills of the Whiteman Mountains where is was rather uncommon and usually solitary. Coultas took it up to 3000 feet.

Chalcophaps stephani stephani Pucheran

GREEN GROUND PIGEON

Weights: Males: 108, 113, 114, 114.

Iris dark brown, bill red-orange to rusty brown tipped with black; cere and eye-ring maroon; skin on face gray; feet pale mauve speckled with maroon and rose.

Apparently this species was common on the floor of the higher coastal forests, but it was not encountered elsewhere.

Gallicolumba beccarii johannae (Sclater)

GRAY-CHESTED GROUND DOVE; SA-VIP-IM, WIL-PAR-UNG

Weights: Males, 84, 92, 94, 104.

Iris dark brown; bill dark brown to blackish; eye-ring tan to gold; skin on face palest blue to pale blue-gray; feet rose-pink.

Food: One of the specimens had 52 seeds of the "garo-garo" palm and three larger seeds in its crop, and its stomach contained a mass of gritty vegetable matter. Another had the stomach "filled with gritty black and buff insect parts, beetles(?)." J. Delacour informs us that it is not at all uncommon for ground doves to eat large quantities of insects.

Apparently thinly distributed in the substage of the lower and mid-mountain forests of the Whiteman Range. Very secretive and apparently solitary much of the time.

A nest with one fresh egg was found near Iambon village January 11. The hunter who

brought it in reported that the nest was on the ground. The egg, which was longish, oval, and white, measured 33 by 22 mm.

Gallicolumba jobiensis jobiensis (Meyer)

WHITE-BREASTED GROUND DOVE

Weight: Male, 173.

Iris dark brown; bill black; eye-ring gray; feet dull rose-brick.

Apparently scarce. Found under vegetation of the coastal strip bordering Moewe Harbor. The one specimen was alone. It flushed from the cleared surface of a little-used trail in semi-open, stunted forest and flew to a fallen trunk lying nearby where it perched 2 feet up.

Caloenas nicobarica nicobarica (Linnaeus)

NICOBAR PIGEON; KU-SI-YUNG

A pair flushed from the forest floor at Moia; another was taken at Kandrian.

PSITTACIDAE

LORIES, PARROTS, AND COCKATOOS

Lorius hypoinochrous devittatus Hartert

EASTERN BLACK-CAPPED LORY

Weights: Males, 198, 219; females, 205, 225.

Iris pink to bright brown; bill dark orange to red-orange; eye-ring black; cere ivory.

This was an abundant species of the upper story of the rain forest.

Trichoglossus haematodus aberrans Reichenow

COCONUT LORY

Weights: Males, 96, 105; female, 90.

Iris red-orange to orange; bill orange to dark red; cere and eye-ring black; feet olive gray to dark gray.

The Coconut Lory was common in small, noisy flocks in the tropical forest crown where it was often observed feeding among the blossoms of flowering trees. It was also observed on the summit of Wild Dog Mountain but was apparently uncommon above about 3000 feet.

Charmosyna placentis pallidior (Rothschild and Hartert)

BLUE-CHEEKED PARAKEET; SU-LU-HOO

Weights: Males, 27–33; females, 26.5–37.

Iris pale yellow to pale orange; bill bright rose to rose-red; eye-ring dark gray to blackish; cere dull orange to dull brick red; feet pale rust to pale wine red.

This species was abundant in the crown of the lowland tropical forest from sea level to about 1000 feet. Almost all our specimens were shot while feeding from the blossoms of an extremely tall tree growing in the forest edge near a native garden. There was much interflock fighting among the blue-cheeks as they fed on nectar; attacks on intruding myzomelas were noted frequently.

Charmosyna rubrigularis rubrigularis (Sclater)

ROSE-CHINNED LONG-TAILED PARAKEET; KLAIS

Weights: Males, 33–37; females, 32.5–34.

Iris gold to red (males); yellow-orange to orange (females); bill dull red-orange; cere dull red to dull red-orange; eye-ring gray to black; feet red-orange to orange.

Abundant in flocks of as many as 10 in flowering trees in the canopy of the mountain forest from about 1500 feet to the summits of the highest peaks. Often found in company with flocks of honeyeaters. Apparently *Charmosyna placentis* and *C. rubrigularis* replace each other altitudinally in the forests of the Whiteman Range.

Cacatua galerita ophthalmica (Sclater)

WHITE COCKATOO

Iris, cere, and feet black; bill black to blackish gray; eye-ring cerulean blue.

Abundant in the tropical rain forests; usually observed in pairs flying above the forest, and screaming all the while. Rare above an altitude of 3000 feet. On December 8 from a lookout at 3000 feet, the senior author watched a white cockatoo as it descended a steep mountain slope nearly a thousand feet. In his notes he recorded the flight as a long fluttering glide, with the wings moving but slightly. Toward the end of this flight the bird began turning and twisting as though to reduce speed. It then doubled back and disappeared into a forested canyon.

Micropsitta pusio pusio (Sclater)

GREEN PYGMY PARROT; KAL-LANG

Wing: Males, 64.5, 65.6. Tail: males, 27, 29. Weights: Males, 12, 13.5.

Iris dark brown; bill mottled yellow to

mottled gray; cere and eye-ring pale gray; feet flesh-colored to gray.

Fairly common in the lowland forests, whereas the orange-bellied species is found only in the mid and high mountain forests. A Kandrian specimen was shot in the middle portions of the forest on a hillside immediately behind the government station. It was one of three. Mava, a hunter, reported that the birds scanned the smaller limbs and trunk for food, and that sometimes they moved about with the head downward. He observed at least one bird as it stripped away thin strands of bark, then fed on something beneath. The specimen that he shot had small brown objects and whitish matter in its stomach. Another specimen, from Moia, had black and white insect remains (termites?) in its stomach.

Micropsitta bruijnii necopinata Hartert

ORANGE-BELLIED PYGMY PARROT

Mt. Uali: Three males, two females.

Weights: Males, 13.5, 15.5, 15.5; females, 11.5, 13. For measurements, see table 2.

TABLE 2

MEASUREMENTS (IN MILLIMETERS) OF *Micropsitta bruijnii necopinata*

	Wing	Tail
New Britain		
Three males	66, 69, 70	27, 29, 31
Two females	63, 63.5	26, 27
New Ireland		
Five males	66.5, 67, 67,[a] 68, 70	28.5, 29,[a] 29.5, 30, 32

[a] Measurements of the type.

Iris dark brown; bill pearl gray; cere flesh to rose (males); cere and eye-ring gray (females); feet bluish gray to gray.

Gilliard wrote in his journal: "December 10: Camp 9 (3000 feet): At about 8:30 A.M. with David Moorhouse I watched six to possibly eight Pygmy Parrots feeding and moving about in the high limbs of trees growing along the top of the narrow volcano lip near Lookout Point. I watched them first with the naked eye and then with binoculars which had been rushed to me. In all I observed the birds for about five to seven minutes before David and I synchronized our shots to bring down two birds.

"The flock kept to the upper limbs and trunk of the slender forest tree. Rarely did they move on purely vertical surfaces. The birds moved industriously, shuffling here and there usually on the tops of horizontal or sloping limbs, frequently bobbing the head over the side and completely around the perching limb. Often the birds leaped several feet like jumping jacks, as they shifted limbs. The group kept together very closely and worked for long periods in the same small area. The birds I watched remained within a radius of 30 feet during the 5–7 minutes we watched.

"I looked particularly at the bill movements, trying to see what the birds were eating. The bill was usually directed downward and was used to bite or pull at something on the surface—usually the sides or bottom of medium-sized limbs (limbs equal or twice the diameter of the bird's body). This kept up continuously, but I could not see what was being eaten.

"This is the first time I have seen *Micropsitta* in New Britain, despite long periods of observation in the immediate area where the birds were taken. They seem to be very local and to live in scattered, nomadic flocks. Aside from the two specimens collected from a flock of three on December 4, apparently only one other has been seen, that one a bird shot at by Mava about December 6."

This species was never encountered below an altitude of 2500 feet. One specimen had soft yellowish orange matter in its stomach, also small black objects resembling insect remains. This stomach was saved in formalin. Two other specimens had golden brown matter in the stomach.

