

BIRDS OF CENTRAL NEW GUINEA



Sanford's Golden-crested Bower Bird at edge of its playground

BIRDS OF CENTRAL NEW GUINEA

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*RESULTS OF THE AMERICAN MUSEUM OF  
NATURAL HISTORY EXPEDITIONS TO  
NEW GUINEA IN 1950 AND 1952*

ERNST MAYR AND E. THOMAS GILLIARD

BULLETIN

OF THE

AMERICAN MUSEUM OF NATURAL HISTORY

VOLUME 103 : ARTICLE 4

NEW YORK : 1954

BULLETIN OF THE AMERICAN MUSEUM OF NATURAL HISTORY

Volume 103, article 4, pages 311-374, text figure 1,  
plates 13-34, tables 1-8

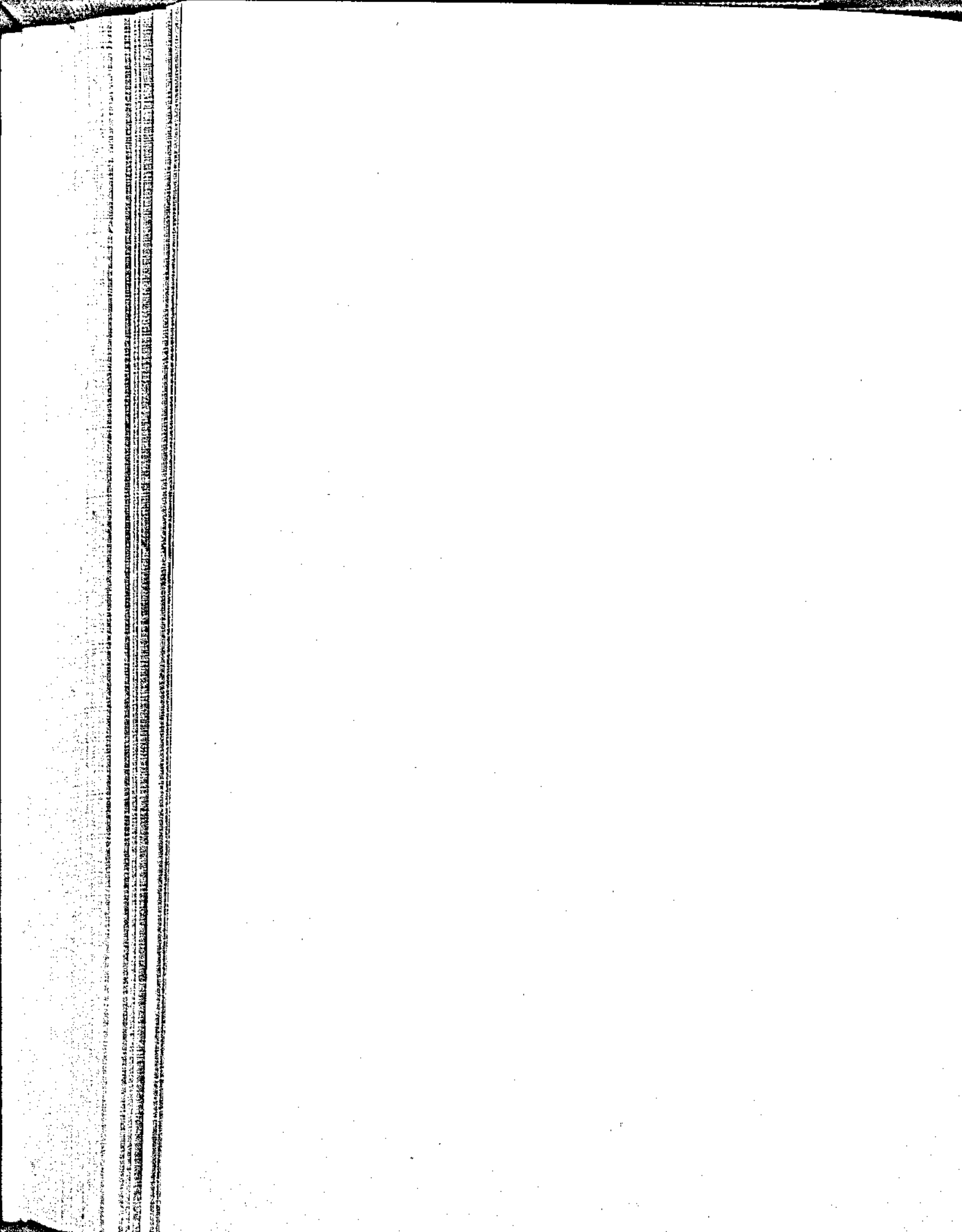
*Issued April 12, 1954*

*Price: \$2.00 a copy*



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## INTRODUCTION

CONTINUING THE ORNITHOLOGICAL EXPLORATION of New Guinea in which this institution has been actively engaged for two decades, the Department of Birds sent parties to the interior of that island in 1950 and 1952.

Dr. Leonard C. Sanford sponsored the 1950 expedition, which was the first to make a thorough survey of the birds in the recently discovered Wahgi region of the Mandated Territory.

This heavily populated region was discovered by Michael Leahy in 1933 (see Leahy, 1936). Owing to various incidents in subsequent years, the area was closed in 1935 and remained closed until World War II when it was needed for emergency aircraft landings. Thus it was not until after World War II that the colonizer, the prospector, the missionary, and the naturalist got their first solid foothold.

The first to collect birds was Capt. N. B. Blood, veteran patrol officer, who sent his collection to Tom Iredale in Australia. From it Iredale described (1948, p. 162) two valid new races of birds (*Parotia lawesi exhibita* and *Cnemophilus macgregorii sanguineus*). Earlier, feathers of the spectacular Ribbon-tailed Bird of Paradise had been collected by Fred Shaw Mayer and described and named in his honor (*Astrapia mayeri*) by C. R. Stonor (1939). Despite this pioneering, it remained for the junior author to make the first comprehensive ornithological survey of the region.

The 1950 expedition consisted of the junior author, as leader; Robert Doyle, a planter of Bougainville Island; William Lamont, a resident of Lae; and several trained natives. Doyle joined the party after it had been in the field for about a month. Lamont joined for the Mt. Hagen phase of the operation. The area covered comprised the mountains (5000 to 14,000 feet) of the Wahgi Divide, Mt. Wilhelm in the Bismarck Mountains, Mt. Hagen, and Mt. Kubor, also lowland areas in the vicinity of Nondugl, Kup, Hagen Airfield, and along the borders of the central portions of the Wahgi River.

The 1952 expedition, known officially as the American Museum-Armand Denis New

Guinea Expedition, was under the leadership of Armand Denis, noted film producer. It was managed by the junior author. This venture was greatly aided by the National Geographic Society, which provided much of the photographic equipment. The mission of 1952 was similar to that of 1950, and the area covered was much the same. However, primary emphasis was placed on observing, photographing, and sound-recording highland birds, particularly birds of paradise and bower birds.

Of first importance to the leader was the making of a color film showing primitive man in his native surroundings. This operation was centered in the Kubor Mountains (between 5000 and 9300 feet), but Mt. Hagen was also surveyed by the 1952 party. On that occasion it was approached by way of the northern watershed, while in 1950 the ascent had been from the south.

In addition to the leader and the manager, the 1952 party consisted of Michaela Denis, actress and photographer; Margaret Gilliard, artist; Robert Carmet, film photographer; Henry Kaltenthaler, bird collector; and, once again, Robert Doyle.

Papua-New Guinea authorities, among them the then Administrator, Mr. J. K. Murray, and the present Administrator, Mr. D. M. Cleland, graciously permitted the American Museum parties to work in the newly accessible terrain. Sir Edward J. L. Hallstrom, Australian naturalist and philanthropist, and his son, Mr. John Hallstrom, were most generous in their support.

Our warm thanks go to Captain and Mrs. N. B. Blood, not only for the valuable information and bird specimens with which they favored us, but for their hospitality. Also, we are much indebted to Mr. Fred Shaw Mayer for advice, assistance, and gifts of valuable specimens.

We are indebted to Mr. W. T. Loke for valuable gifts of bird eggs and a study skin collected by him on Mt. Hagen in 1952. We also express our thanks to Mr. James Greenway for the loan of comparative material.

We wish to thank Father Michael Bodnar, our gracious benefactor at Kup, Father John Nilles, Father William Tropper, Mr. William

MacGregor, Mr. James Patterson, and especially our hosts in Port Moresby, Mr. and Mrs. William Berlin, for their generous help.

We are much indebted to Dr. Dean Amadon for valuable suggestions during the

preparation of this paper.

Finally, the junior author would like to acknowledge his deep debt to the Australian members of the expeditions, Messrs. William Lamont and Robert Doyle.

## SUMMARY OF RESULTS

A total of 182 species and subspecies of birds, including 23 which are new to science (see list following), were collected, comprising some 1500 scientific study skins. Of these, many are geographical and/or altitudinal extensions of range, and some have proved of importance in clarifying the relationship of birds to the east and west.

### NEW BIRDS OBTAINED IN THE WAHGI REGION BY THE 1950 AND 1952 EXPEDITIONS AND DESCRIBED BY MAYR AND GILLIARD

*Elanus caeruleus wahgiensis* (this paper)  
*Synoicus ypsilophorus lamonti* (1951)  
*Rallus pectoralis captus* (1951)  
*Rallus philippensis wahgiensis* (1951)  
*Psittacella picta excelsa* (1951)  
*Psittacella modesta hallstromi* (1951)  
*Saxicola caprata wahgiensis* (1951)  
*Turdus poliocephalus erebus* (1951, 1952b)  
*Megalurus timoriensis montanus* (1951)  
*Megalurus timoriensis wahgiensis* (1951)  
*Tregellasia leucops wahgiensis* (1952b)  
*Peneohello sigillatus hagenensis* (1952b)  
*Epimachus meyeri bloodi* (1951)  
*Paradisaea rudolphi margaritae* (1951)  
*Pteridophora alberti hallstromi* (1951)  
*Cnemophilus macgregorii kuboriensis* (this paper)  
*Archboldia papuensis sanfordi* (1950)  
*Daphoenositta miranda kuboriensis* (1952b)  
*Melidectes princeps* (1951)  
*Zosterops novaeguineae wahgiensis* (1951)  
*Zosterops novaeguineae shaw-mayeri* (1951)  
*Lanchura spectabilis wahgiensis* (1952b)  
*Oreostruthus fuliginosus hagenensis* (this paper)

### NEW GUINEA BIRDS DESCRIBED BY MAYR AND GILLIARD FROM OUTSIDE THE WAHGI REGION, FROM STUDIES OF SKINS OB- TAINED BY THE 1950 AND 1952 EXPEDITIONS

*Rallus philippensis randi* (1951)  
*Melampitta lugubris longicauda* (1952b)  
*Melanocharis striativentris albicauda* (1952b)  
*Epimachus meyeri megarhynchus* (1951)  
*Paramythia montium brevicauda* (this paper)

### LIST OF BIRD SPECIMENS PRESERVED IN SPIRITS, INCLUDING SPECIMENS FROM THE WAHGI, JIMI RIVER, AND LAE REGIONS, TAKEN APRIL TO AUGUST, 1950, AND APRIL TO AUGUST, 1952<sup>1</sup>

*Anas superciliosa pelewensis* X  
*Salvadorina waigiensis*  
*Aviceda subcristata megala* X  
*Hieraaetus morphnoides weiskei* X  
*Ieracidea berigora novaeguineae* X  
*Aepyodius arfakianus* X  
*Synoicus ypsilophorus lamonti*  
*Excalfactoria chinensis novaeguineae*  
*Rallus pectoralis captus*  
*Rallus philippensis wahgiensis*  
*Porzana tabuensis tabuensis*  
*Rallucula forbesi steini*  
*Porphyrio porphyrio melanopterus* X  
*Ptilinopus superbus superbus*  
*Ptilinopus toxonus finschi* X  
*Ducula pinon jobiensis* X  
*Gymnophaps albertisii albertisii*  
*Macropygia amboinensis cinereiceps*  
*Macropygia nigrirostris nigrirostris*  
*Geopelia striata papua* X  
*Gallinula beccarii beccarii*  
*Gallinula jobiensis jobiensis*  
*Otidiphaps nobilis cervicalis*  
*Trichoglossus haematodus intermedius*  
*Psittaculopsitta goldiei*  
*Lorius hypoinochrous devittatus* X  
*Charmosyna papou goliathina*  
*Oreopsittacus arfaki grandis*  
*Neopsittacus pullicauda pullicauda*  
*Neopsittacus musschenbroekii major*  
*Opopsitta diophthalma diophthalma*  
*Geoffroyus geoffroyi minor*  
*Geoffroyus simplex birgersi* X  
*Psittacella picta excelsa*  
*Cacomantis pyrophanus excitus*  
*Centropus phasianinus propinquus* X  
*Tyto alba meeki* X  
*Tyto tenebricosa arfaki*  
*Podargus papuensis*

<sup>1</sup> The species marked with an X are not represented by study skins.



*Aegotheles albertisii salvadorii*  
*Aegotheles insignis insignis*  
*Chaetura novaeguineae bürgeri* X  
*Collocalia esculenta esculenta*  
*Collocalia hirundinacea hirundinacea*  
*Collocalia whiteheadi papuensis*  
*Hemiprocne mystacea mystacea* X  
*Halcyon megarhyncha megarhyncha*  
*Clytoceyx rex rex*  
*Merops ornatus*  
*Coracina longicauda longicauda*  
*Anthus australis exiguus*  
*Saxicola caprata wahgiensis*  
*Crateroscelis robusta robusta*  
*Ifrita kowaldi kowaldi*  
*Malurus alboscapulatus mafulu*  
*Megalurus timoriensis wahgiensis*  
*Sericornis nouhuysi stresemanni*  
*Sericornis (rufescens) perspicillatus*  
*Gerygone ruficollis insperata*  
*Rhipidura brachyrhyncha devisi*  
*Rhipidura atra atra*  
*Rhipidura albolimbata*  
*Rhipidura leucophrys melaleuca*  
*Machaerirhynchus nigripectus saturatus*  
*Monachella mülleriana mülleriana*  
*Tregellasia leucops wahgiensis*  
*Peneothello sigillatus hagenensis*  
*Peneothello cyanus subcyanus*  
*Pachycephala schlegelii obscurior*  
*Pachycephala modesta hypoleuca*  
*Pachycephala rufiventris dorsalis*  
*Pachycephala rufinucha niveifrons*  
*Myiolestes megarhynchus tapfenbecki*  
*Pitohui dichrous*  
*Lanius schach stresemanni*  
*Epimachus meyeri bloodi*  
*Astrapia mayeri*  
*Astrapia stephaniae ducalis*  
*Lophorina superba feminina*  
*Diphyllodes magnificus hunsteini*  
*Paradisaea apoda salvadorii*  
*Pteridophora alberti hallstromi*  
*Loria loriae amethystina*  
*Cnemophilus macgregorii sanguineus*  
*Archboldia papuensis sanfordi*  
*Amblyornis macgregoriae*  
*Chlamydera lauterbachii lauterbachii*  
*Timeliopsis fulvigula (subspecies?)* X  
*Myzomela adolphinae*  
*Myzomela rosenbergii rosenbergii*  
*Toxorhamphus poliopterus septentrionalis*  
*Melipotes fumigatus*  
*Melidectes fuscus fuscus*  
*Melidectes princeps*  
*Melidectes belfordii*  
*Melidectes torquatus polyphonus*  
*Xanthotis chrysotis giulianettii*

*Oreornis subfrenatus salvadorii*  
*Ptiloprora guisei umbrosa*  
*Ptiloprora perstriata lorentzi*  
*Dicaeum geelvinkianum rubrocoronatum*  
*Melanocharis versteri virago*  
*Melanocharis striativentris striativentris*  
*Oreocharis arfaki*  
*Paramythia montium montium*  
*Zosterops novaeguineae wahgiensis*  
*Erythrura trichroa sigillifera*  
*Lonchura grandis ernesti*  
*Lonchura spectabilis wahgiensis*

Some 900 mammals (500 represented by skulls alone) were obtained. So far as is now known, the rarest mammal collected was *Crossomys moncktoni*, then the second known record of the genus (Tate, 1951). Many reptiles (including 17 death adders) and amphibians were preserved in spirits.

A large collection of Lepidoptera and a small series of fishes were prepared. One of the latter (*Gobius brunnoides*) proved to be a new species (Nichols, 1951, p. 6).

About 500 herbarium specimens of flowering plants (the highest from 13,000 feet on Mt. Wilhelm) were collected by the 1950 expedition and have been presented to the Arnold Arboretum, Jamaica Plain, Massachusetts.

The discovery of the display perches of *Paradisaea apoda*, *Pteridophora alberti*, *Loria loriae*, *Astrapia mayeri*, *Diphyllodes magnificus*, and *Lophorina superba* and the bowers and/or dance stages of *Chlamydera lauterbachii*, *Amblyornis macgregoriae*, and *Archboldia papuensis* was a "highlight" of the two expeditions.

The perishable colors of about 100 species of highland birds were recorded in detail on cards. Direct comparisons were made with Ridgway's "Color standards and color nomenclature," and names of colors thus obtained are capitalized. Because the publication of these notes would involve much space and duplication, we merely call attention to the file which is available at the American Museum.

Tape recordings of calls and songs were made of *Pteridophora alberti*, *Diphyllodes magnificus*, *Lophorina superba*, *Chlamydera lauterbachii*, *Amblyornis macgregoriae*, *Paradisaea apoda salvadorii*, and of many other birds, including two lowland birds of paradise

(*Ciccinnurus regius* and *Paradisaea apoda augustaevictoriae*).

Geographic work involved the climbing and filming of Mt. Wilhelm (14,200 feet), including the three crater lakes near its summit, and of Mt. Kubor (to 9000 feet), climbing a subsidiary peak of Mt. Hagen (12,075 feet), and surveying for 22 days the alpine forests and grasslands crowning these mountains.

An important result of these surveys was the clarification of hybridization between *Astrapia mayeri* and *Astrapia stephaniae* (Mayr and Gilliard, 1952a). Another interesting result was the discovery and analysis of the complicated altitudinal hybridization occurring in *Melidectes belfordi* (Mayr and Gilliard, 1952c).

The most spectacular discovery was that of the Golden-crested Black Bower Bird,

*Archboldia papuensis sanfordi*, on Mt. Hagen (Mayr and Gilliard, 1950). This remarkable bird in its immature and female plumages bears a close resemblance to *Archboldia papuensis papuensis*, discovered by the American Museum Richard Archbold Snow Mountains Expedition in 1938. However, the adult male of *sanfordi* has an immense golden crown. The adult male plumage of *A. p. papuensis* is unfortunately still unknown.

During the course of our 1950 and 1952 trips, visits were made by the junior author to the tropical forests bordering the Markham River near Lae for the purpose of collecting small numbers of birds and making sound recordings of their songs.

Many points of geographical and anthropological interest, as well as descriptions of bird courtship and an account of the daily

#### ITINERARY

##### APRIL 10 TO AUGUST 10, 1950, IN NEW GUINEA (PORT MORESBY, CENTRAL HIGHLANDS, LAE, AND MADANG)

April 17-June 4	Nondugl, Wahgi Valley, Camp 1	5,200 feet
May 2-May 11	Wahgi Divide, Bismarck Mountains Camp 2	6,500
May 16-May 17	Kup, Kubor Mountains	5,000
May 17-May 31	Omong River, Kubor Mountains, Camp 3	6,000
May 22-May 24	Mt. O'-mar, Kubor Mountains, Camp 4	8,500
June 5-June 6	Kegalsugl, Bismarck Mountains, Camp 5	8,300
June 6-June 14	Lake Embia, Mt. Wilhelm, Camp 6	11,200
June 12	Climbed to summit, Mt. Wilhelm	14,200
June 14-June 18	Forest Camp, Mt. Wilhelm, Camp 7	9,500
June 18-June 20	Kegalsugl (and Dengalagu), Camp 5	8,300
June 29-June 30	Mt. Hagen airfield, Camp 8	5,600
July 1-July 28	Mt. Hagen base camp, Camp 9	8,400
July 16-July 26	Mt. Hagen summit camp, Camp 10	11,200
July 25	A summit peak of Mt. Hagen climbed	12,075
July 30	Pi-you-gona near Mt. Hagen, Camp 11	6,000
August 8-August 9	Markham Valley near Lae	400

##### MARCH 10 TO AUGUST 14, 1952, IN NEW GUINEA (PORT MORESBY, LAE, AND CENTRAL HIGHLANDS)

March 22	Air reconnaissance, Bismarck and Kubor Mountains	
March 26-August 4	Kup, foot of Kubor Mountains, Camp 1	5,000
April 19-May 2	Omong River, Kubor Mountains, Camp 2	6,000
April 25-May 1	Mt. O'-mar, Kubor Mountains, Camp 3	7,500
May 8-11, 18-22	En route to and from Mt. Hagen via Baiyer River	
May 11-May 18	Mt. Hagen, Camp 4	7,300
May 31-June 12	Katumbag, Kubor Mountains, Camp 5	5,600
June 6-June 14	Saxony Camp, Camp 6	7,400
June 19-June 22	Blue Bird Camp, Camp 7	6,300
June 26-July 3	Katumbag, Kubor Mountains, Camp 5	5,600
July 15-July 18	Nondugl, Wahgi Valley, Camp 8	5,200
August 11-August 12	Markham River forests near Lae	300

activities of the two expeditions, can be garnered from the junior author's popular reports of the two expeditions which have appeared in the National Geographic Magazine (1951, 1953a) and in Natural History Maga-

zine (1953b). These reports were accompanied by maps and numerous photographs, many of which show the geographical and ecological features of the terrain in the little-known Central Highlands.

#### ECOLOGICAL, GEOGRAPHICAL, AND ANTHROPOLOGICAL NOTES

The mid-mountain grassland comprises 80 per cent of the Wahgi region above 5000 feet. It is composed of abandoned native gardens on depleted soil, overgrown with grass ranging up to 10 feet in height. This inflammable grass is burned about once every year by the natives to clear the ground and drive pigs. Soon thereafter new grass springs forth, but woody plants and trees have no chance of reestablishing themselves. To appreciate the destructiveness of this situation, one must realize that the mid-mountain grassland was covered with luxuriant mid-mountain forest (nomenclature from classification of New Guinea forest; Brass, 1941, pp. 338-340) until cleared by the primitive farmer.

This once vast woodland is now restricted to narrow strips of riverine forest bordering the Wahgi River and its tributaries—areas not readily reached by fire. Unfortunately, under existing conditions there is no chance for the forest to replace itself.

Some 100,000 natives live in the Wahgi-Chimbu region (5000-8000 feet), which is roughly 1200 square miles in size. Population pressure is such that firewood, so important to the naked people, is often scarce or non-existent below 7000 feet. Huge areas that went successively from forest to farm have been abandoned to grass simply because they were left too far behind by the ever-receding forest.

In the Chimbu Valley, where population pressure is greatest, the pioneer fringe (the edge of the forest being constantly cut back and burned for new garden areas and for fuel) has climbed the Bismarck Mountains like a giant contour line to 8300 feet. On the south flank of the Wahgi (Kubor Mountains) the forest has been pushed to about 7000 feet, and on the north flank (the Wahgi Divide range) to about 6500 feet. In the Hagen Mountains (both north and south water-

sheds) the forests have been destroyed below 7500 feet.

Removal of forests by man has brought about an unusual set of circumstances at the westernmost end of the Wahgi Valley. Probably nowhere else along the 1500 miles of mountains comprising the backbone of New Guinea, except at that point, is there a grassland link between the mid-mountain grasslands of the north and south watersheds.

This link or gap in the mountain forest is about 12 miles wide (see fig. 1, location 3). Its lowest point is 5500 feet above sea level. It connects the upper Wahgi Valley (Purari River drainage) at 5400 feet with the Baiyer Valley (Sepik River drainage). A small patch of forest crowns a peak some 6500 feet high, situated in the midst of the 12-mile gap.

This gap, which we have called Hybrid Gap, forms an important zoogeographical link as well as a barrier: (1) *Astrapia mayeri* and *A. stephaniae* come together there (a hybrid population exists on the eastern end of Mt. Hagen; see Mayr and Gilliard, 1952a, p. 9); (2) according to an oral communication from Capt. N. B. Blood, there is a large hybrid zone in the Baiyer Valley (east side) where *P. apoda* hybridizes with *P. minor finschi*; and (3) it is here that certain species terminate their ranges or divide into different races. For example, *Archboldia* occurs only to the west, and *Peneothello sigillatus* is represented by a distinct race on each side of the gap.

In the eastern Baiyer region the forest comes down solidly to 3900 feet on the east side of the valley. At this low elevation it probably links with the upper rain forest. However, all flat valley floors are covered solely with grass. On a flight across the Jimi River from the middle Wahgi to Madang in 1950 (see fig. 1) Gilliard noted that, in contrast to conditions on the south side of the

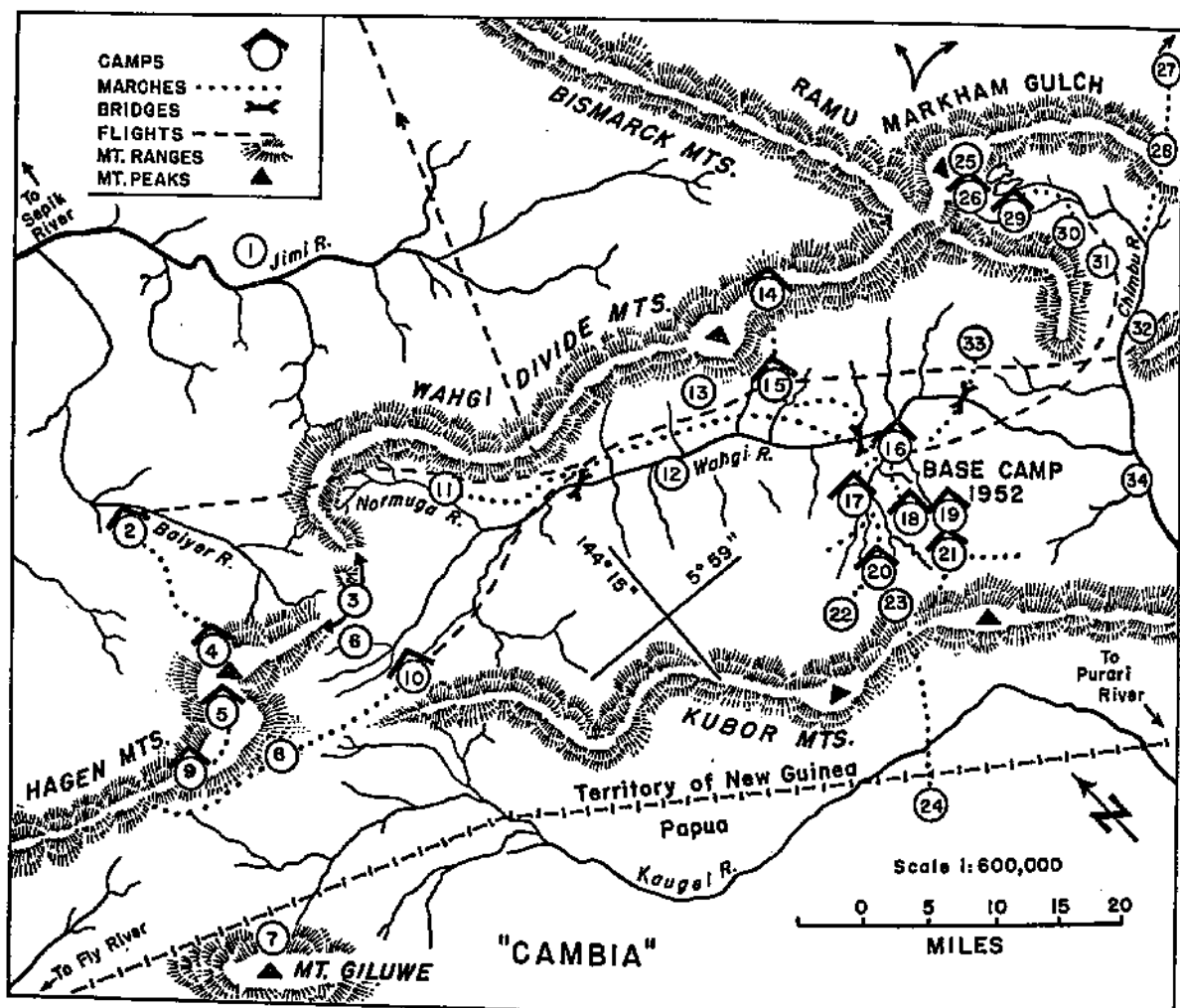


FIG. 1. Map of the Central Highlands of New Guinea. 1. Jimi River, 1000-2000 feet. 2. 1952, Baiyer River Valley, 3900 feet. 3. Hybrid Gap, 5500 feet. 4. 1952, Camp 4, 7300 feet. 5. 1950, Camp 10, 11,200 feet; 1950, a summit peak, Mt. Hagen, 12,075 feet. 6. Minyip, 5600 feet. 7. Mt. Giluwe, 13,660 feet. 8. 1950, Camp 11, 6000 feet. 9. 1950, Camp 9, 8400 feet. 10. Hagen Airfield, 5600 feet. 11. Normuga River. 12. Wahgi River. 13. Banz. 14. 1950, Wahgi Divide, Camp 2, 6500 feet. 15. 1950, 1952, Nondugl Camp 1, Camp 8, 5200 feet. 16. 1950, 1952, Kup, Camp 1 (1952), 5000 feet. 17. 1950, 1952, Omong River, Camp 3, Camp 2, 6000 feet. 18. 1952, Katumbag, Camp 5, 5600 feet. 19. 1952, Blue Bird Camp, Camp 7, 6300 feet. 20. 1950, Mt. O'-mar Camp, Camp 4, 8500 feet. 21. 1952, Saxony Camp, Camp 6, 7300 feet. 22. Mt. Orata. 23. Mt. O'-mar. 24. Cambia. 25. 1950, summit, Mt. Wilhelm, 14,200 feet. 26. 1950, Lake Embia, Mt. Wilhelm, Camp 6, 11,200 feet. 27. Bundi. 28. Yandara, 6000 feet. 29. 1950, Forest Camp, Mt. Wilhelm, Camp 7, 9500 feet. 30. Kegalsugl. 31. Dengalagu. 32. Chimbu Gorge. 33. Kerowagi. 34. Kundiawa.

divide (the Wahgi region), the entire northern watershed of the Wahgi Divide and Jimi valleys was heavily forested. Very few clearings existed, and the forest continued unbroken until the coastal lowlands were reached. This condition is doubtless due largely to the fact that virtually no valley flats exist in the mid-mountain zone of the north watershed in

this region and to the related fact that the native population is very sparse.