TAXONOMY: The range of the Orange-bellied Pygmy Parrot (*Micropsitta bruijnii*) extends from Ceram through New Guinea to the Solomon Islands (Guadalcanal and Kulambangra) and the Bismarck Archipelago (New Ireland and New Britain). The discovery of the last-mentioned population in December, 1958, extended the range of the species from New Ireland and added a new species to the known avifauna of New Britain.

It should be noted that Mayr and others strongly suspected that *M. bruijnii* would eventually be found in the mountain forests of New Britain (see Mayr, MS, p. 115). Possibly when adequate mountain surveys are conducted on New Hanover, the species will be found there also.

GEOGRAPHICAL VARIATION: Although the species has been divided into five subspecies [Ceram, *pileata;* New Guinea, nominate *bruijnii;* Guadalcanal and Kulambangra, *rosea;* Bougainville, *brevis;* New Ireland (and New Britain), *necopinata*], the geographical variation is slight except for one sharp break between the Ceram-New Guinea-Solomon Island complex of populations and those of the Bismarck Archipelago. Throughout the broad range of the former complex the differences consist chiefly of degrees of pigment saturation (abdomen rose-red to red; crown dull orange-brown to orange-rose) and of minor differences in size. No clines are evident, but the populations of small islands tend to be more reddish. Much individual variation in crown coloration is present.

The chief differences distinguishing the Bismarck complex from the other are: under tail coverts yellow, not rose-red (males); under parts and cheeks nearly clear orange, not orange strongly tinted with rose-red (males); crown pale purplish blue, not violet-blue (females).

The birds of New Ireland and New Britain are fairly uniform in coloration and size, although there is a tendency toward deeper saturation of the orange ventral color in the New Britain males. However, this difference is slight.

The distinctness of the Bismarck Archipelago populations serves to emphasize the strength of the narrow Vitiaz Strait as a zoogeographical barrier.

Larius roratus goodsoni Hartert

DIMORPHIC PARROT; GA-LANG-AT

Weights: Males, 382, 442; females, 361, 374.

Fairly common in the lowlands. About January 14 an individual in female plumage was seen in the entrance to a hole 70 feet up in lowland rain forest. It peeked out in response to "squeaking" and then disappeared back into the hole.

Geoffroyus heteroclitus heteroclitus
(Hombron and Jacquinot)

YELLOW-HEADED PARROT; GEL-LENG

Iambon: Two males, one female. Wild Dog Mountain: One male.

Weights: Males, 154, 169, 177; female, 180.

Iris pale yellow; bill dull yellow-green; eye-ring dull gold; feet gray-green to olive.

Apparently very uncommon. Our specimens were collected by Papuan gunboys attached to the expedition.

Loriculus tener Sclater

PYGMY LORICULUS

Wing: 66; tail: 29; weight: 12.

Iris ivory; bill black; cere and eye-ring black; feet mustard.

Never observed in the wild. Our only specimen flew into a mist net situated on a sharp ridge on Mt. Uali between two steep valleys. It was probably traveling from the lowlands on one side of the ridge to those on the other. See Mayr (1934, p. 6) for further comments on this rare parakeet.

CUCULIDAE

CUCKOOS

Cuculus saturatus horsfieldi
Horsfield and Moore

PARASITIC CUCKOO

Weights: Male, 106; female, 100.

The two specimens of this migrant that the expedition encountered were taken in quite different ecological niches. A male was shot in the steep-walled mountain forest. A subadult female was shot from the middle limbs of a garden tree at sea level behind the Kandrian Government Post.

Cacomantis variolosus macrocercus Stresemann

BRUSH CUCKOO; UL-LU-LU, SA-NOO-HIN (GRAY), HO-KA-LAS (BARRED)

Weight: Males, 35.5, 43; females(?), 35, 39. Stomach contents, four specimens: Many dark gray, black or green caterpillars, many yellow and black insect wings.

A fledgling begging food from a much smaller bird was shot January 20 from a perch in the middle tier of lowland rain forest.

Apparently abundant in the lower and middle tier of the open forest; also in bushes and trees of native gardens.

Eudynamis scolopacea salvadorii Hartert

KOEL; WOO-LU-LU

Weights: Males, 254, 300, 327.

Iris bright red; bill bone-gray, with black at base. Stomach contents: Large blue berries with cherry-sized pits (one); many pea-sized fruits with pinkish purple flesh (one).

Apparently not uncommon. Our specimens were taken among thick vines in the middle story of tropical forest near sea level and in the lower tier at the edge of the forest. One was discovered while being mobbed by a small flock of Mynah Birds (*Mino dumontii*).

Scythrops novaehollandiae Latham

CHANNEL-BILLED CUCKOO

Iris ruby red; bill bone, streaked with gray on basal two-thirds; skin on face dark rose-red; feet dark gray. Stomach contents: a large mass of gold and orange fruit.

Apparently abundant. The expedition encountered scattered parties of from three to a dozen birds in the forests fringing the coasts near Kandrian, but the species was not found elsewhere. The only specimen taken was shot from a group found in a tall tree immediately behind a thick band of mangroves. The specimen fell into the bay and was seized by a small crocodile (*Crocodilus porosus*). After the crocodile had swum in carrying the bird it was driven off by a shotgun charge, and the bird was retrieved.

Centropus violaceus Quoy and Gaimard

VIOLET-BACKED GIANT CUCKOO; UMBIE, SU-HOOP (NESTLING)

Weight: Female, 500.

Iris bright red, smoky gray (subadult); bill black; feet and skin on face milky; eye-ring black. Stomach contents: Many large insects, including three large armored stick insects of enormous proportions (one with a body at least 7 inches in length!); about 25 pinhead-sized snail shells; a number of small shells twice as large; and the legs of a green and gray tree frog (one leg was 2 3/4 inches long).

According to Gilliard's field notes, a subadult male taken December 26 on Mt. Uali "was shot from a perch in a small tree of the forest substage at 3000 feet. Although apparently alone, violet-backs are usually heard in pairs (at this season). Their ventriloquistic calls carry more than a mile across gorges and are antiphonal. The birds suddenly begin cooing very deeply (more deeply than any *Ducula*) and keep up the dual din for perhaps half a minute. Invariably the sound comes from the lower part of the forest and is heard most frequently in the tropics, although I have heard the calls as high as 3000 feet. The specimen here noted was shot at about the top range of this tropical species. At Akalel on November 26 a young bird, perhaps one week out of the nest, was brought to us. It had the quills of the wings and tail, on their basal thirds, still sheathed in wax.

"On November 22 near Haulil a pair of this long-tailed cuckoo was observed in the middle portions of the tropical rain forest. One perched with its neck pulled down and its tail hanging nearly vertically. The birds emitted deep notes which sounded like those from a bottle with air blowing across its neck. The cuckoos disappeared from my sight even though I watched most intently. Soon a passing native caused them to reappear. Apparently they had been hiding. As the native walked by they moved around the large trunk and back into my view. With the departure of the native the birds suddenly became very active; apparently they had forgotten me. One hopped vigorously over limbs and vines to a height of about 50 feet and there tugged at something on the bark. After this brief encounter it planed downward, across my view, 150 feet(a flight which I followed with binoculars), its bill held open around a large object. The cuckoo then landed on the side of a vertical vine half an inch thick. The large, blackish bird with a vivid pale mark around its eyes clung there, its bill still open and holding a bulky stick-like insect. The cuckoo had one foot higher than its head on the vertical vine. Next it began jumping up the naked vine, ascending some 30 feet to a large limb upon which it walked. It placed one foot well in front of the other as it moved with deliberation. It carried the stick insect a full five minutes before I lost sight of it.

"At 8:59 A.M. about 100 yards away, as I was sitting hidden in the forest, I noted another *C. violaceus* on a thin limb, slightly

sloping, in the crown of the forest. Its tail was much worn, and, as I watched, it wiped the bill on the perch and then preened the under side of the wings, at the same time expanding the tail many inches so that I could see daylight through the broken vanes. As it preened with the tail expanded it held the wings outward and slightly upward. This performance, which I think was a courtship display, was carried out in solitude and in complete silence.