The most spectacular evidence of the destructiveness of man was revealed by the forest distribution on either side of the little Baiyer River which flows through a valley about 6 miles wide. On the east the forest persists to the valley floor (3900 feet), while on



the west side it does not descend below 7000 feet, the hills being stripped bare below that altitude. On one side the secondary peaks and rounded mountain heads are luxuriantly cloaked in forest; on the west they are nude and heavily cut up into gardens.

This condition appears to have nothing whatever to do with soil conditions, prevailing winds, or rainfall, and there is no rain shadow involved. Gilliard was informed by Mr. William MacGregor (authority on the Baiyer area) that two very different tribes, speaking different languages, live on either side of the gap, which forms an inviolate boundary, and that the people of the west are much more numerous.

Thus Hybrid Gap is peculiar in that it separates tribes, languages, and forests, as well as birds. In view of the geographical features of New Guinea, the growing importance of the Central Highlands, and the imminent need for surface links between the political and military sectors of the island, the Gap has far-reaching significance. Since 1950 it has been possible to drive a "jeep" through the gap from Hagen Airfield in the upper Wahgi Valley to MacGregor's station in the Baiyer Valley.

Beginning at the upper edge of the mid-mountain grasslands (7500 ± feet), a luxuriant beech forest extends upward to about 10,000 feet, where it changes to a subalpine "cloud" or "moss" forest. The former is high crowned (averaging 90 feet, with a few "Bulolo pines" — *Araucaria Cunninghamii* — up to 160 feet) and open; the latter is stunted (averaging 35 feet) and gnarled. This subalpine forest is comprised in large part of rhododendrons at its upper edge (11,500 ± feet), which comprises tree line in this latitude (6° S.).

The alpine grasslands are areas covered with coarse short grass (up to 2 feet tall) capping about six of the Wahgi region peaks. Only two are of any size, namely, the grassy areas of Mts. Wilhelm and Hagen, each of which covers at least 15 square miles. Mt. Giluwe, just south of the Wahgi region (see panorama, Gilliard, 1951, p. 682), which was viewed but not visited, has an alpine grass cap which is probably larger than that of either Mt. Wilhelm or Mt. Hagen. In the Kubor Range there are several peaks which

are narrowly capped with grass. Several, such as Mt. Leahy (see panorama, *ibid.*, p. 670, left center), probably have less than a square mile of it, while others, such as Mt. Spinks, "the spike" (*loc. cit.*, right of center), have grass cap areas of perhaps 3 to 5 square miles. No alpine grass was noted on the Wahgi Divide west of Mt. Wilhelm.

Lobes of alpine grass in rounded valleys sometimes extend down to 10,000 feet (below twin lakes on Mt. Wilhelm, for example). They may be due to cold air streams, which not infrequently caused us much discomfort when we camped in such areas.

The alpine grass extends up to 13,500 feet in patches on Mt. Wilhelm before it gives way to bare rock. Curiously, on Mt. Wilhelm, Gilliard came on two small, solid, native houses built on the rim of the central divide in a low point just east of Mt. Wilhelm at 12,800 feet. One was probably several years old; the other was new. The "boys" informed Gilliard that the natives built them to live in during their overnight hunts for alpine grassland "kapuls" (a terrestrial marsupial which we found to be fairly common). Wood for house construction and fuel was carried up from rhododendron clumps 500 feet below.

There has been much argument concerning snow on these mountains. As a result of Gilliard's personal observation, from Kup using a 40-power "scope," while camped near the summit of Mt. Wilhelm, and through discussion with Father Michael Bodnar, who has watched the summit of Mt. Wilhelm (14,200 feet) for four years, there is no doubt that snow caps this peak above 13,000 feet at infrequent intervals. Gilliard several times examined it when it was sheathed either with ice, due to freezing rain, or with snow. However, the snowy covering always melted away by midmorning.

There is no permanent ice in even the most shaded of the summit niches of Mt. Wilhelm. However, Gilliard came upon several moraines composed of huge boulders at the lower edge of glacier-fluted valleys. These indicate plainly that the peaks were formerly capped with permanent ice.

Frost is uncommon below 10,000 feet but occasionally descends to 7000 feet with devastating results. At Tomba (8000 feet) in 1950 the natives were just recovering from a period

of famine caused by frost which killed their sweet potato plantings, on which they depend for 90 per cent of their food.

It is probable that the upper limit of the man-made mid-mountain grasslands is to some extent predicated on the distribution of frost. The only plantings we saw above 8300 feet were oily pandanus groves in deep cloud forest to 9500 feet. However, the native makes good use of the mountain slopes, be they forested or grass covered. His flocks of pigs work the forest floor to at least 9000 feet, and he hunts the "kapul" (as mentioned previously) to the upper edge of grass line (13,000 feet), using his peculiar little mongrel dogs.

Thus, though situated high above the habitable zone (from which practically every vestige of the original mid-mountain oak forest has been removed), the beech forest is subject to much destruction. Over much of

the region it provides the only substantial source of game, fuel, and building materials and is economically invaluable. Nevertheless, the "bush kanaka," particularly now that he has the steel ax, is hacking it to pieces for lumber, bark, bush rope, and pandanus gardens. He is a master axman and thinks nothing of cutting a dozen trees per day just to retrieve arrows, or of felling the most imposing forest giant in order to catch a tree marsupial weighing a few pounds.

All of this has an immediate bearing on the bird population. Some species, such as the Blue Bird of Paradise, have been virtually extirpated from the Wahgi region along with a multitude of species, both animal and plant, which lived in the mid-mountain oak forests.

Conservation measures are sorely needed to protect the beech forest and, in turn, the wonderful birds that live in it.

#### CONSERVATION AND PARADISE PLUME COLLECTING TODAY

Concerning the hunting and use of paradise plumes by the New Guinea native of today, it was found that the plumed birds of the highlands are under continuous pressure from native hunters. Great numbers of male birds are killed each year. At Kup in 1952 in a period of two months, June and July, the junior author knew of 17 displaying Greater Birds of Paradise which were killed from their display perches. This number comprised practically all of the display trees (which are well known to the native) in an area of about 40 square miles. Plumes are valued highly and are much coveted as money and as articles of wealth and adornment.

At Katumbag above Kup on June 28, 1952, the junior author made the following census of paradise plumes worn by 54 men participating in a small sing-sing dance: "Twenty-six wore twin tail feathers of the adult male Stephanie Bird of Paradise (*Astrapia stephaniae*). One man had four sets. There were 11 men with paired sets of occipital plumes of the King of Saxony Bird of Paradise (*Pteridophora alberti*) stuck on their heads. One man had five. Fourteen wore males of the Superb Bird of Paradise (*Lophorina superba*) across the forehead, the black cape being spread out, with the gleaming metallic shield superimposed upon it like a medallion. By far the

most numerous plumes, and the most coveted, were the flank plumes of the Greater Bird of Paradise (*Paradisaea apoda*) which are the color of fire in this region. Thirty-seven pairs were worn. There were two wings of *Tyto alba*, 12 of *Charmosyna papou*; about 18 men wore the secondaries and primaries of the White Cockatoo (*Cacatua galerita*). Three men wore the skins of *Diphyllodes magnificus* on their heads: one, a male with the tail plumes intact, and two, the barred chest patch of the female. One man had the plumes of the King Parrot (*Lorius loratus*) on his head, 20 wore remnants of the Cassowary (*Casuarius bennetti*?) or moruk; eight had the primaries or secondaries of the Vulturine Parrot (*Psittichas fulgidus*); and three had the large wing feathers and tail plumes of *Harpyopsis novaeguineae*, the great eagle of New Guinea. Two wore the plumes of *Trichoglossus haematodus*; 19 had plumes of *Paradisaea minor*. Of the latter some were yellow and fresh and some were quite faded. Two, which were pure white, were probably the result of hybridization between *minor* and *apoda*. There was one complete skin of the King Bird of Paradise (*Cicinnurus regius*). The long slender central tail plumes of *Charmosyna papou* were worn by several men in the nose, where they were inserted in the

holes usually meant for King of Saxony occipital plumes. A frigate bird (*Fregata ariel*) wing from a living bird brought to my camp at Kup several days before again astonished me. The Black Cockatoo (*Probosciger aterrimus*) was popular. Fourteen men wore its feathers. One wore the wings of a rifle bird (*Craspedophora magnifica*). There were one large pigeon (*Ducula chalconota*) with iridescent plumage; one goatsucker, unidentified; one male Sickie-billed Bird of Paradise (*Epimachus meyeri*); one hawk, unidentified; three sets of small parrot wings with bright yellow streaks through the primaries and brilliant red under wing coverts (probably *Neopsittacus*); one gray wing from a large hawk (probably *Accipiter novaehollandiae*); three wings from a very large barn owl (probably *Tyto longimembris*); and one brown wing of *Macropygia nigrirostris*. One man wore the blue secondary plumes of a Goura Pigeon (*Goura scheepmakeri*?), and to my surprise one 'boy' had two complete flat skins of *Peltops*. One 'boy' wore the yellow crest plumes of the Gardner Bower Bird (*Amblyornis macgregoriae*), and one wore a patch of golden orange feathers from the back of *Cnemophilus macgregorii*."

In the northeastern lowlands in the vicinity of Lae the junior author was informed by Mr. Adolph Batze, a former plume collector, that the natives no longer have much regard for paradise adornment. In 1938 in the Port Moresby region of Papua the same was true.

In conclusion, judging from the above, and from many other observations of the great number of paradise plumes in the possession of the highland natives, as well as from the numbers of male Greater Birds of Paradise which we know to have been killed by natives in 1952, it is clear that the paradise birds of the mid-mountain regions need protection. These facts, coupled with the even more devastating rapid removal of the mid-mountain forests by the primitive farmer, who uses the new-found steel ax with a vengeance, pose a serious challenge for the conservationist.

A solution might be the establishment of a Bird of Paradise National Park in which man and the wild life surrounding him could be induced to live in harmony, as they do, for example, in the Krueger National Park in Africa.

A triangular reservation with sides 60 miles

long, encompassing the eastern portion of Mt. Hagen, the western ends of the Wahgi Divide and Kubor Mountains between low mountain rivers (Baiyer River, 3800 feet; Jimi River, 1500 feet; lower Wahgi River, 5000 feet; and Kaugel River, 2000 feet), and tree line (11,000 feet), would include within its bounds virtually every important species (some represented by two or more races) of birds of paradise and bower birds of non-peninsular New Guinea, as follows:

#### Birds of paradise

*Manucodia jobiensis*  
*Phonygammus keraudrenii*  
 ? *Macgregoria pulchra*  
*Paradigalla carunculata*  
*Drepanornis albertisii*  
*Epimachus fastosus*  
*Epimachus meyeri*  
*Astrapia mayeri*  
*Astrapia stephaniae*  
*Parotia carolae*  
*Parotia lawesi*  
*Lophorina superba*  
*Craspedophora magnifica*  
*Diphyllodes magnificus*  
*Paradisaea apoda*  
*Paradisaea minor*  
*Paradisaea rudolphi*  
*Pteridophora alberti*  
*Loria loriae*  
*Loboparadisaea sericea*  
*Cnemophilus macgregorii*

#### Bower birds

*Archboldia papuensis*  
*Amblyornis macgregoriae*  
*Chlamydera cerviniventris*  
*Chlamydera lauterbachii*  
*Ailuroedus crassirostris*  
*Ailuroedus buccoides*

In short, excluding the peninsular isolates of the Huon Peninsula and Vogelkop, all but five species of mainland New Guinea paradise birds would be included. These five are:

*Astrapia splendidissima*, Oranje, Nassau, and Weyland Mountains  
*Seleucides ignotus*, tropical sago swamps everywhere  
*Cicinnurus regius*, lowland flood plain forests everywhere  
*Drepanornis bruijnii*, northern lowlands of Dutch New Guinea  
*Manucodia ater*, lowland forests everywhere

## TYPES OF HABITAT AND BIRDS TYPICAL OF EACH

## Rivers and lakes

- Anas superciliosus*  
*Salvadorina waigiensis* (up to 11,300 feet)

## Stream and river borders (5000-6000 feet)

- Porzana tabuensis tabuensis*  
*Porphyrio porphyrio melanopterus*  
*Pomareopsis bruijni*  
*Monachella mulleriana mulleriana*

Mid-mountain oak and mixed riverine forest  
(5000-7000 feet)

- Epimachus fastosus stresemanni*  
*Lophorina superba feminina* (to 7300 feet)  
*Diphyllodus magnificus hunsteini* (to 5100 feet)  
*Paradisaea rudolphi margaritae* (to 6300 feet)

Edge of mid-mountain and mixed riverine forest  
(5000-7500 feet)

- Macropygia amboinensis cinereiceps*  
*Trichoglossus haematodus intermedius* (to 5800 feet)  
*Podargus papuensis* (to 6000 feet)  
*Aegotheles insignis insignis*  
*Tregellasia leucops wahgiensis*  
*Myiolestes megarhynchus tappenbecki*  
*Pitohui dichrous*  
*Artamus maximus* (to 8500 feet)  
*Aplonis cantoroides* (to 5400 feet)  
*Paradisaea apoda salvadorii* (to 5600 feet)  
*Myzomela adolphinae* (to 6000 feet)  
*Myzomela rosenbergi rosenbergi* (to 6300 feet)  
*Melidectes torquatus polyphonus* (to 5800 feet)  
*Dicaeum geelvinkianum rubrocoronatum* (to 5500 feet)  
*Zosterops novaeguineae wahgiensis* (to 6500 feet)

## Mid-mountain grassland, bushes, and occasional trees (400-7500 feet)

- Milvus migrans affinis* (to 6000 feet)  
*Synoicus ypsilophorus lamonti* (to 8000 feet)  
*Rallus philippensis wahgiensis*  
*Centropus phasianinus propinquus* (up to 4200 feet)  
*Tyto longimembris papuensis*  
*Merops ornatus*  
*Anthus australis exiguus* (to 8300 feet)  
*Saxicola caprata wahgiensis* (to 6000 feet)  
*Malurus alboscapulatus mafulu* (to 5800 feet)  
*Megalurus timoriensis wahgiensis* (to 8000 feet)  
*Rhipidura leucophrys melaleuca* (to 6000 feet)  
*Lanius schach stresemanni* (to 7500 feet)  
*Chlamydera lauterbachii lauterbachii* (to 7000 feet)  
*Lonchura spectabilis wahgiensis*

## Native gardens, citrus, fig, and casuarina groves

- Excalfactoria chinensis novaeguineae*  
*Ptilinopus superbus superbus*  
*Cacomantis variolosus oreophilus*  
*Halcyon sancta sancta*  
*Pachycephala rufiventris dorsalis* (up to 5500 feet)

## Beech forest (7500-9500 ± feet)

- Harpyopsis novaeguineae*  
*Rallacula forbesi steini* (up to 9500 feet at least)  
*Ducula chalconota smaragdina*  
*Gymnophaps albertisii albertisii* (up to 11,000 feet)  
*Macropygia nigrirostris nigrirostris*  
*Charmosyna papou goliathina*  
*Neopsittacus pullicauda pullicauda*  
*Tyto tenebricosa arfaki*  
*Coracina longicauda longicauda* (up to 9500 feet)  
*Melampitta lugubris longicauda*  
*Crateroscelis robusta robusta*  
*Eupetes leucostictus lorae*  
*Ifrita kowaldi kowaldi*  
*Sericornis nouhuysi stresemanni*  
*Sericornis rufescens perspicillatus*  
*Rhipidura albolimbata*  
*Eugeryone rubra saturator*  
*Microeca papuana*  
*Peneothello cyanus subcyanus*  
*Pachycephala schlegelii obscurior*  
*Pachycephala modesta hypoleuca*  
*Pachycephala soror klossi*  
*Machuerhynchus nigripectus saturatus* (up to 6300 feet)  
*Epimachus meyeri bloodi* (up to 9000 feet)  
*Astrapia meyeri* (Mt. Hagen; up to 9500 feet)  
*Astrapia stephaniae ducalis* (Bismarck and Kubor Mountains; up to 9500 feet)  
*Pteridophora alberti hallstromi* (7000-8300 feet)  
*Loria lorae amethystina* (up to 8500 feet)  
*Cnemophilus macgregorii* (up to 11,000 feet)  
*Archboldia papuensis sanfordi*  
*Amblyornis macgregoriae* (up to 8900 feet)  
*Daphoenositta miranda kuboriensis* (to 8500 feet)  
*Melidectes belfordi* (7000 ± 12,000 feet)  
*Melipotes fumigatus* (7000-9500+ feet)  
*Ptiloprora guisei umbrosa* (up to 8500 feet)  
*Melanocharis versteri virago*  
*Oreostruthus fuliginosus hagenensis* (up to 10,000 ± feet)

## Subalpine forest (10,000 ± 11,500 feet)

- Psittacella brehmi pallida*



*Psittacella picta excelsa*  
*Eurostopodus archboldi*  
*Acanthisa murina*  
*Gerygone ruficollis insperata*  
*Rhipidura brachyrhyncha devisi*  
*Rhipidura atra atra*  
*Ptiloprora perstriata lorentzi* (down to 8500 feet)  
*Melidectes belfordii*

Upper edge of subalpine forest and in spaced-out bushes

*Peneothello sigillatus*  
*Melidectes belfordii*  
*Melidectes fuscus fuscus*  
*Melidectes princeps*  
*Paramythia montium montium* (once seen down to 9500 feet)

Alpine grassland amid rocks

*Anthus gutturalis rhododendri* (up to 13,000 feet)  
*Turdus poliocephalus erebus* (up to 13,500 feet)  
*Megalurus timoriensis montanus*

### EFFECT OF MAN UPON THE ALTITUDINAL DISTRIBUTION OF SOME NEW GUINEA BIRDS

Seventeen species of birds were found living in the Wahgi region at higher altitudes than are usual for these species. All were species of the forest edge, islands of forest, bushes, farm, and grasslands. All apparently had been able to colonize the highlands as a consequence of the drastic man-made changes in the landscape. The mid-mountain forest has been replaced by an open plant association of savannas, native villages and gardens, and second-growth and isolated tree groves which appears very attractive to many species normally living at much lower altitudes:

*Haliastur indus girrenera*  
*Milvus migrans affinis*  
*Elanus caeruleus wahgiensis*  
*Turnix maculosa* (subspecies?)  
*Porphyrio porphyrio melanopterus*  
*Centropus phasianinus propinquus*  
*Tyto alba meeki*  
*Hirundo tahitica frontalis*  
*Malurus alboscapulatus mafulu*  
*Rhipidura leucophrys melaleuca*  
*Pachycephala rufiventris dorsalis*  
*Pitohui dichrous*  
*Lanius schach stresemanni*  
*Aplonis cantoroides*  
*Paradisaea apoda salvadorii*  
*Melidectes torquatus polyphonus*  
*Lonchura spectabilis wahgiensis*

*Haliastur indus* and *Milvus migrans* were uncommon and common, respectively, over the farmlands and sheep pastures of Kup and Nondugl. *Elanus caeruleus* preferred perches high in sentinel trees and in partition for-

ests amid grasslands. *Turnix maculosa* was resident in tall grasslands. *Porphyrio porphyrio* lived in the cane grass (15 feet tall) bordering rivers, swamps, and streams. *Centropus phasianinus*, although apparently absent from the Wahgi grasslands, was found on the floor of medium tall grasslands of the Sepik headwaters (Baiyer Valley, 4000 feet). *Tyto alba* probably lived in the forest edge and in the open forest clumps (many with tall dead trees) which occur abundantly among the grass and farmlands. Birds lured by grassland bushes and low undergrowth of the forest edge are *Lanius schach*, *Malurus alboscapulatus*, and *Lonchura spectabilis*. Birds of spaced-out trees, native plantings, open gardens, and firewood (casuarina) groves are *Rhipidura leucophrys*, *Pachycephala rufiventris*, *Pitohui dichrous*, *Aplonis cantoroides*, *Paradisaea apoda*, and *Melidectes torquatus*.

*Paradisaea apoda*, which was found to be common up to 5600 feet, thrived in the casuarina clumps planted for firewood and in islands of trees (usually an acre or two in size) growing over "mat-mat" (graveyard) plots. Virtually every such island was visited daily by Greater Birds of Paradise, and, in many, males danced. The marked liking which these birds had for such artificial casuarina plantings (the casuarina itself having been conveyed to abnormally high altitudes by primitive man) doubtless is a factor contributing to the abnormally high distribution of this lowland species.

ZOOGEOGRAPHICAL AFFINITIES OF WAHGI REGION BIRDS<sup>1</sup>

## BIRDS WITH EASTERN AFFINITIES

## Southeastern New Guinea to Mt. Hagen

- \**Psittacella modesta hallstromi*  
*Tyto longimembris papuensis*  
*Tyto alba meeki*  
*Halcyon megarhyncha megarhyncha*  
*Anthus australis exiguus* (east to Wau)  
*Malurus alboscapulatus mafulu*  
*Megalurus timoriensis montanus*  
 \**Megalurus timoriensis wahgiensis*  
*Tregellasia leucops wahgiensis*  
*Peneothello sigillatus sigillatus*  
*Astrapia stephaniae ducalis*  
*Parotia lawesi* subspecies?  
 \**Paradisaea rudolphi margaritae*  
 \**Cnemophilus macgregorii sanguineus*  
 \**Cnemophilus macgregorii kuboriensis*  
 \**Daphoenositta miranda kuboriensis*  
*Melidectes torquatus polyphonus*  
*Melanocharis striativentris striativentris*  
*Rhamphocharis crassirostris piperata*  
*Zosterops novaeguineae crissalis*

## Southeastern New Guinea to Hagen and Saruwaged Mountains

- Coracina longicauda longicauda*  
*Gerygone ruficollis insperata*  
 \**Turdus poliocephalus erebus*  
*Peneothello cyanus subcyaneus*  
*Lanius schach stresemanni*  
*Diphyllodes magnificus hunsteini*  
*Oreornis subfrenatus salvadorii*  
*Paramythia montium montium*

## Southeast New Guinea, Hagen, Saruwaged, and Sepik Mountains

- Otidiphaps nobilis cervicalis*  
*Oreopsittacus arfaki grandis*  
*Neopsittacus musschenbroekii major*  
*Crateroscelis robusta robusta*  
*Phylloscopus trivirgatus giulianettii*

## Southeast New Guinea, Hagen and Sepik Mountains

- Neopsittacus pullicauda pullicauda*  
*Geoffroyus simplex bürgeri*  
*Eupetes leucostictus lorae*  
*Dicaeum geelvinkianum rubrocoronatum*

## Southeast New Guinea, Hagen, Saruwaged, and Snow Mountains

- \**Melampitta lugubris longicauda* (west to Oranje Mountains)  
*Ifrita kowaldi kowaldi*

<sup>1</sup> Endemics of the Mt. Hagen area are marked with an asterisk.

- Clytomyias insignis oorti* (west to Mt. Goliath)  
*Rhagologus leucostigma obscurus* (west to Mt. Goliath and Idenburg River)  
*Pycnopygius cinereus marmoratus* (west to Nassau Mountains)

## Southeast New Guinea, Hagen, west to Dutch New Guinea

- Eurostopodus archboldi* (west to Lake Habbema)  
*Edolisoma montanum minus* (west to Oranje Mountains)  
*Acanthiza murina* (west to Oranje Mountains)  
*Monarcha axillaris fallax* (west to Nassau Mountains)  
*Melidectes fuscus* subspecies? (west to Oranje Mountains)  
 \**Oreostruthus fuliginosus hagenensis* (west to Oranje Mountains)

## Hagen and Saruwaged Mountains

- Anthus gutturalis rhododendri*  
*Toxorhamphus poliopterus septentrionalis*  
*Zosterops novaeguineae shaw-mayeri*

## Hagen, Sepik, and Saruwaged Mountains

- Pachycephala modesta hypoleuca*  
*Myiolestes megarhynchus tapfenbecki* (mid Sepik to upper Ramu rivers)  
*Lonchura spectabilis wahgiensis*

## BIRDS WITH NORTHERN AFFINITIES

## Hagen and Sepik Mountains

- Psittacella brehmii bürgeri*  
*Sericornis nouhuysi stresemanni*  
*Pitohui nigrescens bürgeri*  
*Phonygammus keraudrenii neumanni* (and Lordberg)  
*Epimachus fastosus stresemanni*  
*Parotia carolae chrysenia* (including Lordberg and Hunsteinspitze)  
 \**Pteridophora alberti hallstromi*  
*Loria lorae amethystina*  
*Ptiloprora guisei umbrosa*  
*Melanocharis versteri virago* (also Cyclops Mountains)

## BIRDS WITH WESTERN AFFINITIES

## Hagen and Dutch New Guinea mountains

- \**Peneothello sigillatus hagenensis*  
*Eulacestoma nigropectus clara* (extension of range from Mt. Goliath)  
*Astrapia mayeri* (west at least to Victor Emanuel Mountains)<sup>2</sup>

<sup>2</sup> Observation by Max Meinehan, Lae.

*Lophorina superba feminina* (west to Weyland Mountains)

\**Archboldia papuensis sanfordi*

\**Melidectes princeps*

*Melanocharis longicauda umbrosa*

\**Zosterops novaeguineae wahgiensis*

Hagen, Sepik, and Dutch New Guinea mountains

*Charmosyna papou goliathina*

*Coracina caeruleogrisea strenua* (extension of range from Sepik Mountains)

*Sericornis papuensis bürgersi*

*Machaerirhynchus nigrippectus saturatus*

*Poecilodryas albonotata griseiventris*

*Heteromyias albispectus centralis*

*Pachycephala soror klossi*

*Pachycephala rufinucha niveifrons*

*Paradigalla (carunculata) brevicauda*

#### TROPICAL NORTH NEW GUINEA AFFINITIES

Wahgi, Jimi and/or Baiyer Valleys, and northern tropical lowlands

*Psittaculirostris edwardsi*

*Opopsitta diophthalma diophthalma*

*Geoffroyus geoffroyi minor*

*Centropus phasianinus propinquus*

*Clytoceyx rex rex*

*Pitta erythrogaster (habenichti?)*

*Saxicola caprata wahgiensis*

*Paradisaea minor finschi*

*Chlamydera lauterbachii lauterbachii*

#### TROPICAL SOUTH NEW GUINEA AFFINITIES

Wahgi region to southern lowlands

*Paradisaea apoda salvadorii*

It is evident that the primary relationship of the Hagen area is with eastern New Guinea. In 36 species there is either subspecific identity or close relationship with species of southeastern New Guinea; in 16 species the relationship is with Weyland and Snow Mountains, while the situation is ambiguous with a few other species.

The following species or conspicuous subspecies have their eastern or western limit in this area:

Western limit

*Mafurus alboscapulatus mafuru*

*Tregellasia leucops wahgiensis*

*Peneothello sigillatus sigillatus*

*Astrapia stephaniae*

*Parotia lawesi*

*Paradisaea rudolphi*

*Cnemophilus macgregorii*

*Paramythia montium montium*

*Otidiphaps nobilis cervicalis*

Eastern limit

*Epimachus fastosus*

*Parotia carolae*

*Peneothello sigillatus hagenensis*

*Astrapia mayeri*

*Lophorina superba feminina*

*Archboldia papuensis*

*Melidectes princeps*

*Paradigalla (carunculata) brevicauda*

#### MIGRANT VISITORS OF THE WAHGI REGION

From the south

*Chalcites lucidus plagosus*, May 31

*Eurostopodus mystacalis mystacalis*, May 15

*Halcyon sancta sancta*, April–July

From the north

*Pluvialis dominica fulva*, April 21

*Actitis hypoleucos*, April 27

*Merops ornatus*, April–July

#### LIST OF SPECIMENS OBTAINED IN THE MARKHAM RIVER DELTA 5 TO 10 MILES SOUTH OF LAE

*Aviceda subcristata mekala*

*Hieraaëtus morphnoides weiskei*

*Ieracidea berigora novaeguineae*

*Ptilinopus isononus finschi*

*Ducula pinon jobiensis*: Large numbers are killed for food throughout the year by native, Australian, and Malay hunters. The Malays often use automatic shotguns. The Australian favors "pea" rifles, and the natives use single-barreled, 12-gauge "trade" shotguns.

*Geopelia striata papua*: This is either an extension of range or an introduction from the south coast of New Guinea.