"Two nestling cuckoos were brought in this afternoon (November 24) which looked like the young of *Archaeopteryx*! Both were calling raucously, both had disproportionately large legs, and both were very cold to the touch. In hand they felt like reptiles. Both were covered with long rows and tracts of sheathed feathers giving them the spiny look of young kingfishers, only more so!"

Three nestlings were collected by a native on January 7 near Iambon (3000 feet). The smaller specimens, which weighed 37 and 42 grams, had the upper parts, including the crown, covered with long, hairlike filaments and the egg tooth still showing prominently near the tip of the maxilla; below they were naked. The larger specimen, which weighed 151 grams, had the hairlike filaments largely replaced by needle-like wax feather casings. The feathers of its wings were well advanced, with many of the flight quills emerging from the wax sheathings.

Mr. Charles O'Brien called to our attention the fact that Coultas, in November, 1932, collected three eggs of this species which were just hatching. They were said to be found in a loosely constructed nest of twigs, similar to that made by the American Crow (*Corvus brachyrhynchos*), in the top of a tall tree.

Centropus ateralbus Lesson

WHITE-NECKED COUCAL; SOO-HOO

Weights: Male, 330; subadult female, 342.
Iris dark red (adults).

This is a common species of the lowland forests, forest edges, and native gardens. It also occurs sparingly in the hill forests to an altitude of about 4000 feet, but throughout the uplands it is apparently uncommon. It is usually found near the floor of the forest and in bushes, including vegetation close to the seacoast.

A specimen shot near Iambon was one of a group of four which were excitedly moving about on and near the floor of a native garden.

The subadult specimen bears only a few traces of the immature feathering, yet it had the grayish rather than the red iris. The immature bears striking resemblances to the adults of brownish coucals of the genus *Centropus* in that it has the anterior half of the body striped with rufous. Its identity, however, is confirmed by a few pure white feathers which have emerged on the left side of the breast and the right side of the throat, together with the shining purplish blue coloration of the flight quills.

TYTONIDAE

BARN OWLS

Tyto aurantia (Salvadori)

NEW BRITAIN BARN OWL; MON, MON-WAH

One male.

The expedition maintained a number of small mammal traps in the same sink-hole in which this owl was shot, but never succeeded in trapping any mammals. Nevertheless the owl was successful. Its stomach contained a small rodent with dark grayish hair.

Apparently not uncommon in the original lowland and upper mountain forests. Our only record is of a specimen discovered perching about 15 feet up near the trunk of a fairly open tree which stood in a crater-like limestone pothole near the summit of Mt. Uali. Attention was drawn to the owl in midmorning by a drongo which was attempting to mob it. The natives of Iambon village apparently know only two species of owls.

An owl was heard calling at 8:45 P.M., December 17, at an altitude of about 6000 feet. The call, "ka-ka," was repeated about six times per second and ascending slightly was answered several times. On December 21 at this same altitude a long ascending whistle, probably that of an owl, was also heard at night.

STRIGIDAE

OWLS

Ninox odiosa Sclater

EARLESS OWL; MAR-AH-HONG

Weight: Female(?), 209.
Iris gold to orange.

Apparently common in the lowland forests. Two specimens were shot in the upper middle tier of the original forest. One was solitary and one was with another owl. In each case small birds, including flycatchers, drew attention to the owls by their mobbing activities. In the stomach of one were the remains of long-legged insects. According to native lore, this species preys upon small bats.

APODIDAE

SWIFTS

Collocalia spodiopygia eichhorni Hartert

WHITE-RUMPED SWIFTLET; GUS-MARAN

Weights: Males, 7, 7.5; female, 6.

Abundant in moderately large nomadic flocks. On December 18 at 6:15 P.M. a flock swept the summit of the Whiteman Range; this was found to be of regular occurrence. On December 19 the birds returned to fly very close over the forest crown along the sides of the sharp ridge, riding buoyantly in the brisk breeze fluming up from the lowlands and apparently finding a rich store of insects. On the twentieth, for several hours beginning about noon, the white-rumped swiftlets were back. This time a small series was collected from a tree platform.

In flight this species is easily distinguished from *C. esculenta* by its pale gray to whitish rump, its dull rather than metallic upper parts, and its slightly larger size. At Kandrian the White-rumped Swiftlet occasionally flew in company with *C. vanikorensis*. At Iambon village, at dusk January 8, a flock of about 20 of these swiftlets hunted over the little clearing, situated in tall forest within about 200 yards of a breeding cave of *C. vanikorensis*, yet no other species of swifts were to be seen. At Tol Plantation, Wide Bay, where the Gilliards paused briefly, one specimen was shot near the beach as it flew with about 40 others in a coconut plantation. The flock moved slowly over the landscape as the birds swirled about 10 to 100 feet up, remaining in sight for about half an hour.

Collocalia esculenta stresemanni
Rothschild and Hartert

GLOSSY SWIFTLET; GUS-MARAN

Weights: Male, 7; females, 7, 7.2.

An abundant species in the lowlands, particularly in clearings and along stream edges in the forest, also over the crown of the pure forest. All our specimens were trapped by native boys in a cave near the village of Pomalal. This cave was said to be the habitual breeding place of this species and, at the time the native boys visited it, to have contained about 30 nests. It was said to be in a rock outcropping forming an island in the Oum River near Pomalal.

One of the nestlings, although nearly the weight of an average adult, had its plumage still completely encased in waxy sheathing. Two nests (averaging about 85 mm. in diameter by 45 mm. in depth) were collected with the nestlings. Both were constructed of fine rootlets and a few mossy vines which had been formed into a shelflike saucer. The nest is flattened on one side, and the presence of some glossy, gluelike substance, together with nest material and particles of white limestone, indicates that the nests were glued with a small amount of saliva to the wall of a limestone cave.

Collocalia vanikorensis subspecies?

SOOTY SWIFTLET; GUS-MARAN

Wing: Ten males, 113-121.5; female, 116; tail: eight males, 44.5-52; female, 49; weights: 9–14.

Apparently an abundant species of the lowlands from the beaches to the heart of the dense rain forest. Usually in open flocks, it was once seen flying with "white-rumped swifts." Numbers were observed near Kandrian and along the southern coast of New Britain where a few specimens were collected; the specimen from Lindenhafen was shot over the beach. All but one of the forest specimens were taken by native boys as they entered a nesting crevice.

This crevice was a chimney-like vent in the floor of open forest near a native trail. The hole, which was about 5 feet long and 2 to 3 feet wide, provided an entranceway to a subterranean cavern of considerable size. The low roar of a sizable stream could be heard somewhere below. Over the hole were trees reaching 70 feet in height and a semi-closed leafy canopy formed by the closely knit crowns of old second-growth trees. The native boys who pointed out the hole stated that there were no other similar ones in the vicini-

ty. They had caught the swifts at dusk as they fluttered into the opening. To do this, they stood partway down in the hole on a ledge and used their cloth laplaps and their hands to clasp the fluttering birds as they passed downward within a foot of their bodies. The cave is "haunted," and no one has ever gone into it. There is some doubt that they could. This tiny terrain feature is about 200 yards from the village clearing at Iambon.

Sooty swifts probably leave this hole in the early morning and then remain aloft all day, covering untold miles, and at night descend through the roof of the forest, probably on a special route through the trees and other vegetation, down into the darkness of the ground. The specimens that the hunters caught were of both sexes and all were gorged with flying ants. One had 22 large orange to amber ants in its stomach; others seemed to have a preference for ants of similar size but glossy blue-black with white head markings. A few had eaten small beetles.

After careful studies we find that there is much overlap between the measurements of our series and those of birds found on a number of the Solomon Islands. It is obvious that wing measurements cannot be used to distinguish New Britain birds from those of the Solomons when the wing length of our series is compared with that of *vanikorensis* from the Solomon Islands, in which Mayr (1937, p. 6) reported that in the specimens he examined the wing never went over 117.5 (average 114.4), and with that of a large series from Wide Bay, New Britain, in which the wing varied between 117 and 126, with an average of 120. Therefore, following Mayr, we are postponing racial allocation of the New Britain population.