*Chaetura novaeguineae bürgersi*

*Hemiprocne mystacea mystacea*

*Lanchnura grandis ernesti*

#### LIST OF NEW GUINEA BIRDS PHOTOGRAPHED IN COLOR DURING THE 1950 AND 1952 EXPEDITIONS<sup>1</sup>

*Fregata ariel ariel* y

*Casuaris bennetti (shawmayeri?)* ♂, y

*Anas superciliosa peleuensis* a

*Milvus migrans affinis* a, y

*Accipiter melanochlamys schistacinus* a

*Elanus caeruleus wahgiensis* a

*Harpyopsis novaeguineae* a

*Syncoicus ypsilophorus lamonti* a

*Rallus philippensis wahgiensis* a

*Rallula forbesi steini* n

*Porphyrio porphyrio melanopterus* a

*Goura victoria beccarii* a

<sup>1</sup> Symbols: a, adult: ♂, male; ♀, female; y, young; n, nest; E, eggs; B, bower; D, dance tree or limb or ground arena.

- Ptilinopus superbus superbus* ♂  
*Gymnophaps albertisii albertisii* y  
*Macropygia amboinensis cinereiceps* a  
*Gallicolumba beccarii beccarii* ♂, ♀  
*Neopsittacus pullicauda pullicauda* a  
*Psittaculirostris edwardsii* a  
*Opopsitta diophthalma diophthalma* a  
*Cacatua galerita trilon* a  
*Alisterus chloropterus wilhelminae* ♀  
*Psittacella brehmii pallida* ♀, y  
*Psittacella picta excelsa* ♀  
*Tyto alba meeki* a  
*Tyto longimembris papuensis* a  
*Tyto tenebricosa arfaki* a, y  
*Ninox theomacha theomacha* a  
*Podargus papuensis* a, y  
*Aegotheles albertisii salvadorii* a  
*Aegotheles insignis insignis* a, y  
*Halcyon sancta sancta* a  
*Merops ornatus* a  
*Rhyticeros plicatus jungei* ♂, ♀  
*Saxicola caprata wahgiensis* y  
*Crateroscelis robusta robusta* a  
*Malurus alboscapulatus mafulu* y  
*Megalurus timoriensis wahgiensis* a  
*Sericornis nouhuysi stresemanni* a  
*Eugerygone rubra saturatior* a  
*Gerygone ruficollis insperata* a  
*Phylloscopus trivirgatus giulianettii* a, n  
*Rhipidura albolimbata* a  
*Rhipidura leucophrys melaleuca* y, n  
*Machaerirhynchus nigripectus saturatus* a  
*Monachella mulleriana mulleriana* a  
*Tregellasia leucops wahgiensis* a  
*Peneothello cyanus subcyaneus* a, y, n  
*Pachycephala soror klossi* a  
*Pachycephala modesta hypoleuca* a  
*Pachycephala rufinucha niveifrons* a, n, E  
*Myiolestes megarhynchus tappebecki* a, n  
*Ptilohui dichroa* a  
*Pomareopsis bruijnii* a, n  
*Phonygammus keraudrenii neumanni* a  
*Paradigalla (carunculata) brevicauda* ♀  
*Epimachus meyeri bloodi* ♂, ♀, n, E  
*Astrapia mayeri* ♂  
*Astrapia stephaniae ducalis* ♂, ♀  
*Parotia carolae chrysenia* ♂  
*Parotia lawesi* ♂, ♀  
*Lophorina superba feminina* ♂, ♀, D  
*Diphyllodes magnificus hunsteini* ♂, ♀, D  
*Paradisaea apoda salvadorii* ♂, ♀, y, D  
*Paradisaea rudolphi margaritae* ♂, ♀, D  
*Paradisaea minor finschi* ♂  
*Pteridophora alberti hallstromi* ♂, ♀, D  
*Loria loricae amethystina* ♂, ♀, D  
*Cnemophilus macgregorii sanguineus* ♂, ♀  
*Archboldia papuensis sanfordi* a, D  
*Amblyornis macgregoriae* ♂, B  
*Chlamydera lauterbachii lauterbachii* a, B, E, n, y,  
 ♂  
*Myzomela adolphinae* a  
*Toxorhamphus poliopterus septentrionalis* y, n  
*Melipotes fumigatus* a  
*Melidectes belfordi* a, n  
*Melidectes torquatus polyphonus* y, n, a  
*Meliphaga montana subspecies?* a  
*Ptiloprora guisei umbrosa* a  
*Dicaeum geelinkianum rubrocoronatum* a  
*Melanocharis longicauda umbrosa* ♂  
*Paramythia montium montium* a  
*Zosterops novaeguineae wahgiensis* a  
*Erythrura trichroa sigillifera* a  
*Lonchura spectabilis wahgiensis* a



## ANNOTATED LIST OF BIRDS OF THE CENTRAL HIGHLANDS

*Casuarus bennetti* (*shawmayeri*?) Rothschild

WE HAVE NEVER SEEN a wild cassowary in the Wahgi region and therefore cannot be sure of the species that the natives say inhabits the mountain forests of the Bismarck, Kubor, and Hagen ranges. Identifications based on native-collected specimens would probably be inaccurate because of the extensive trading in these birds. For example, in April, 1950, on the trail leading from Nondugl to the Jimi River on the north side of the massive central divide, the junior author met two native travelers who were transporting two young cassowaries from the northern tropics (Jimi River) to the Wahgi Valley in order to sell them. Incidentally, the young birds were being alternately carried and driven like swine.

On Mt. O'-mar in June, 1952, a native pointed out a large *Elaeocarpus* tree growing in deep forest at 7300 feet on which were dark blue fruits the size and shape of very large marbles. These he said were "Ki Ki [food] belong Moruk." Moruk is the native name throughout the Wahgi region for the cassowary which, in the native economy, constitutes a valuable and often dangerous commodity.

Young birds are purchased or captured in the woodlands, sometimes far away. After a variable period of confinement they become quite tame and thereafter, until they become dangerous, they are permitted to wander around home and garden. At night they are placed in stake pens located next to the women's house. At about the age of two years the chick stands 3 feet high, and its brown plumage begins to be replaced by the black hair-like feathers of adulthood. Although long treated as a pet and child's plaything, the bird becomes more and more aggressive as it grows. Often it continues to enjoy comparative freedom until an unfortunate incident occurs. Such took place at Motumotu on the lower Brown River, Papua, in 1946. A seven-year old boy was playing with the village pet, a two-year old cassowary, when suddenly it lashed out with its powerful nails and ripped a one-foot opening in the boy's abdomen. A year later the unattended victim had a great tattered scar complete with bulbous append-

ages to prove his miraculous recovery.

Even after these birds demonstrate their dangerous propensities, native owners are apt to be casual in their associations with them. Above Katumbag in the Kubor Mountains about the year 1950, the bird that is illustrated in the National Geographic Magazine (Gilliard, 1953a, p. 485) killed an old man with its knife-like hind claws. And, sad to relate, Gilliard was a witness when this bird, on June 14, 1952, attacked and nearly killed a middle-aged woman at Kup.

A history of the attack with details leading up to it are pertinent, because there are few records of birds injuring and killing humans. In the first place, Gilliard did not know that supposedly tame adult cassowaries were generally dangerous, nor that the bird in question had already been responsible for one death and for two severe assaults. Being anxious to make photographs of the splendid nude neck and cheek coloration, as well as to have a 16-mm. film of the bird in a natural setting, he requested the native owner to release the huge bird from its 8-foot high cage of stakes.

When first he had visited the kanaka homestead to see the bird, he had found that this bird had been let out to feed in a near-by woodland. On another occasion Gilliard noted three old men with 8-foot, slender sticks which they held across the path of a large cassowary they were driving home. The slowly walking bird obeyed the signals perfectly, never crossing a stick barrier when it was held close in front of the lower neck.

"Thus," Gilliard recorded in his notes, "I felt no qualms the day I arrived with still cameras accompanied by film photographer Robert Carmet to make the necessary shots. Nor was there any suggestion of imminent danger as the big, black, orange and cobalt blue-necked ratite was let out of its enclosure. I did note that it was emitting from deep within its body a series of hollow sounding groans and windy sighs. The bird moved deliberately, placing each foot carefully before picking the other up, like a stalking heron, as it headed for a banana grove through medium deep grass. I made several color shots, and Carmet stood close to and virtually in front

of it making the film. All of a sudden, the great bird turned and ran through the clearing towards a 3½-foot fence. On the far side of the fence a woman was carrying a bag of sweet potatoes. The bird seemed to head purposely for the portion of the fence nearest to her. It leaped with its great feet extended forward and struck the woman resoundingly with both of its weapon-like feet, then continued running without so much as a momentary halt.

"The native went down as though shot, then began screaming. I found that her abdomen had been punctured to a depth of about an inch by the left foot and that her right upper arm had been cut to the bone by the stilleto-like inner nail of the right foot. Through application of tourniquet, four stitches, penicillin ointment and injections, and daily care for three weeks, we were able to save her life.

"Needless to say, we were incredulous when, after the attack on the woman and after exposing ourselves, the natives began expounding on the bloody history of this bird. Later, three men with long broomstick-sized poles ushered the wayward bird back to the house with usual deliberation."

Cassowaries are valuable in the native economy because of their plumes, which are worn commonly in a kind of hat-like head-dress. Also, the strong black wing quills are frequently worn in the nose. Men and women perforate the nasal septum so as to be able to insert straight sticks, slivers of gold lip shell, or cassowary quills. In actual worth a full-grown cassowary is about equal in value to one wife or eight large pigs or 10 large gold lip shells. At Kup in 1952 a large shell was worth £2.10 (or \$5.60). In the same area, labor was considered well paid at a shilling a day. Thus, a full-grown cassowary was worth the equivalent of 500 days' work.

Gilliard's notes continue: "During the 1950 and 1952 expeditions, I came on about eight penned cassowaries, which would indicate that they are by no means common. This may be partly owing to the fact that shortly before 1950, a large number were purchased from the natives and shipped by Capt. N. B. Blood at Sir Edward Hallstrom's request to the Taronga Zoological Park at Sydney.

"In early August, 1952, I was present at Nondugl when Captain Blood placed young cassowaries of different species together. One was a *C. bennetti*, the other a freshly acquired *C. unappendiculatus*, probably from the upper Baiyer River. Both birds, which stood about 3½ feet tall each and were hair brown in color, emitted quaint little peeps reminiscent of chicken nestlings. The wattled bird was the more aggressive."

Lower lateral neck wattles orange, nude throat, and neck cobalt blue; cheeks baby pink tinted with blue on anterior edges; eyes chestnut brown.

*Salvadorina waigiensis* Rothschild and Hartert

About six pairs were observed in the twin lakes at 11,200 feet on Mt. Wilhelm. Said to be common along the Wahgi River at 5000 feet, where they occur in flocks in ponds bordering the river near Kup.

Natives state that these birds are "switched" out of the air as they fly below bush rope bridges crossing the Wahgi.

A live bird was brought into the Kup base camp May 6, 1952, by a native who had had it in captivity for several months. Adult male: 324 grams; no sign of molt, plumage worn; wing, 185 mm.; tail, 77.

*Anas superciliosa pelewensis*  
Hartlaub and Finsch

According to Capt. N. B. Blood, not uncommon on the Wahgi River.

Our only specimen was collected August 3, 1950, at Nondugl at 5300 feet. It was found swimming at dawn in a small irrigation pond in company with several white domestic ducks which probably had decoyed the wild bird.

The only conclusive morphological character differentiating the two New Guinea races *rogersi* and *pelewensis* is wing length (Amadon, 1943, p. 3). Our specimen (sex?) with a wing of 230 mm. agrees with Amadon's measurements of *pelewensis*. This form has the wing averaging 20 mm. shorter than that of *rogersi*.

*Elanus caeruleus wahgiensis*, new subspecies

TYPE: A.M.N.H. No. 704566; adult female; Nondugl, Wahgi Valley, Central Highlands, Mandated Territory of New Guinea; April 20, 1950; 5200 feet; E. T. Gilliard.

**DIAGNOSIS:** Nearest to *hypoleucos*, but darker above, more slate gray, less ash gray; below, sides of upper chest darker, washed with steel gray, not nearly pure white; under wing coverts with some black tipping, not pure white.

**REMARKS:** In order to diagnose the characters of *wahgiensis* correctly, it was necessary to study the variation displayed by a series (19 specimens: Philippines, Malaya, Celebes) of *hypoleucos*. Two distinct color phases, not correlated with sex, age, or geography, were found. These we have named the "black-wing" and the "white-wing" phases. In the former the inner vanes of the primaries and secondaries are largely black; in the latter they are largely white. Of the 19 specimens at hand, five are of the black-winged type.

The New Guinea race (*wahgiensis*) has the primaries and secondaries colored as in the black-winged phase of *hypoleucos*.

Both *Elanus notatus* and *E. scriptus* of Australia differ greatly from *E. c. wahgiensis* by having black under wing coverts and much paler upper parts. In addition, *scriptus* has different measurements.

No sexual dimorphism in size was found in *E. c. hypoleucos*, and no size differences correlated with the black- or white-winged color phases were noted.

In size *wahgiensis* is similar to *hypoleucos*. The type is in fresh plumage, except for a worn tail. The wings are in molt. It had the ovaries enlarged to 7 mm.

This is the first record of the genus from New Guinea. We found it a not uncommon resident of the Wahgi Valley. The type, and only specimen collected, was shot when it flew from a perch 80 feet up in bulolo pine (*Araucaria Cunninghamii*) which stood in a large grove of casuarinas growing amid farmlands near Nondugl.

In 1952 during May, June, and July, a lone kite of this species was seen (and photographed) as it perched many times in the dead top of a tall tree growing in partition forest at Kup amid extensive grasslands.

*Henicopernis longicauda longicauda* Garnot

Adult male; Yandara, north slope of Mt. Wilhelm, Bismarck Mountains, 5000 feet; collected by Mr. F. Shaw Mayer who pre-

sented the specimen to the Museum field party. Wing, 400 mm.; tail, 314; bill from cere, 22.5; tarsus, 55. Iris golden yellow; bill pale horn, becoming dark on ridge and black on tip; feet pale bluish white. Stomach contents, remains of grubs.

The legend "with one young in nest" appears on the field label.

Judging from the number of tail and wing feathers of this species worn in the head-dresses of the Wahgi Valley men, the species appears to be common. Above 5000 feet, however, Gilliard saw the bird only once. In April, 1950, in the Kubor Mountains near midday, he observed a *Henicopernis* flying slowly through a steep-walled canyon at 5800 feet. It resembled a large marsh hawk as it maneuvered to within 2 or 3 feet of the steeply graded sweet potato beds and sailed between the spaced-out trunks of dead casuarina trees still standing among the gardens.

*Milvus migrans affinis* Gould

Common in the Wahgi Valley up to altitudes of at least 5300 feet. Frequently observed sailing low over the sheep fields of Nondugl and over sweet potato beds near Kup. Particularly active hunting in the vicinity of grass fires.

A large fledgling about six weeks old and just able to fly was collected in the lower Chimbu gorge (5000 ± feet), on May 22, 1952. This bird was kept in captivity and photographed periodically in color until it was three months old. At time of capture: sex?; 429 grams; wing, 268.

Heretofore in New Guinea not known to occur above the tropical lowlands.

*Haliastur indus girrenera* Vieillot

Male, Nondugl, 5200 feet, testes enlarged, April 24, 1950.

*Accipiter fasciatus polycryptus*  
Rothschild and Hartert

Adult male: Nondugl, 5500 feet, May 3, 1950; wing, 236 mm.; tail, 185; bill from cere, 17; tarsus, 61; plumage fresh; wings in molt. Not common in the Wahgi Valley.

*Accipiter melanochlamys schistacinus*  
Rothschild and Hartert

Two juveniles, male and female, were

purchased from natives near base camp (7500 feet), Mt. Hagen, in 1950.

Compared with an immature from near Yule Island, the Mt. Hagen specimens have the upper parts decidedly blacker, less rufous, particularly the head, which is very dark, and the upper back and neck, which are colored like the head but with traces of tawny rufous instead of being strongly washed with rufous.

Measurements of the Mt. Hagen specimens: male and female, wing, 221 mm., 244; tail, 163, 194; bill from cere, 16, 19; tarsus, 63, 71.

A subadult male was collected near Katumbag (5000-6000 feet), Kubor Mountains, June 20, 1952: weight, 172 grams; wing, 219.5 mm.; tail, 170. This specimen was in fresh plumage without sign of molt.

Iris Pale Lemon Yellow; cere near Apricot Yellow; skin around eye deep yellow; skin at base of mandible yellow; legs and feet Light Cadmium; bill and talons black.

*Harpyopsis novaeguineae* Salvadori

Adult male with testes enlarged (11 mm.); Mt. O'-mar, Kubor Mountains, 8600 feet; May 27, 1950: wing, 442 mm.; tail, 393; culmen from cere, 45 (culmen from base as measured on skull purchased from a Mt. Hagen native, 43.5). Bill sooty black, with a bone-colored tip. Feet brownish gray.

The O'-mar specimen was shot as it sat 60 feet up in the middle limbs of a huge tree growing on a sharp ridge. It had fresh blood and "kapul" (marsupial) fur on its talons. Local natives told the junior author that this bird, the "doo" in Kubor "place talk," kills small pigs in open farming areas.

This bird is apparently rather common but thinly distributed in the high forests (6000 to 10,000 feet) of the Central Highlands where the junior author has seen it at Mt. Wilhelm (9500 feet), Mt. Hagen (8500 feet), Mt. O'-mar (8600 feet), and in the mountains behind Kup.

The last-mentioned record was of a pair which were often seen during April and May, 1952, flying over a forested ridge at the 7000-foot level. These birds were reported to be a breeding pair. One of Gilliard's camp "boys" accompanied a native huntsman to a huge nest which was said to have been built by *Harpyopsis*. It was located high in one of the

biggest trees of the 7000-foot cloud forest. Its contents could not be examined because of the inaccessibility of the structure, but the adults were said to be in attendance.

Feathers of *Harpyopsis* are probably as highly treasured by local natives as those of the male Greater Bird of Paradise (*Paradisaea apoda*). Men of chief rank usually wear one or more tail or primary feathers when participating in tribal ceremonies. At other times the feathers are placed in dried banana leaf and woven pandanus containers and stored among the rafters of the men's houses, along with stone axes, drums, shells, spears, bows, arrows, gourds of pig grease, packets of colored paints, strings of trophy skulls, and sundry other treasures.

*Circus spilonotus spilothorax*  
Salvadori and D'Alberty

April, 1950, an adult male was twice seen slowly flying and hovering over the farmlands of Nondugl.

*Aepyodius arfakianus* Salvadori

Trapped at the upper Jimi River by natives who brought it to Nondugl. Gift of Capt. N. B. Blood.

*Synoicus ypsilophorus lamonti*  
Mayr and Gillard

This quail (Mayr and Gillard, 1951, pp. 1-2) is common throughout the Wahgi, Chimbu, Melgavais, and Tomba valleys (5000-7000 feet), where it occurs in coveys of up to 20 birds in the rolling grasslands.

A female with fully developed egg (in oviduct) was collected July 1 at Tomba, and a set of six eggs was brought in to the Mt. Hagen base camp (8500 feet), July 11, 1950. The eggs measured, respectively: 31 by 24.5 mm.; 31 by 24.5; 31.5 by 24.5; 31.5 by 24; 30.5 by 24. A nest and four eggs (not saved) were brought in to the Kup base camp on April 24, 1952.

The native name on Mt. Hagen near Tomba is "ke-wi"; at Banz in the mountains of the Wahgi Divide, "ke-sip"; on the Omong River above Kup, Kubor Mountains, "ke-ke-sip."

Data from specimens obtained near Kup during the period April 24-May 4, 1952: females: 90 grams, 99; molt (April 24), no sign,

plumage worn; (May 4), back, rump, tail, wings, and flanks—a heavy molt. Male: 81 grams; molt (May 4), heavy.

Iris (male and females) Mikado Orange; bill slaty black; skin around eye slate colored; legs and feet dull bone yellow. Total length in life, 191 mm.

*Excalfactoria chinensis novaeguineae* Rand

Series from the southern slopes of Mt. Hagen and Mt. Wilhelm are intermediate between *novaeguineae* from the Balim Valley, Dutch New Guinea (type compared), and *papuensis*, eastern New Guinea.

In common with the western representative, our Wahgi region specimens have the chestnut abdomen somewhat less extensive, the scapular and wing coverts less blue, and the abdomen less chestnut, more pallid. However, in the blue coloration of the under parts in females, our series is indistinguishable from *papuensis*.

Apparently not uncommon in the mid mountains in the vicinity of farmed areas.

*Turnix maculosa* subspecies?

A subadult female purchased from a trapper at Nondugl (5200 feet) on June 23, 1950, is the only highland record of this button quail. Below, it differs from adult females of *horsbrughii* from both the Aroa and Fly rivers. The chest and abdomen are more pale chestnut, less rich rufous. Also it is buffy around the eyes and on the hind neck, not rufous.

From *furva* (Parkes, 1949), a very dark race, it differs greatly in color.

Probably an undescribed race. Additional specimens are badly needed.

*Rallus pectoralis captus* Mayr and Gilliard

For a description of this bird, see Mayr and Gilliard (1951, pp. 2-3). The type locality is Mt. Hagen (7800 feet).

Common; all our 1950 records are of specimens trapped by natives.

Data collected in 1952: one male (?), one female; May 7, 22; 78 grams, 58; molt (both), back, tail, and wing.

Iris Sayal Brown; legs and feet pale gray touched with pink; bill grayish flesh, blackish on ridge.

On April 16 a small (29 grams) downy black

chick was brought to Kup by a native child.

*Rallus philippensis wahgiensis* Mayr and Gilliard

For description, see Mayr and Gilliard (1951, pp. 3-4). The type locality is Nondugl (5600 feet).

Common in damp grass swamps of the "pit pit" variety.

Data obtained by the 1952 party: one male; May 1; Kup, 5000 feet; testes much enlarged; 129 grams; molt, head, breast, and tail.

Iris reddish brown; bill smoke gray with wine-pink sides; legs purplish gray.

*Porzana tabuensis tabuensis* Gmelin

Wahgi Valley birds differ from *richardsoni* of Lake Habbema by having the upper parts darker, deep chocolate, less reddish brown, and by having a longer bill. They agree fairly closely with *tabuensis* from western New Guinea but average slightly darker.

Measurements, in millimeters, are:

	EXPOSED CULMEN
<i>P. tabuensis richardsoni</i>	
Lake Habbema	16, 17, 17, 17, 18, 18
<i>P. tabuensis tabuensis</i>	
Wahgi Valley	18.5, 19, 20, 20
Arfak Mountains	18, 19, 20
Balim Valley	18

Common throughout the Wahgi Valley.

*Rallicula forbesi steini* Rothschild

Compared with *forbesi* of southeastern New Guinea, a series from Mt. Hagen, Mt. Kubor, Mt. Wilhelm, and the mountains of the Wahgi Divide have the tail averaging shorter and the back blacker, less reddish brown. *R. f. dryas* of the Huon Peninsula also has the short tail but differs from all by its much more brownish, less blackish, back.

No conclusive distinctions were found between the Wahgi region specimens and *steini* of the Weyland Mountains, of which we have for comparison the unique type, as well as a male from the Habbema region which Rand (1942, p. 438) took to be the missing male of *steini*. Since the unique type of *steini* is somewhat more brownish, less blackish, above, than typical Wahgi region birds, a final verdict as to the identification of our birds must await the collection of additional specimens from the Weyland Mountains.

Pronounced variation is displayed by our series. This seems to bear no relation to local geography. For example, the coloration of the abdomen feather tips ranges from white to brown, the white barring of the axillaries varies greatly in width, the wing bars vary from bars to spots, and the round dorsal spotting in the female, while generally amber and coarse, becomes small and white in several of our specimens. The last condition is like that of the lone example of *steini* at hand. The black dorsal plumage varies from nearly pure black to blackish, strongly edged with reddish brown—a condition also present in the *steini* specimen.

Measurements, in millimeters, of the tail:

	MALES	FEMALES
Southeastern		
New Guinea	70, 72, 72, 76, 77, 78, 79	58, 62, 67, 71, 72
Huon Peninsula	63	62
Wahgi region	62, 62, 62, 64, 66, 66, 66	61, 62, 62, 62, 62, 62, 63, 65
Snow Mountains	67	—
Weyland Mountains	—	62

Common throughout the highland forests (6000–9500 ± feet) where natives regularly trap this rail for food.

On Mt. Wilhelm at 9500 feet a roosting nest of this species was found on a ridge in deep cloud forest. It was located 9 feet up in the heart of a low pandanus tree the evening of June 18. A male was shot from the nest with a three-pronged arrow, after which the dishevelled nest (a football-sized collection of skeletonized leaves and "Spanish" moss) was put back in the tree. Before dawn the following morning the junior author visited the nest and held a light on it as the native again fired an arrow at point blank range. The shot killed three sleeping rails—two adult males and an adult female.

The native name on Mt. Wilhelm is "cunack."

An adult female was obtained on Mt. O'mar, Kubor Mountains, April 26, 1952, and was preserved in spirits; weight, 95 grams; molt, wing, flanks, and tail.

Iris Bister; bill and legs black; skin around eye gray; inside of mouth whitish; ovaries whitish.

*Porphyrio porphyrio melanopterus* Bonaparte

Although this species, the "tilif," is well known to the local Kup native, only a single record (a spirit specimen) was obtained: one, sex?, May 15; Kup, 5000 feet; about 650 grams; 240 mm., tail, 98; molt, neck, back, flanks.

Iris a little brighter than Brazil Red; casque more wine colored than Nopal Red; legs Onion-Skin Pink; bill like casque but more grayish on cutting edges; toes grayish slate; nails dark gray.

This is a remarkably high altitude for this bird, which is chiefly resident in swampy areas near sea level. In the Wahgi region it apparently stays close to rivers in tall, wet, bamboo-like grass ("pit pit") swamps. It is doubtful that it occurs above 5500 feet.

*Pluvialis dominica fulva* Gmelin

Small flocks of up to six were observed in Nondugl fields during March and April.

*Actitis hypoleucos* Linnaeus

One male, April 27, 1950, Nondugl, 5200 feet.

*Scolopax saturata rosenbergii* Schlegel

Our only record is an adult male, south watershed, Mt. Wilhelm, 9700 feet, June 16, 1950.

This "bug-lee" was shot by a native as it walked on a muddy trail in deep forest near a small stream.

Iris dark brown.

*Ptilinopus rivoli bellus* Sclater

Common up to at least 8500 feet.

*Ptilinopus superbus superbus* Temminck

One skin and one spirit specimen from Kup, April 5, May 22, 1952; male, 103 grams, testes enlarged, white; sex?, 125 grams; molt, traces on wing, otherwise fresh plumage.

A series of excellent color photographs was obtained, including shots of an adult on its nest with a single white egg (May 15). The nest was located 10 feet up and 12 feet from the trunk in a thick tree growing in a field of bananas.

Very common in the open and semi-open mid-mountain agricultural areas. Not seen above 6000 feet.



*Ducula chalconota smaragdina* Mayr

Thirty-three specimens from the Vogelkop, Weyland, Snow, Goliath, Hagen, Saruwaged, and Owen Stanley Mountains were examined. The nominate form from the Vogelkop differs from all by a shorter wing and more copper-colored upper parts. Weyland, Snow, Goliath, and Hagen Mountain birds have the wing averaging shorter than Huon Peninsula and eastern New Guinea birds. Also, there is a slight size increase from west to east in length of bill and tail.

Below, the eastern population (including seven nearly toptypical birds) is somewhat more grayish cinnamon, less brownish on the throat, neck, and chest, and the flanks appear slightly more pallid than in birds from the Wahgi region and Dutch New Guinea. These differences, however, are too slight for sub-specific recognition.

Not uncommon in the high forests of Mt. Hagen above 8000 feet, where it is known as the "kay-ray-im"; not observed elsewhere.

Two specimens (one female, one ?) were examined May 16, 17, 1952: 494 grams, 509; both were in general molt.

Iris of female deep wine, near Ox-Blood

Red; eye ring Carmine; skin around eye gray; legs salmon pink; nails black.

A male taken July, 1950, had the testes partially enlarged.

*Gymnophaps albertisii albertisii* Salvadori

Common in flocks in the upper half of the high mountain forest between 7000 and 10,000 feet.

A nestling just out of the nest was collected at 9000 feet from a limb in a heavily moss-covered tree 60 feet above ground on the south flank of Mt. Wilhelm. This bird could hardly fly and must have been reared in a high nest near by. An adult male (testes 7 mm., white) with the nestling was collected.

*Macropygia amboinensis cinereiceps* Tristram

Common in pairs in patches of grassland trees near water, up to 5500 or 6000 feet.

Two spirit specimens; April 5, May 16, 1952: male (testes much enlarged), 120 grams; female, 94 grams; molt, general in one, the tail in the other.

*Macropygia nigrirostris nigrirostris* Salvadori

Rather common in the cloud forests of

TABLE 1  
MEASUREMENTS (IN MILLIMETERS) OF *Ducula chalconota*

	Wing	Tail	Bill
<i>chalconota</i>			
Arfak Mountains			
2 ♂	201, 215	141, 150	16, 16
1 ♀	195	146	15
<i>smaragdina</i>			
Weyland Mountains			
1 ♂	207	144	16
3 ♀	206-208	145-146	16-17
Snow Mountains			
3 ♂	212-215	149-156	15.5-18
Mt. Goliath			
2 ♂	213, 218	147, 148	16.5, 18
1 ♀	208	143	17
Hagen Mountains			
1 ♂	212	146	18
Saruwaged Mountains			
6 ♂	216-227	148-160	16-18
1 ♀	213	151	18
Eastern New Guinea Mountains			
7 ♂	213-234	150-162	17-18.5
3 ♀	212-213	140-160	18-18

Mts. Wilhelm, Kubor, and Hagen between 7000 and 8500 feet.