Hemiprocne mystacea mystacea (Lesson)

WHISKERED TREE SWIFT

Mees (1964, pp. 11–12; 1965, pp. 173–174) has synonymized both the races *Hemiprocne mystacea confirmata* (Moluccas and Aru Islands) and *H. m. aeroplanes* (Bismarck Archipelago) with the nominate form from New Guinea and satellite islands. He has retained the race from the Solomon Islands, *H. m. woodfordiana*. Since the American Museum has large series of all the races of *H. mystacea*, it seemed advisable to measure these specimens and to examine them for any consistent color differences between populations.

The three races, *confirmata*, *mystacea*, and *aeroplanes*, were originally differentiated on the basis of wing length. Mees has showed that there is overlap in the measurements, and our measurements confirm this (see below). In fact, wing length shows a clinal distribution, with the smallest birds occurring both on the eastern and western ends of the species range, Solomon Island birds averaging smaller than any others. There is some size variation within the Solomon Islands, where mean wing length from islands represented by a fair series varies from 198 to 205. All of the Solomon Island birds are, however, small.

Wing measurements of *Hemiprocne mystacea* are:

Moluccas and Aru Islands	210–230
Vogelkop and western islands	218–234
Central New Guinea	226–245
Madang area	223–240
Southeastern New Guinea	220–243
Western Bismarck Archipelago	209–228
Eastern Bismarck Archipelago	198–217
Solomon Islands	190–215

Moluccan and Aru Island birds (mean wing length of 17 specimens, 220) and Bismarck Archipelago birds are next in size after the Solomon Island populations. The Bismarck Archipelago populations are quite variable, birds from New Britain, the Admiralty Islands, St. Matthias, Storm, and New Hanover having mean wing lengths between 217 and 222, and birds from Tabar, Mahur, Lihir, and Boang averaging 210. Birds from Feni average 205. We could find no record of the species' having been collected on New Ireland.

Our birds from the Vogelkop and Japen (mean of six specimens, 222) appear small when compared with Waigeu and Misol birds (mean of six specimens, 230) but Mees's (1964) and Gyldenstolpe's (1955b, p. 258) measurements show that much larger birds do occur both on the Vogelkop and on nearby Biak. Birds from central and southeastern New Guinea are the largest (means vary from 229 to 233).

As is evident from the literature, there is much individual color variation. The race *woodfordiana*, however, is well marked in having the abdomen uniformly gray like the rest of the under parts. Our six Bauro Is-

land specimens are darker gray, both on the back and the abdomen, than typical *woodfordiana*.

Throughout the remainder of the range, the amount of white on the abdomen is variable and is further affected by the way in which the skin is made. It is evident, however, that birds from the central part of New Guinea (Snow Mountains) have more extensive white than any others. Toward the west the average amount of white decreases, with the island forms averaging least. This applies also to Moluccan birds, but does not apply to birds from the Aru Islands which have as much white as birds from the Vogelkop.

To the east of the Snow Mountains the amount of white again averages less, with southeastern New Guinea birds quite variable but with western Bismarck Archipelago birds averaging considerably less white, often having no pure white but some light gray in the middle of the abdomen. Admiralty Island birds are exceptional in having as much white as southeastern New Guinea birds. Birds from the eastern Bismarck Archipelago are intermediate between *mystacea* and *woodfordiana*. Specimens from Mahur, Lihir, Boang, and Feni agree with *woodfordiana* in color; those from Tabar have white on the abdomen.

Under tail coverts are extremely variable in color and are even more likely to be affected by skinning, so that they seem completely unreliable as a taxonomic character. *Woodfordiana* was described as having under tail coverts uniformly gray. While generally true, one specimen reported by Mees (1965, p. 174) from Bougainville and a few of our specimens from various localities in the Solomons show traces of white in the under tail coverts.

The above results confirm Mees's conclusions—that *H. m. confirmata* and *H. m. aeroplanes* should be considered synonymous with the nominate form and that *woodfordiana* should be recognized on the basis of its solid gray abdomen and average smaller size. Tabar birds have white on the abdomen and are included with *H. m. mystacea*. Mahur, Lihir, Boang, and Feni birds are provisionally included with *woodfordiana* since they lack white on the abdomen and average rather small in size.

The Whiskered Tree Swift was thinly distributed throughout the high rain forests of the Whiteman Mountains. A flock of approximately 35 was observed on November 28 at about 6 P.M. feeding on the wing over the forests at Hualil. On January 16 one was observed on a high slender limb over open trail in the Iambon forests. Rambur, who collected this bird, reported that it perched for a considerable period of time, frequently calling to another Whiskered Tree Swift which came and perched on the same spot after the first specimen observed had been shot. Perhaps a nest, known to be of minute size, was there.

ALCEDINIDAE

KINGFISHERS

Alcedo atthis hispidoides Lesson

RIVER KINGFISHER; SEM-MIN

Weights: Males, 24.5, 26, 28.

Iris dark brown; bill black; feet dull orange washed with brown or black; nails dark brown to black.

Fairly common in its restricted niche, which is apparently always confined to streams and beach edges. The four specimens collected by the expedition were found alone. One was caught in a net set a few feet above a small forest stream, and one was shot from a dead branch at the beach edge. The stomach of one contained green insect remains.

Ceyx websteri (Hartert)

WEBSTER'S KINGFISHER; SI-NON-GAY-KLEK, POP-SUAL

Wing: Males, 89, 90; female, 92. Weights: males, 54, 57; female, 67. Stomach contents: Large green insect remains; large shrimp.

In our opinion Webster's Kingfisher has reached the level of a good species. It is much larger and more greenish than *azureus* from New Guinea but nevertheless belongs with it as a superspecies.

Not uncommon in the lowland forests. Not encountered elsewhere. Two specimens were caught in nets stretched across small rivers in the lowland forest. The other specimen was chased by Mandina for an hour during which it kept close to a stream, perching on dead limbs, always close to the water.

Ceyx lepidus sacerdotis Ramsay

ORANGE-BELLIED PYGMY KINGFISHER; SEM-YIN

Weights: 18–23.

Fairly common along the edges of small streams in the lowland forest where it perches on limbs close to the water.

Halcyon saurophaga saurophaga Gould

WHITE-HEADED KINGFISHER

Weight: Male, 114. Stomach contents: A claw and other remains of a small crab.

Our only record is of a specimen shot along the shores of Moewe Harbor. This species appears to be restricted to the immediate seacoast.

Halcyon chloris tristrami Layard

BLACK-MASKED KINGFISHER; POP-SUAL, PILE, SI-LANK-KEK-LEK, KEG-LET

Weights: Males, 71, 72, 77; females, 70, 88. Stomach contents: Black bettles; grasshopper; small lizard, approximately $3\frac{1}{2}$ inches in length; a small mammal, probably a mouse.

Iris dark brown; bill black, with white tip and white at base of mandible; feet blackish. One female had three ova very much enlarged.

Very common throughout the lowlands in the forest edge bordering native gardens.

Halcyon albonotata Ramsay

BLUE-AND-WHITE KINGFISHER; POP-SUAL

Weight: Male, 145.

This species appears to be uncommon. Our only records are of two taken from perches fairly high up in trees bordering village clearings. An Iambon specimen was one of a pair. It had medium-sized grasshoppers in its stomach.

Tanysiptera sylvia nigriceps Sclater

SPIKE-TAILED KINGFISHER; KUR-KIK, GUD-KEK, GUR-KEY

Weights: Females, 64, 74. Stomach contents: Insect remains.

Iris dark brown; bill bright red-orange, orange washed with dark brown (subadult), dark brown but lighter at tip (nestling); feet greenish gold, greenish gray (nestling); naked skin on face mustard to bright orange.

This species is fairly common in the interior forests, up to an altitude of about 5000 feet. On December 11 Tusako observed a bird drilling a nest hole about 16 feet up in a dead forest tree at an altitude of about 3000 feet. As the bird worked in the rotten wood, only its tail could be seen protruding from the entrance. Periodically the bird raked out wood chips. Tusako succeeded in climbing an adjacent tree and capturing the kingfisher as it worked.

In hunting, this species perches close to the ground in deep forest, then swoops down to capture its prey among the debris of the forest floor.

CORACIIDAE

ROLLERS

Eurystomus orientalis crassirostris Sclater

DOLLAR BIRD; TAK-KLANG

Weights: 190, 195, 198. Stomach contents: Glossy green and gold beetles, some up to 30 mm. in length.

Fairly common. Usually encountered perching quietly on exposed limbs in the crown of the tropical forest.

BUCEROTIDAE

HORNBILLS

Rhyticeros plicatus dampieri Mayr

HORNBILL

Iris bright rust; bill creamy ivory, with dark red-brown on basal third and at base of casque; naked skin around eye pale violet-blue; naked skin on throat milky white; feet blackish. Food: Orange figs.

Hornbills are seen and heard daily in the foothills and high mountain forests of the Whiteman Range. At the time of the Gilliards' visit, most of the birds appeared in pairs; no large flocks were seen except at Sag Sag (see below). Once a male with a tan head flew 60 feet above a pair flying 3 feet apart. The birds honked continuously in flight, "ka-ka-ka-ka," and all flew straight and evenly, with steady wing flapping. At the end of a half mile of level flight the pair suddenly spread their white tails and cupped their wings and then swooped in an instant to land simultaneously on the same limb, where they perched 3 feet apart.

Sitting on a point of rock, Gilliard was sometimes able to watch these birds as they flew by only a few feet away. Once a pair

passed just below, and he noticed that the male was leading an all black bird by about 20 feet. Another time a male led another which flew about 10 feet above and slightly behind.

Once, while he was sitting under a tree in thick forest on Mt. Uali, a hornbill came flying noisily through the forest. It happened to land in the limbs just above him, and in doing so it immediately became silent and motionless and remained so for more than a minute.

At Sag Sag on November 14 he observed hundreds of hornbills at dusk as the birds moved in sizable flocks over the forest and the clearing to roosts which the Anglican missionary, Mr. Kenneth Law, said were in a small area of forest on Lagoon Point, the westernmost point of land on New Britain. The sound made by this species in flight is very much like the hissing of escaping steam.

CAMPEPHAGIDAE

CUCKOO-SHRIKES

Lalage leucomela falsa Hartert

BLACK-AND-WHITE TRILLER; POW, EL-WAS-SIAN

Weights: Males, 31.5–35.5; females, 26–36. The food of the Black-and-White Triller consists largely of caterpillars and small fruits. The stomachs of the specimens taken contained caterpillars, usually green, other insect remains, and greenish or bluish berries, also hard seeds.

This is an abundant, usually solitary species of lowland garden areas where it is found perched in the upper limbs of garden trees and large bushes; also found less commonly in the upper branches of open second-growth forest.

Coracina papuensis sclateri Salvadori

BLACK-FRONTED GRAYBIRD; WAM-YA

Weights: Males, 92, 96, 110; females, 95–115. Stomach contents: Insect remains, some with iridescent green skeletal fragments, green caterpillars, and an assortment of oval seeds resembling cucumber seeds.

This bird is common in the lowland forests, where it appears to keep mostly to the canopy. The call is a whistled "whee-ah" delivered from high perches in the forest.

Coracina tenuirostris heinrothi (Stresemann)

CICADA BIRD; HOM-MON-GIN

Weights: Males, 60 (subadult), 61, 62; females, 54–67.

Iris dark brown; bill and feet black.

Fairly common in the lowland and mountain rain forest. Usually solitary and occasionally encountered high up in tall trees bordering small forest clearings. One was observed very closely as it quietly moved about feeding on insects in the upper limbs of a heavily leafed tree growing in the tall rain forest. The bird occasionally flew from its slender perches to the under sides of the leaves and there hovered as it pulled at something it was eating. The stomach contents of this bird proved to be small green berries and some green insect remains, including a caterpillar. Stomach contents of other specimens collected were small ivory-colored berries, hundreds of small yellow seeds, some olive-colored fruit matter, green berries, and green insects.

Coracina lineata sublineata Sclater

BAR-WINGED GRAYBIRD; HOM-MUNG-IN

Weights: Males, 66, 68. Stomach contents: Small green tree berries, caterpillars, and small seeds.

Quite uncommon. Both of our specimens came from the uppermost limbs of high trees growing in the foothills and steep sides of the Whiteman Range. One male was shot in the top of a huge "rain tree" growing at the edge of the Iambon village clearing. It was approached by way of a ladder leading more than halfway up the tree. The species is apparently not at all wary.

DICRURIDAE

DRONGOS

Dicrurus hottentottus laemostictus Sclater

DRONGO; TAS

Weights: Females, 64, 72; female(?), 70; fledglings, 39, 45.

Iris red in adults, brown in fledglings.

Very common in the lowland forests and forest edges. Also found in diminished numbers in the mid-mountain forest and even occasionally in the forest crowning the summit of the Whiteman Mountains at 5200 feet. Most frequently observed alone, but occa-

sionally pairs were found. On November 21, a pair was observed near two young which had just left the nest. The young and the adult female were collected. The latter had the contour feathers of the lower and middle breast much worn and fragmented, apparently owing to abrasion connected with the nesting duties.

On December 6 at 6:30 in the morning, one ascended to a dead limb tip 30 feet up at the top of a mountain slope and perched facing the rising sun. It then called and sang about 20 times, each phrase being emitted every four to five seconds. In song, it stretched the head forward, opened the bill widely, and then forced out its scratchy, ascending notes which were immediately followed by a rather sweet whistle. As the whistle ended, the bird flared the tail widely. On December 8 at about the same position two Drongos were observed. One flew over the singing perch with its tail abnormally flared.

CORVIDAE

CROWS

Corvus orru insularis Heinroth

CROW; KONG

Weights: Males, 428, 444; female, 428.

Iris sky blue to gray. Iris color in this race is generally blue, but two apparently adult birds from the Whitemans had the iris gray. Coultas collected two adults with the iris brown in the Rabaul area; other specimens from the same area had the iris blue. Since this difference is not sexual, we assume that these individuals have retained the juvenile coloration.

Widely but thinly distributed throughout the lowland and mid-mountain forests of the Whiteman Range. Apparently more common in the coastal regions which were hardly surveyed by this expedition. Crows were not heard or seen above about 5000 feet. Usually solitary. A specimen from Moia was shot on a rock close to the edge of a broad stream flowing through second-growth forest.

SYLVIIDAE

WARBLERS

Ortygocichla rubiginosa Sclater

RUFOUS-FACED THICKET WARBLER; EN-SU-LU

Wing: Male, 77; female, 75; tail, male, 77; female, 78; weights: male, 43; female, 39.5.

Insect remains, including long insect legs and small black beetles, were found in the stomachs of five specimens; a few small snail shells were found in two of these specimens.

Iris gray to brown, one gray, with inner rim of brown; maxilla black; mandible gray to gold; gape yellow in subadults, gray in adults; feet pinkish tan to smoky brown.

Common but rather elusive in the forests of the lowlands and lower mountainsides. Not found above 2500 feet. Usually encountered on or very close to the ground in vegetation which is rather bushy and usually interspersed with bamboo; also found in the second growth of abandoned forest gardens and stream edges. Almost always in pairs or perhaps small parties. Two collected January 13 were closely accompanying two young.

Cichlornis grosvenori Gilliard

GROSVENOR'S THICKET WARBLER

Wing: Male (?), 71; female (type), 72; tail: Male (?), 65; female (type), 59.

Iris dark smoky gray, with lighter outer rim (male?), dark brown with a dull green rim (female, type); bill brownish black to black; feet and legs dark smoky brown.

See Gilliard (1960b) for the description and ecology of this rare species and Gilliard (1961, p. 273) for a painting from life by Margaret Gilliard. The genus is known from endemic forms on Guadalcanal, the Solomons, and Espirito Santo, New Hebrides. This elusive bird of mountain forests may eventually be found on other large islands in Melanesia.

Phylloscopus trivirgatus Strickland

ISLAND LEAF WARBLER

Mayr (1955, p. 19), in a discussion of the Island Leaf Warbler, stated: "In the Bismarck Archipelago it has so far been found only on St. Matthias (*matthiae*) . . . The mountains of New Britain and New Ireland are high enough for this species, and it is therefore surprising that it has never been encountered there by collectors." *Phylloscopus trivirgatus* proved to be common in the forests of the summit of the Whiteman Range (but nowhere else). The New Britain population was found to be new and we name it as follows.