Data, two male spirit specimens, Mt. Hagen, 7900-8000 feet; May 15: 94 grams, 103; no sign of molt; testes much enlarged in one, slightly in the other.

Skin around eye a little darker than Carmine; bill black; legs and feet a little more yellowish than Carmine; iris near Jasper Red.

*Reinwardtoena reinwardtsi griseotincta* Hartert

Not uncommon in the top of high mountain forest between 8000 feet and tree line (11,100 feet).

Although heretofore thought to be restricted to the lowland and lower mountain forest up to 1800 meters (Mayr, 1941, p. 47), the junior author collected a skin at 11,100 feet on Mt. Hagen in mid July, 1950. The bird was shot from a branch 18 feet up in thick, moss-covered rhododendron forest (30 feet high).

Iris, inner rim pale yellow, outer rim deep scarlet; skin around eye, soft parts of bill, and lores deep wine red; bill sooty brown; feet vinaceous scarlet near strawberry.

A male collected in July, 8200 feet, had testes enlarged to 14 mm.

*Gallicolumba rufigula septentrionalis* Rand

A Nondugl cage bird (female) probably from the Jimi River; gift of Capt. N. B. Blood.

*Gallicolumba beccarii beccarii* Salvadori

Four specimens (three males; one ?) were examined by the 1952 party on April 26 and June 2: 68 grams, 69, 48, 68.5; molt, two were in general molt on April 26 and June 2, and two showed no sign of molt.

Iris Bister; bill and cere blackish; legs and feet near Vinaceous Purple.

All the males had enlarged testes (up to 15 mm.).

*Gallicolumba jobiensis jobiensis* Meyer

A specimen was trapped by a native near Kup (probably above 4000 feet), June, 1952.

*Otidiphaps nobilis cervicalis* Ramsay

One specimen collected by a native in the Jimi Valley at about 2000 feet and brought

alive to the Nondugl aviaries; gift of Capt. N. B. Blood.

*Trichoglossus haematodus intermedius*  
Rothschild and Hartert

Very common up to 6000 feet in large flocks which move noisily through the crowns of casuarina and other tall trees of the garden and forest edge.

Three specimens (male, April 9; female, May 22; male, May 30) were examined at Kup (5000 feet): 71 grams, 87, 81; no sign of molt was found in any; both males had the testes somewhat enlarged.

*Psittuteutes goldiei* Sharpe

Not very common in the Wahgi region, where on Mt. Hagen it is called "tigel-me," and on Mt. Kubor, "min-too-kupeta."

One (sex ?) examined at Mt. Hagen, May 17, 1952: 8000 ± feet; 54 grams; molt, wings, flanks, and under tail coverts.

Iris leather brown, with a grayish rim; bill black; legs pale gray tinted with lemon yellow.

*Lorius hypoinochrous devittatus* Hartert

A live bird belonging to a native was photographed and studied at Kup in May, 1952: 137 grams; no sign of molt.

Bill Orange Chrome; cere and base of maxilla blackish; cutting edges of bill gray; legs and talons black; iris Light Orange Yellow.

Said to have been captured in "Cambia," south of the Kubor Mountains.

*Charmosyna papou goliathina*  
Rothschild and Hartert

Very common in pairs and small flocks in the forest canopy above 6500 feet.

The black color phase of this elsewhere predominantly red species is in the Bismarck and Hagen ranges three or more times more numerous than the normally colored bird. The species seemed much less abundant in the Kubor Mountains.

Four specimens (two males, two ?), Mt. Hagen, 8300-8700 feet; May 14-17, 1952: 105 grams, 102, 95, 84; molt, two were changing part of the body and tail. Two of the 1950 series (July 8, 21) had the testes enlarged.

There is no difference in coloration in the

soft parts of the two phases. Iris amber; bill near Carmine; legs Peach Red; skin around eye gray.

The Nondugl native name is "wa-lep."

*Oreopsittacus arfaki grandis* Ogilvie-Grant

Common; observed in flocks in the canopy of cloud forest at 9000 feet.

Three specimens (one male, one male?, one female), from Mt. Kubor, April 7-29, 1952: 20 grams, 17, 18; molt, one, no sign; one, the tail; one, the rump and tail coverts.

Kubor Mountain native names are "nit-sing-ru," Kup; "dop-kon-dable," Mt. O'-mar.

*Neopsittacus musschenbroekii major* Neumann

Compared with toptotypical *medius*, Hagen and Bismarck Mountain birds have the chest more broadly edged with scarlet. They thus agree with *major*, which Neumann described from near-by Schraderberg.

Data from two unsexed specimens collected by the 1952 expedition near Kup, Kubor Mountains: April 30, 6500 feet, 41.5 grams; June 2, 7600 feet, 55 grams; molt general.

Iris orange; bill and cere bright yellow; legs and feet light slate.

Common in the crown of the 7000 to 10,000-foot forest in pairs and small flocks.

*Neopsittacus pullicauda pullicauda* Hartert

Mt. Hagen, Kubor, and Wahgi Divide birds agree well with one another and with a single specimen from Schraderberg, also with a series from the Owen Stanley Mountains. All have the extensive crimson chest of the nominate form.

One female collected by a native from Mt. Wilhelm (9000 feet) on June 11, 1950, has an apparently aberrant tail 262 mm. long, or nearly three times as long as any in the extensive American Museum series, of which the measurements of some are 86, 90, 92, 95, and 95. It is dull yellowish brown on the outer third and green elsewhere, with a dusky shaft streak, and, in shape, it is like that of *Charmosyna papou*. It would be interesting to know what physiological or genetic condition was responsible for this excessive growth.

Data of an adult preserved in spirits at Kup, May 27, 1952: 26.5 grams; molt general; iris Cadmium Yellow; maxilla near English Red, becoming yellow near tip,

cutting edges and tip grayish; cere dark brownish gray; mandible dull yellow, becoming English Red at base; legs and feet slate.

Common in flocks in the crown of cloud forest up to 9000+ feet. The native name in the Kubor Mountains is "mary-yeap."

*Psittaculirostris edwardsii* Oustalet

In 1951 Sir Edward Hallstrom presented to the American Museum a male and a female collected by Capt. N. B. Blood on the Jimi River, Bismarck Mountains (north watershed), in August, 1949. In addition we have an aviary specimen (male) from Nondugl.

*Opopsitta diophthalma diophthalma*  
Hombroen and Jacquinot

Not uncommon up to 5000 feet in the riverine forests near Kup.

Four specimens (three males, one ?), March 30 to May 26, 1950: 44.5 grams, 46, 48.5, 49.5; molt, three were molting body plumage; one (May 26) showed no sign of molt. One had enlarged testes (10 mm.).

*Micropsitta bruijnii bruijnii* Salvadori

Our only record: adult male, Mt. Orata, Kubor Mountains, 7500± feet, March 25, 1950.

The native name is "on-de-sing-em-ki."

*Cacatua galerita triton* Temminck

This tropical species was a favorite pet of Wahgi region natives. A live bird photographed at Kup, May, 1952: 700± grams; crown, back, wings, and flanks in molt.

*Geoffroyus geoffroyi minor* Neumann

One, from the Nondugl aviaries, probably from the Jimi River region; gift of Capt. N. B. Blood.

*Geoffroyus simplex bürgersi* Neumann

One spirit specimen obtained from the Nondugl aviaries, probably from the Jimi River region; gift to the 1950 expedition of Capt. N. B. Blood.

*Alisterus chloropterus wilhelminae* Ogilvie-Grant

A male from the Nondugl aviaries, said to have come from the Jimi River; gift of Capt. N. B. Blood.

TABLE 2  
MEASUREMENTS (IN MILLIMETERS) OF *Psittacella brehmii*

	Wing	Tail
<i>pallida</i>		
Southeastern New Guinea mountains		
♂	115, 115, 117, 118, 119, 121	78, 78, 80, 83, 84, 88
♀	116, 117, 117, 119, 119, 121	74, 80, 81, 81, 86, 87
Herzog Mountains		
♂	120, 125, 126	83, 83, 83
Wahgi region		
♂	120, 122.5, 123	82, 82, 88
♀	123.5, 124	80, 85
<i>intermixta</i>		
Mt. Goliath		
♂	118, 123, 125, 127	91, 92, 94, 98
♀	120, 123, 124, 128	83, 89, 91, 96
Weyland Mountains		
♂	130	95
♀	119, 126, 127, 129.5	91, 96, 96, 98, 100, 109
	131, 131.5, 135	

*Psittacella brehmii pallida* Meyer

Wahgi region specimens (Mt. Hagen, Mt. Kubor, Bismarck Mountains, three males, two females) appear inseparable from south-east New Guinea birds (*pallida*) although there is a tendency towards a longer wing. A series from Mt. Goliath (*intermixta*) differs greatly from the Wahgi region birds by having the yellow of the back more widespread and brighter, as well as by generally larger proportions. The Schraderberg race (*bürgersi*) we have not seen. The Huon Peninsula bird (*harterti*) is very distinct. (See table 2.)

*Psittacella picta excelsa* Mayr and Gilliard

This relatively common, well-marked race was discovered by the 1950 expedition in the high forests of the Kubor, Bismarck, and Hagen Mountains. (See Mayr and Gilliard, 1951, pp. 6-7.)

Data pertaining to two skins collected in the Kubor Mountains by the 1952 expedition: sex ?; April 27; 8000 feet; 68 grams; wing, 112; tail, 76; no sign of molt, plumage slightly worn. Iris Orange Citrine; nostrils pale apricot yellow; bill bone white, with dark grayish sides; legs dark gray; pads pale buff. Sex ?; June 3; 8000 feet; 64 grams; wing, 112; tail, 71; molt general.

The native name in the Kubor Mountains is "bog-gag-namp."

*Psittacella modesta hallstromi*  
Mayr and Gilliard

For description, see Mayr and Gilliard (1951, pp. 5-6). The type locality is Yandara, north slope of Mt. Wilhelm, Bismarck Mountains, 6000 feet.

Data on a skin collected May 15, 1952, at Mt. Hagen: male subadult; 7000 ± feet; 43 grams; wing, 98 mm.; tail, 67.5; molt, body (wing and tail fresh).

Compared with the type of *hallstromi* (the only other male known) from the Bismarcks, this Mt. Hagen male has the wing and tail decidedly longer. Additional specimens are needed to establish the significance of this.

Iris Sepia; bill Mustard Yellow, with large dark grayish areas on basal two-thirds; cere dark gray, becoming lemon yellow around nostrils; skin around eye dark greenish gray; legs gray.

*Cuculus saturatus horsfieldi* Horsfield  
and Moore

Adult male, Nondugi, 5200 feet, May 10, 1950.

*Cacomantis variolosus oreophilus* Hartert

Pending a study of this group we include for geographical reasons the 1950 Wahgi series with *oreophilus* of eastern New Guinea.

Data on an adult male collected in 1952 in the Kubor Mountains, 5000 feet; May 24:

29 grams; molt, back, wing, tail, and flanks.

A common species of the forest edge and bushy fields.

*Cacomantis pyrrhophanus excitus* Rothschild and Hartert

Kubor Mountains, 5300 feet; June 1; sex ?; 45.5 grams; molt, crown, neck, back, tail, and wing. Iris dark brown; bill vinaceous black; eye ring canary yellow; legs dull yellowish brown.

In the Kubor Mountains, June 5, a live fledgling was found, estimated to be several days out of the nest.

Very common in second-growth edge and high open forest, usually solitary or in pairs.

One specimen was shot at 9500 feet on Mt. Wilhelm slightly above the range credited to this species (Mayr, 1941, p. 72).

*Chalcites lucidus plagosus* Latham

Adult female, Nondugl, 5200 feet, May 31, 1950.

The 1952 expedition secured an adult male in the Kubor Mountains in April, 1952, at 5000+ feet, with no sign of molt.

*Chalcites ruficollis* Salvadori

Uncommon, solitary. One specimen of unknown sex was taken from a perch 4 feet up in a sapling growing in high original forest, 7000 feet, Kubor Mountains. The native name is "mont-to-quin." One adult male, Mt. Wilhelm, 8500 feet.

*Chalcites meyeri* Salvadori

Adult male, Kup, April, 1952.

*Centropus phasianinus propinquus* Mayr

A single specimen was obtained by the 1952 expedition in the Baiyer River Valley, 4000 feet, May 16: 230 grams; wing, 199 mm.; molt general; testis large and white; iris near Carmine.

This species does not occur in the Wahgi, Melgavais, or Chimbu valleys, which are situated above its altitudinal range.

*Tyto alba meeki* Rothschild and Hartert

Two live birds of this species were seen at Kup but not saved.

*Tyto longimembris papuensis* Hartert

Two live specimens were examined and photographed at Kup by the 1952 party (pl. 17, fig. 2): sex ?; May 27, June 2; 445 grams, 395; wing, 291 mm., 333; tail, 116, 103; no sign of molt in one, the June 2 specimen had the lower back and rump in molt.

During April to July an adult was seen many times flying low over agricultural areas and grasslands at 5000 feet, about half an hour before dark.

Common; used extensively for adornment by native dancers.

*Tyto tenebricosa arfaki* Schlegel

Common in the deep forests. A downy young was collected on Mt. O'-mar, May 22, 1952, at about 7000 feet.

One adult from the Bismarck Mountains was presented to the 1950 expedition by Capt. N. B. Blood.

*Ninox theomacha theomacha* Bonaparte

Two live specimens were examined at Kup in 1952. Both were said to have been captured in the immediate neighborhood at about 5000 feet: sex ?; May 4, May 12; 125 grams; wing, 180 mm., 190; tail, 100, 97. The May 12 bird was found to be replacing the back, tail, and under wing coverts; the other specimen was not examined for molt.

Iris bright Lemon Yellow; cere greenish black; legs dull brown; bill whitish.

*Podargus papuensis* Quoy and Gaimard

Three specimens were examined in the Hagen and Kubor Mountains: two males, one ?; 317 grams, 356, 391; wing, 301 mm., 285, 285; molt, May 15, 16, 29, general.

Iris dark cherry red.

When cornered this species emits an impressive series of growls, croaks, and grunts accompanied by threat posturing and bill clapping.

A fledgling about a month old was brought in to Kup by a native in late June.

Not uncommon up to 6500 feet. By day it rests in thick trees of the forest edge or in isolated trees in grasslands. It perches on large mossy limbs like an owl. When disturbed by day this species flies without difficulty but usually seeks a landing spot within 50 yards.

A skull of a bird which had been shot and eaten by natives at Mt. Hagen was collected by the 1950 party.

*Aegotheles albertisii salvadorii* Hartert

Wahgi region birds (Mts. Hagen, Kubor, Wilhelm) are nearest to *salvadorii* (Weyland Mountains to mountains of southeastern New Guinea), but with the under parts somewhat more coarsely marked. They differ from the Mt. Wilhelmina bird (*archboldi*) by having the upper parts somewhat darker in the dark phase; the dorsal barring finer, with fewer white spots (particularly on rump); and the body plumage generally less rufous and with a different pattern.