Phylloscopus trivirgatus moorhousei,
new subspecies

TYPE: A.M.N.H. No. 708134; adult male; Wild Dog Range, Whiteman Mountains, central New Britain; December 17, 1958; 5200± feet; E. Thomas and Margaret Gilliard.

MEASUREMENTS OF TYPE: Wing, 58; tail, 42; culmen, 13; tarsus, 22; weight, 10.

DIAGNOSIS: Nearest to *P. t. makirensis* of San Cristobal in coloration of crown and back but with the latter generally deeper, more brownish olive, less yellowish olive; under parts with yellow areas (chiefly flanks) duller, more tinged with olive brown, less olive; sides of head more brownish, less grayish, particularly superciliaries, lores, and malar region. Differing from *P. t. becki* of Guadalcanal by having under parts richer, more brownish yellow, and upper parts more amber brownish, less yellowish brown. Differing from *P. t. matthiae* of St. Matthias by having crown generally dark brown, not dark grayish tinged with olive; otherwise differing as described for *makirensis*. Differing from *hamlini* of Goodenough by lacking black on crown; otherwise, as described for *makirensis*. Differing from the New Guinea races (*giulianettii* and *albigularis*, including examples from Huon Peninsula) by having crown dark brown, not dark grayish olive or dull blackish tinged with olive, also by having upper parts generally more brownish, less yellowish olive or olive.[1]

RANGE: Known only from the summit of the Whiteman Mountains; probably occurs on all the high mountains of New Britain.

We name this new form in honor of David B. Moorhouse, whose help was so essential to the success of the expedition.

SPECIMENS COLLECTED: Wild Dog Mountain, Camp 12: Six males, nine females, one (sex ?), December 13–22, 1958.

[1] Salomonsen has compared specimens of *moorhousei* with his recently described race *leletensis* from New Ireland (1965, pp. 77–83) and wrote, "Differs from the newly described *leletensis* from New Ireland in having throat suffused with yellow (not white), flanks suffused with olive-brown (not greyish green), upper parts including crown and nape olive-brown (as opposed to greenish upper parts contrasting with dark grey crown and nape in *leletensis*), superciliary streak light buffish (not white), mandible lighter (but not so light as in *matthiae*), bill slightly finer but other proportions similar to those in *leletensis*."

Wing: Males, 55, 56, 56, 56, 56, 58; females, 53.5–58.5; tail: males, 39, 39, 39.5, 39.5, 41, 42; females, 39.5–42; weights: males, 9.5–11; females, 9–10.5.

Iris dark brown; bill blackish, with base of mandible light; feet gray.

To try to determine the systematic position of the newly discovered New Britain population, we made the following short review of the variation of all populations of this species known to occur in the Papuan region, the Bismarck Archipelago, and the Solomon Islands.[2] Populations from many localities in New Guinea were examined, including series of four races (*poliocephala*; *albigularis*, including the type; *cyclopum*; and *giulianettii*), as well as populations from Numfor Island (*maforensis*), Goodenough Island, New Britain, St. Matthias Island, Bougainville Island (*bougainvellei*, including the type), Kulumbangra Island (the type of *pallescens*), Ysabel, Malaita, and Guadalcanal islands (*becki*, including the type), and San Cristobal Island. The geographical variation was found to be irregular with morphologically rather similar populations sometimes occurring in "checkerboard" fashion. Individual variation within populations living on small and medium-sized islands was found to be rather narrow. For example, a long series of *bougainvillei* is quite uniform in its generally dark coloration, and a series of *hamlini* is rather uniformly yellowish. On the much larger land mass of New Guinea, however, geographical variation occurs, and the populations themselves are more variable. An example is *albigularis* of the Weyland Mountains, in which the central stripe of the crown may be rather vivid, or completely missing. Yellow in the under parts is of spotty distribution: Populations with bright under parts occur on San Cristobal (*makirensis*) in the eastern Solomon Islands, on St. Matthias Island (*matthiae*) in the northwestern Bismarck Archipelago, on Goodenough Island in the D'Entrecasteaux Archipelago (*hamlini*), on New Britain (*moorhousei*), and on New Guinea (five races). Reduction of yellow in the under parts seems to be a convergent

[2] Inadvertently, Mayr (1955, p. 19) reported that *P. trivirgatus* had not been discovered on Guadalcanal. See Hartert (1929, p. 13) for a description of *P. t. becki* from Guadalcanal; see also Cain and Galbraith (1956, p. 269).

characteristic of populations of smaller oceanic islands; for example, the Numfor Island race, *maforensis*, is solid grayish white, and a population from Kulumbangra Island (*pallescens*) in the west-central Solomons is also virtually without yellow. *Pallescens* occurs near the center of a northwest-southeast cline (dull to bright) in the yellow of the under parts. It is noteworthy that this cline is confined to the Solomon Island chain, with the Bougainville form on the west being the darkest, most olive, least yellow, and the San Cristobal form on the east the most yellowish. A pronounced shift in coloration occurs between the Bougainville population in the western Solomons and our race from New Britain. *Bougainvillei* is dark olive, whereas, in reversal of the above-mentioned cline, the New Britain population is as yellow as the brightest birds known from New Guinea or from San Cristobal. However, as diagnosed above, they differ from all by their generally browner appearance. From this brief study we suspect that the New Britain birds were derived from New Guinea rather than from the direction of the Solomon Islands.

Common in the stunted forests crowning the summit of the Whiteman Range; not found elsewhere. These leaf warblers are very hard to see in their favorite habitat, which is among the topmost leaves of the mossy forests of the ridges. They have the highly protective habit of moving a few inches, then pausing under or over leaves to scan them for insect food, then repeating this movement. In such manner they scurry through the forest crown, hardly attracting any more attention to themselves than attends the thousands of leaves that flutter in the inevitable breezes of such mountain summits. Fortunately, the species responds to the hunter's "squeak" and can thus be made to reveal itself.

MUSCICAPIDAE

OLD WORLD INSECT EATERS

Rhipidura dahli dahli Reichenow

RUFOUS FANTAIL FLYCATCHER; BAU

Weights: Males, 9–10.5; females, 9–11.

Common on the summit of the Whiteman Range, where this species was frequently found in company with Leaf Warblers (*Phylloscopus trivirgatus*) in the crown of the mossy forest; also observed on occasion within a few feet of the ground in this same forest; becoming very uncommon at the elevation of Camp 9 (3000 feet) and apparently not found below 2500 feet. This species, which was usually found in pairs, has a bubbling, whistle-like note. In moving about in search of food, it frequently flares the tail.

Rhipidura rufiventris finschii Salvadori

WHITE-THROATED, BUFF-BREASTED FLYCATCHER

Weights: Males, 15.5–18; females, 14.5, 15, 17.5.

Fairly common throughout the lowland forests, becoming rare on the summit of the Whiteman Range. This wagtail is usually encountered in the highest stratification of the trees.

Rhipidura leucophrys melaleuca
(Quoy and Gaimard)

WILLIE WAGTAIL; PO-DAY

Weights: 31, 31.

Common along the beach and in the vicinity of native habitations at Kandrian and at Sag Sag; also observed on the rocks fringing Luther Anchorage on the northern tip of Umboi Island.

Myiagra cyanoleuca (Vieillot)

SATIN FLYCATCHER

Weight: 16.5.

Our only record is of a specimen shot in company with a mixed flock of small birds feeding in the canopy of second-growth garden forest just above sea level.

This is an Australian visitor which has been recorded several times in the New Britain region (see Mayr, 1955, p. 32).

Monarcha verticalis Sclater

BLACK-AND-WHITE FLYCATCHER;
KOOG-E-YENG, WAM-YO

Weights: Adult males, 21.5, 22.5, 29; females, 20.5, 21.

Abundant in the upper story of the tropical rain forests; also found fairly commonly along the edges of this forest near native gardens and streams. Rare above 4200 feet. A fledgling begging food was shot on January 9. A

fledgling about two weeks out of the nest was taken December 30.

At Umbi, the "blowgun people" call this species "mul-mul-i."

Monarcha alecto chalybeocephalus (Garnot)

GLOSSY MONARCHA

Weight: Female, 21.5.

Our only records are of birds found near the beach at Moewe Harbor.

Monarcha hebetior eichhorni Hartert

LITTLE GLOSSY MONARCHA; TA-HAS

Weights: Males, 18.5–21.5; females, 20, 21.

Fairly common in the lowland and hill forests, where it is frequently encountered in the base of the forest.

Pachycephala pectoralis citreogaster Ramsay

GOLDEN WHISTLER; EL-VAS-I-AL

Weights: Males, 25–30.5; females, 24–29.

Galbraith (1956) made an exhaustive study of the variation, relationships, and evolution of this remarkably pliable species.

Apparently widely distributed in the forests of New Britain. Usually found alone or in pairs in the middle and lower parts of the rain forest. On the summit of Mt. Uali a male was found singing from a perch about 40 feet up in the upper limbs of a tree growing on a sharp ridge. The song was a series of shrill, whistled phrases.

A nest with one young three-quarters grown was found on Wild Dog Mountain (5200 feet) December 13. The nest was an open cup placed 3 feet up in a thin sapling in the substage of a patch of forest composed of spindly trees averaging 25 feet in height. It was a thin structure of ferns, leaves, reddish mosses, and arboreal rootlets. On December 15 the senior author watched this nest from 4:45 to 5:18 P.M. At 4:55 the female arrived, quickly fed the young, waited quietly for a few seconds, then took a fecal sac and flew off. At 4:57 the female returned, flew over the nest, landed 8 feet distant on a low branch and, in about 20 seconds, flew to the nest rim with a small caterpillar which it poked into the mouth of the widely gaping nestling; after some 40 seconds the female then departed. At 5:09 she flew to the nest rim for a moment, then flew off a short distance, then returned in about 15 seconds to feed the vigorously gaping nestling; soon she picked up another fecal sac, flew off, and was not seen again. The male was not seen near the nest, but a male collected about 500 yards distant might have been the mate.

ARTAMIDAE

WOOD-SWALLOWS

Artamus insignis Sclater

WHITE-BACKED WOOD-SWALLOW; LU-MAN

Weights: Males, 49–54; female, 53.

Common in and about native gardens, particularly in the vicinity of Iambon, where this species was always found in pairs or small groups of up to 10 individuals. The White-backed Wood-swallow feeds entirely upon flying insects which it captures in sorties from high exposed perches. It often perches in closely knit groups, the birds sitting with their shoulders nearly touching for long periods of time. Fruit pigeons, rollers, and occasionally whiskered tree swifts are very apt to be found perching nearby in the same tree.

Two specimens in subadult plumage were collected. These may be recognized by the more brownish, less solid black, head, the gray instead of bluish bill, the white-edged rather than solid black flight quills, and the slightly longer tail.

STURNIDAE

STARLINGS

Aplonis metallicus nitidus (Gray)

SOCIAL STARLING: YOK-MAYAN

Iris bright vermilion.

Fairly common in flocks in the lowland forests and forest clearings.

Mino dumontii kreffti (Sclater)

ORANGE-FACED, BLACK-AND-WHITE MYNAH; MO-GOLE

Weights: 200, 216, 218, 233.

Iris, bill, naked skin on face, and feet yellow-orange.

Very common throughout the lowlands where it is usually found in noisy pairs in the upper half of the forest, the forest edges, and in isolated trees in native villages and gardens.

NECTARINIIDAE

SUNBIRDS

Nectarinia jugularis flavigaster Gould

YELLOW-BELLIED SUNBIRD

Weights: 9.5, 10.

Our only records are from along the coast of Moewe Harbor and just off the beach at Lindenhafen. This species is probably quite common throughout the coastal areas of New Britain. Our specimens were taken in the tops of mangroves and in small trees and coconut trees of the coastal strip.

Nectarinia sericea corinna Salvadori

BLUE-BLACK SUNBIRD

Weights: 7–11.

Common along the edges of Moewe Harbor, chiefly in coconut plantings and about native gardens; also found in the forest edge of trails, streams, and woodland gardens, far in the interior; apparently absent from all the higher slopes of the main Whiteman Range. This species was often observed alone or in pairs in flowering trees, often coconuts.

A common name for the male is "sut-poi-ha," and the female is known by several names, including "sep-sep" and "kang-kang."

MELIPHAGIDAE

HONEYEATERS

Myzomela erythromelas Salvadori

BLACK-BELLIED MYZOMELA

Wing: Seven males, 52–55; four females, 49–50; tail: seven males, 32–35; four females, 30–31; weights: seven males, 7–9; four females, 6.5–7.5.

Iris dark brown; bill black (males), blackish with lower third of mandible lighter (females); feet gray, with yellow pads.

Abundant in the crown of the lowland and high tropical rain forest where large numbers of these black-bellied myzomelas were found feeding among flowering trees in company with small parrots, white-eyes, and other species of myzomelas.

Apparently the female of this species had not been collected before. It is very similar to the females and young males of *M. cruentata*, but has the upper parts and tail solid olive, not olive suffused with red.

Myzomela cruentata coccinea Ramsay

RED MYZOMELA

Weights: Males, 6.5–8; females, 6–9.5.

Mayr (1955, p. 42) commented on the variability of this species in the Bismarck Archipelago. Three names are available: *coccinea* for birds from the Duke of York Islands; *erythrina* for New Ireland; and *kleinschmidti* for New Britain birds. Mayr (1955) stated, however, that Sharpe failed to give really diagnostic differences for his *kleinschmidti* and that birds from the Duke of York Islands " . . . are almost invariably identical with New Britain birds." Therefore he concluded that " . . . the name *kleinschmidti* must be considered a synonym of *coccinea* unless new material from the Duke of York Islands reveals a difference." Since no new material from this locality has become available, we follow Mayr in using *coccinea* for our extensive series from the Whiteman Mountains, New Britain. When Mayr studied this species, the American Museum had only three specimens of *coccinea*, all from New Britain; he considered this series inadequate for a proper description. With our new material from the Whiteman Mountains, it is now possible to present the diagnostic characters best distinguishing *coccinea* from *cruentata* of New Guinea on the one hand, and from *erythrina* of New Ireland on the other, and to provide the missing description of the adult male of *coccinea*.

In a comparison of females, *coccinea* differs but slightly from *cruentata* by having the bill slightly heavier and longer, and by having the rose-red of the forehead, throat, and upper tail coverts slightly more extensive and slightly deeper in coloration; *coccinea* differs distinctly from *erythrina* by having the nape, neck, and back generally solid olive, faintly tinged on the lower back with rose, not strongly washed with rose-red; it also differs by having the rose of the forehead and throat much more restricted and the under parts lighter, more yellowish gray, less grayish brown tinted with rose.

DESCRIPTION OF ADULT MALE: Generally bright crimson, with a somewhat glossy texture, becoming brighter on the rump and upper tail coverts, and duller on the back and on the exposed surfaces of the folded wing.

The young male is irregularly washed with red on nape and back, and often irregularly tinged with red below.

This species was observed feeding in flowering trees on the summit ridge of the Whiteman Range. Usually the birds were solitary or in small groups which worked quietly through clusters of red thistle-like flowers growing abundantly in the canopy of the forest. They worked methodically among the flowers, dipping the bill from all angles into the bases of the flowers, and sometimes even hanging far down or under the perch to do so. One that the senior author watched remained feeding in one small area for perhaps five minutes. In other areas where he observed the species feeding in trees containing no flowers, the birds seemed to scan the leaves very rapidly for insect food.

Myzomela eques cineracea Sclater

GRAY MYZOMELA; GANG-GANG; PADIMGUN

Weights: Males, 15–18; females, 12.5–14.5.

This is an abundant species of the tropical forest crown where it is often to be seen feeding in company with small parrots, white-eyes, and other myzomelas and honeyeaters. At Mt. Uali (3000 feet) the Gray Myzomela was found feeding in company with *M. cruentata* and *M. erythromelas*.

Vosea whitemanensis Gilliard

VOSE'S HONEYEATER

Mt. Uali: One female; Wild Dog Mountain, Camp 12: two males, five females.

Wing: Males, 113, 116; females, 100, 103, 104, 105, 105, 105; tail: males, 89, 91; females, 80, 80, 81, 82, 83, 84; weights: females, 47, 49.

Iris dark brown; bill black; feet dark gray; naked skin around eye pale gray washed with pale yellow; gape yellow (one). See Gilliard (1960a) for description of this genus and species and Gilliard (1961, p. 272) for a painting from life by Margaret Gilliard.

Vose's Honeyeater is confined to the upper elevations of the Whiteman Mountains. The only record of the species occurring below the summit forests is of a solitary female shot at about 3700 feet near the summit of Mt. Uali. In the forests of Wild Dog Mountain some 2000 feet higher, it was an uncommon to very uncommon species. Vose's Honeyeater is an inhabitant of the pure forest crown. It was usually encountered darting rapidly across narrow open areas caused by gullies and slides scarring the steep sides of the summit ridge. It moved quickly from one wall of vegetation to the other, its mustard-olive wings flashing unmistakably, then disappeared into the tops of the stunted vegetation. Most of the specimens, including the one from Mt. Uali, were shot as they fed in the crown of the forest 25 to 40 feet up among reddish thistle-like tree flowers which were a feature of the forests in December.

Philemon novaeguineae cockerelli Sclater

NEW BRITAIN LEATHERHEAD; KA-HOK

Weights: Males, 139, 147, 147; females, 153, 177.

The New Britain Leatherhead is a very common inhabitant of the lowlands from the immediate beach areas to the mid-mountain forests of the Whiteman Range at about 3000 feet. At higher elevations its unmistakable calls can be heard as high as 5200 feet, but it is very uncommon in or absent from the forests crowning the range. Often found in pairs, but sometimes in flocks of up to seven. The calls of this species range from rasping sounds to bugle-like notes which remind one of a novice practicing on a saxophone intermixed with hilarious bursts of laughter. This is one of the noisiest birds of the New Britain forests, rivaling even the Cockatoo and Hornbill.

In February at Apugi Island facing Moewe Harbor, an adult female was collected from a nest about 35 feet up in a breadfruit tree near sea level.

DICAEIDAE

FLOWER-PECKERS

Dicaeum eximium layardorum Salvadori

RED-SPOTTED FLOWER-PECKER; PEP-TSAY, SUT-PAY-AK

Weights: Males, 7–9.5; females, 7–8. One specimen from Iambon had insect remains in its stomach, some 5 mm. long, but no seeds.

Abundant at the edges of native gardens where it frequents tall bushes and isolated trees; also found on the forest edge and in the crown of the tropical forest, at least to an

altitude of some 3000 feet. One was taken in a net in a notch of the rim forest crowning Mt. Uali.

ZOSTEROPIDAE

WHITE-EYES

Zosterops minor hypoxantha Salvadori

BLACK-HEADED ZOSTEROPS; KUN-YAN, LAY-LOK, SUT-POI-HAK

Weights: Males, 11.5–13; females, 12.5–13. Stomach contents: Small tree fruits with large stones.

Fairly common in the forested foothills, becoming uncommon above about 4700 feet. Usually solitary, feeding in the higher parts of the forest. At Moia, frequently observed in the upper crown limbs of flowering trees, where it fed in company with several species of *Myzomela*.

APPENDIX

LIST OF LAND AND FRESH-WATER BIRDS KNOWN FROM NEW BRITAIN

Casuarius bennetti bennetti
Podiceps ruficollis collaris
Demigretta sacra sacra
Nycticorax caledonicus mandibularis
Dupetor flavicollis gouldi
Ixobrychus sinensis
Dendrocygna guttata
Dendrocygna arcuata pygmaea
Anas superciliosa pelewensis
Aviceda subcristata bismarckii
Henicopernis longicauda infuscata
Milvus migrans affinis
Haliastur indus girrenera
Accipiter meyerianus
Accipiter novaehollandiae dampieri
Accipiter luteoschistaceus
Accipiter princeps
Accipiter brachyurus
Haliaetus leucogaster
Pandion haliaetus melvillensis
Falco peregrinus ernesti
Falco severus papuanus
Megapodius freycinet eremita
Excalfactoria chinensis lepida
Turnix sylvatica saturata
Rallus (Habropteryx) insignis
Rallus philippensis meyeri
Poliolimnas cinerea minima
Amaurornis olivaceus nigrifrons
Porphyrio albus neobritannicus
Porphyrio porphyrio samoensis
Esacus magnirostris
Ptilinopus superbus superbus
Ptilinopus insolitus insolitus
Ptilinopus rivoli rivoli
Ptilinopus solomonensis meyeri
Ducula pistrinaria vanwycki
Ducula rubricera rubricera
Ducula finschi
Ducula melanochroa
Ducula spilorrhoa subflavescens
Gymnophaps albertisii albertisii
Columba pallidiceps
Macropygia amboinensis carteretia
Macropygia mackinlayi arossi
Macropygia nigrirostris major
Reinwardtoena browni
Streptopelia chinensis tigrina
Chalcophaps stephani stephani
Henicophaps foersteri
Gallicolumba beccarii johannae
Gallicolumba jobiensis jobiensis
Caloenas nicobarica nicobarica
Lorius hypoinochrous devittatus
Lorius amabilis
Trichoglossus haematodus aberrans
Charmosyna placentis pallidior
Charmosyna rubrigularis rubrigularis
Cacatua galerita ophthalmica
Micropsitta pusio pusio
Micropsitta bruijnii necopinata
Larius roratus goodsoni
Geoffroyus heteroclitus heteroclitus
Loriculus tener
Cuculus saturatus horsfieldi
Cacomantis variolosus macrocercus
Chalcites lucidus lucidus
Chalcites lucidus plagosus
Eudynamis scolopacea salvadorii
Scythrops novaehollandiae
Centropus violaceus
Centropus ateralbus
Tyto aurantia
Ninox solomonis solomonis
Ninox odiosa
Caprimulgus macrurus yorki
Collocalia vanikorensis subspecies?
Collocalia spodiopygia eichhorni
Collocalia esculenta stresemanni
Hemiprocne mystacea mystacea
Alcedo atthis hispidoides
Ceyx websteri
Ceyx pusilla masauji
Ceyx lepidus sacerdotis
Halcyon saurophaga saurophaga
Halcyon macleayii macleayii
Halcyon chloris tristrami
Halcyon sancta sancta
Halcyon albonotata
Tanysiptera sylvia nigriceps
Merops ornatus
Merops philippinus salvadorii
Eurystomus orientalis crassirostris
Rhyticeros plicatus dampieri
Pitta erythrogaster gazellae
Hirundo tahitica ambiens
Petrochelidon nigricans nigricans
Lalage leucomela falsa
Coracina papuensis sclateri
Coracina tenuirostris heinrothi
Coracina lineata sublineata
Coracina novaehollandia melanops
Dicrurus hottentottus laemostictus
Corvus orru insularis

Ortygocichla rubiginosa
Cichlornis grosvenori
Zoothera dauma talasea
Phylloscopus trivirgatus moorhousei
Saxicola caprata aethiops
Acrocephalus arundinaceus meyeri
Cisticola exilis polionota
Megalurus timoriensis interscapularis
Rhipidura dahli dahli
Rhipidura rufiventris finschii
Rhipidura leucophrys melaleuca
Myiagra cyanoleuca
Monarcha verticalis
Monarcha alecto chalybeocephalus
Monarcha hebetior eichhorni
Monachella muelleriana coultasi
Pachycephala pectoralis dahli
Pachycephala pectoralis citreogaster
Artamus insignis
Aplonis metallicus nitidus
Aplonis cantoroides
Mino dumontii kreffti
Nectarinia jugularis flavigaster
Nectarinia sericea corinna
Myzomela erythromelas
Myzomela cruentata coccinea
Myzomela eques cineracea
Vosea whitemanensis
Philemon novaeguineae cockerelli
Dicaeum eximium layardorum
Zosterops minor hypoxantha
Erythrura trichroa sigillifera
Lonchura spectabilis spectabilis
Lonchura melaena

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