Range of wing measurements of the Wahgi region series: eight males, 114–126.5 mm.; two females, 115–122.5.

Spirit specimen, May 14, 1952: adult male; Mt. Hagen, 7000± feet; 36 grams; molt, tail and tail coverts. Iris Prout's Brown; legs pinkish white.

*Aegotheles insignis insignis* Salvadori

Wing: Males, 156 mm., 158, 162, 163, 164, 164; females, 159, 161, 169, 173, 174, 175.

Our series from Mts. Kubor, Hagen, and Wilhelm agrees with the highland populations which vary only slightly (in size), and which Rand (1942, p. 456) would regard as a single form (*insignis*), with *pulcher* as a synonym.

Spirit specimens, Mts. Kubor and Hagen: two males; April 24, May 16; 59 grams, 71.5; body in general molt, wings worn; three females; April 14, 16, May 15; 67 grams, 83, 84; molt, two showed general molt, the last showed no sign of molt. Two males (April 24, May 16) had the testes partially enlarged.

Iris Russet; bill vinaceous bone, tip smoke colored; legs pale gray, with a vinaceous cast.

*Eurostopodus mystacalis mystacalis* Temminck

This migrant from Australia was collected near Kup, Wahgi Valley, 5000 feet, May 15, 1952; wing, 251 mm.

*Eurostopodus archboldi* Mayr and Rand

The differences noted by Rand (1942, p. 457) between three Mt. Tafa skins (type included) and three from the Habbema region seem to be of racial rank. However, in view

of the worn condition of the western series, we agree that it is advisable to await the collection of material in comparable plumages before reaching any definite conclusion. A single specimen obtained by the 1950 expedition on Mt. Hagen, July 20, also is worn. This specimen agrees closely with the western series and differs from the Mt. Tafa birds as diagnosed by Rand.

A very secretive bird of the high mountain forests. Our specimen was killed by a native with a stick as it sat dozing in the late afternoon on a broad moss-covered limb in the stunted cloud forest at an elevation of about 10,000 feet.

Iris deep brown; bill black; feet vinaceous brown; total length in flesh, 273 mm. The Mt. Hagen native name is "kom-bu-gang."

*Collocalia esculenta esculenta* Linnaeus

Abundant between 5000 and 12,000 feet in the Wahgi region in flocks of up to 15, flying low or high over all sorts of open and forested terrain.

Total length in life: males, 97 mm., 100, 100, 103, 104, 105, 107; females, 94, 94, 98, 99, 100, 102,

The Nondugl name is "kin-si-ba"; the Kubor name, "ton-de-ba."

*Collocalia hirundinacea hirundinacea*  
Stresemann

Abundant in medium and large flocks chiefly over mid-mountain and summit grasslands to 13,000 feet. Often, in company with *C. esculenta esculenta*, seen coursing over rocky ridges near the summit of Mts. Wilhelm and Hagen or over the agricultural lands of Nondugl.

Total length in life: males, 105, 113, 113, 114, 115, 115, 119, 121, 121; females, 105, 110, 112, 113, 116.

*Collocalia whiteheadi papuensis* Rand

Apparently very uncommon in the Kubor region and rare or absent in the Hagen and Bismarck regions.

The 1950 and 1952 parties each secured two specimens in the foothills of Mt. O'-mar and Mt. Orata, Kubor Mountains (5000–6000 feet). All were reported to have been trapped as they slept under overhanging rocks in the bed of a mountain stream.



The native name is "tont-to-bar."

Two skins, one male, one female: total length in life, 131 mm., 130. Two spirit specimens (April 23): one in general molt, the other in fresh plumage with no sign of molt. Iris Carob Brown.

*Halcyon megarhyncha megarhyncha*  
Salvadori

During the summer of 1945 this specimen, an adult male, was collected near Nondugl (5200 feet) by Capt. N. B. Blood, who kindly presented it to the 1950 expedition.

In coloration it agrees with a series of males from southeastern New Guinea, but it has the wing exceptionally long.

Wing measurements of *Halcyon megarhyncha* are:

*megarhyncha*

Eastern New Guinea, 86, 86, 86, 88, 88.5  
Wahgi Valley, 96

*wellsi*

Snow Mountains, 87, 92  
Weyland Mountains, 85, 88

Males of *sellamontis* of the Huon Peninsula were not measured. A single female (wing, 83) agrees with a female (wing, 84) from the Hydrographer Mountains.

Additional material is needed to evaluate this apparent size difference.

*Clytoceyx rex rex* Sharpe

See Rand (1942, p. 461) for a discussion of *septentrionalis*, which he believes to be invalid. Our single example from the Jimi River in the Sepik River drainage is indistinguishable from *rex* of southeastern New Guinea.

Captain N. B. Blood presented this skin to the expedition, also two examples preserved in spirits. All were obtained during the course of a reconnaissance made by Blood and Mr. John Hallstrom to the Jimi River region during the summer of 1949.

*Halcyon sancta sancta* Vigors and Horsfield

This migrant from eastern and southern Australia and Tasmania is common in the Wahgi Valley, at least during April and May. Specimens examined April 11 and 14 were in general molt. Weight in grams: males, 31, 31.5; females 34, 32.

*Merops ornatus* Latham

The 1950 and 1952 parties found this Australian migrant common in the central Wahgi Valley during the period April to July.

A solitary bird was observed and photographed in July as it hunted day after day like a kingbird from the same perch in bushes on the side of a little canyon at Kup, 5200 feet.

An adult (sex ?) preserved in spirits, May 26, 1952, weighed 30 grams and was in general molt.

*Rhyticeros plicatus jungei* Mayr

A captive male with a reddish neck from the Jimi River region was examined and photographed by the 1952 party.

Weight, 1190 grams. Bill bone white, with vinaceous brown posterior edges; base of casque chalk white; naked throat and sides of neck white, faintly tinted with pale blue; skin around eye pale cobalt blue, becoming deep violet blue in front of eyes; iris, outer rim buffy brown, middle ring dark coffee brown, inner rim (a thin edge) pale buffy brown.

Hornbills make delightful pets and are frequently kept by highland natives. The species is absent from the Wahgi region, being restricted to lower elevations, although in 1948 on Mt. Maguli, Papua, the junior author collected a specimen at 4500 feet.

*Pitta erythrogaster* subspecies?

A gift to the 1950 expedition by Capt. N. B. Blood who collected it on the lower Jimi River (Sepik watershed).

Probably an adult female. The nape is paler, more pinkish, less brownish, than that of any in the series of *habenichti* at hand. Based on geographical grounds only, it should be that subspecies.

*Pitta sordida novae-guineae* Müller and Schlegel

Collected on the Jimi River, Sepik watershed, by Capt. N. B. Blood, who presented it to the 1950 expedition.

*Hirundo tahitica frontalis* Quoy and Gaimard

A specimen collected at Nondugl, 5200 feet, is from near the altitudinal ceiling of this bird.

*Edolisoma montanum minus* Rothschild  
and Hartert

Several collected in mountain forest, 7500-8500 feet.

*Coracina longicauda longicauda* De Vis

Common in isolated pairs in the pine forests of the Wahgi region above 7000 feet. A female was taken on its nest and egg, June 17, south slope of Mt. Wilhelm, 9500 feet. The nest was 65 feet up in a pine tree in a crotch. It consisted of a bulky foundation of stringy, living, green "Spanish" moss, a cup of fine rootlets decorated near the outside top with green, gray, and white lichens, and on the inner surface with a few small greenish leaves. The cup measured 80 mm. by 35 deep. The nest over all measured 180 by 210 by 120 mm.

The egg (a large fragment was collected) was like that of a crow, with a pale bluish base mottled with brown flecks and spots.

Two spirit specimens, April 23, May 14, 1952: 109 grams, 100; one with the tail in molt.

The Kubor Mountain name is "boganana."

*Coracina caeruleo-grisea strenua* Schlegel

One adult male from above Nondugl, 7700 feet: wing, 174.5 mm.; bill from nostrils, 24.5; bill width at nostrils, 15.5.

Compared with a series, including the type of *adamsoni*, our specimen has the paler ochre under wing coverts and axillaries, the shorter, less bulky bill, and the somewhat darker grayish body plumage of *strenua*.

This record constitutes an extension of range southeastward from the Sepik Mountains.

*Anthus gutturalis rhododendri* Mayr

On the basis of the description, Wahgi region birds agree with *rhododendri*, heretofore known only from the Saruwaged Mountains (see Mayr, 1931, p. 962), but no specimens were compared. They differ from *gutturalis* of southeastern New Guinea by having the upper parts somewhat more greenish, less brownish, the chest darker, more olivaceous, less buffy olive, and the abdomen somewhat darker, more ochraceous, less buffy. In comparison to *wollastoni* they are more

olive above, and the under parts are generally darker.

In wing measurements the Saruwaged-Bismarck-Hagen series has the wing somewhat smaller than do eastern New Guinea birds.

Wing measurements, in millimeters, of *Anthus gutturalis* are:

*gutturalis*

Southeast New Guinea, "♂♂, 100-103"  
(Mayr, 1931, p. 693)

Southeast New Guinea, 4, ♂, 99, 99, 100, 102

*rhododendri*

Saruwaged Mountains, "4 ♂♂, 93, 93, 94, 96"  
(Mayr, 1931, p. 692)

Mt. Wilhelm, 7 ♂, 93, 95, 96, 97, 98, 98, 98  
Mt. Hagen, 1 ♂, 99

*wollastoni*

Mt. Wilhelm, 6 ♂, 95, 96, 96, 97, 99, 101

Common in the summit grasslands on Mt. Wilhelm between tree line (11,000 feet) and 12,500 feet. Very uncommon in the grasslands capping Mt. Hagen.

*Anthus australis exiguus* Greenway

Somewhat larger than topotypical *exiguus* from Wau, Herzog Mountains.

	WING	CLAW
Nondugl, 7 ♂	79, 82, 83, 84,	11, 11, 11.5, 12,
	84, 84, 85	12, 12, 13
Wau, 1 ♂	81	9

Very common in cut-over areas, particularly on grass airfields at Nondugl (5200 feet), Kup (5000 feet), and Kegalsugl (8300 feet).

*Saxicola caprata wahgiensis* Mayr and Gilliard

For description, see Mayr and Gilliard (1951, p. 8).

A series from Nondugl and Mt. Hagen. One (May 1) has the tail in molt. Another (May 2) has fresh plumage, except for two pairs of secondaries. Two (April 19 and July 9) are in fresh plumage. A female (May 1) has the plumage worn.

*Turdus poliocephalus erebus* Mayr  
and Gilliard

For description, see Mayr and Gilliard (1951, pp. 7-8; 1952b, p. 7). The type locality

is Mt. Wilhelm, Bismarck Mountains, 11,500 feet.

Rather common on Mt. Wilhelm between 11,000 feet and grass line at 13,500 feet. A "thrush-like" nest found in a chimney of rocks at 13,500 feet probably belonged to this species. Two nestlings were found by natives in early June near the lower of the two Mt. Wilhelm lakes (11,200 feet). When disturbed, this species shows its preference for dark, wet rocks by flying to perches on or near such situations. In so doing they quickly merged with the background.

Only a single specimen was obtained on Mt. Hagen despite concerted hunting by one or more men for 10 days.

*Melampitta lugubris longicauda* Mayr  
and Gilliard

For description, see Mayr and Gilliard (1952b, pp. 1-2). The type locality is Mt. Tafa, 2400 meters.

This form occurs from southeastern New Guinea westward through the Saruwaged, Bismarck, Kubor, Hagen, and Snow Mountains.

Wahgi region specimens (May) are replacing the wing, tail, and body plumage. All have the gonads minute. Three May birds from Mt. Tafa are in similar condition, while one, the type, taken September 10, is in fresh plumage.

Iris Nopal Red.

The Kubor Mountain native name is "go-de-verge."

*Crateroscelis robusta robusta* De Vis

Very common. An inquisitive inhabitant of the floor and lower growth of deep forest. Of four specimens taken May 9, 11, and 24 and June 16, three were molting the tail, one the wing and tail, and one the belly. Six collected between May 24 and July 24 show no sign of molt. The gonads were minute in all but one male (July 8).

Bismarck, Kubor, and Hagen Mountain birds vary in coloration of the under parts. Although they range from dark gray to olivaceous brown, no correlation between color and sex is evident. In general color, as well as in variation of color, the Wahgi region series agrees with specimens from southeastern New Guinea. From *deficiens*, they differ

by having the chest dark, not light gray, and from *sanfordi* they differ by being grayer, less rufous, throughout.

*Eupetes leucostictus loriae* Salvadori

Our series differs somewhat from *loriae* by having the upper chest and flanks less heavily and less extensively washed with green. Several nearly topotypical *loriae* in the American Museum collection match individuals from the Kubor Mountains and Mt. Hagen. Thus, although an average difference is perceptible, it is considered too slight for recognition.

Not uncommon in the high forests, but very elusive.

In December, 1952, Mr. W. T. Loke presented to the American Museum a set of two eggs of this species which he collected near Tomba (8000 feet) on the south slopes of Mt. Hagen, October 16, 1952. The eggs (31 by 22, 28 by 21 mm.) are pale cinnamon, slightly darker, more brown in a restricted area at the larger end. The larger egg is several shades darker cinnamon brown and is sprinkled with very pale gray spots which are just visible through the brown color.

*Ifrita kowaldi kowaldi* De Vis

See Rand (1937, p. 113; 1942, p. 469). We find no significant size difference between *kowaldi* of the east and *brunnea* of the west. Wing measurements of geographically intermediate Wahgi region birds are: males, 86, 87, 88, 89, 90.5; females, 77, 81, 82, 83, 86.

In color of upper parts the fresh Wahgi specimens are similar to a fairly recent collection from southeastern New Guinea (1933), but they are generally more greenish, less brownish, than *brunnea* of the Weyland (1931) and Snow Mountains (1939). A single Schraderberg (1913) male is as brown above as *brunnea*. This may be due to foxing. The Wahgi series is somewhat intermediate, but closer to *kowaldi*, in that it has slightly more ochraceous, less buffy, under parts than true *kowaldi*. The Schraderberg skin has underparts which match those of *kowaldi* of the east.

Gonads minute. Six specimens collected during May, June, and July are replacing the wing and tail, and two are molting the back and upper tail coverts.

Common in the middle tier of mountain forest above 6000 feet.

The native name in the Kubor Mountains is "de-lip."

*Malurus alboscapulatus mafulu* Mayr  
and Rand

Since a Nondugl series agrees with topotypical *mafulu*, the range of this mid-mountain form is extended westward from the upper Kikori River.

Western birds show a tendency towards a larger wing:

Wahgi region, ♂, 49.5 mm., 49.5, 51, 51, 51.5, 52.

Mafulu, ♂, 48.5, 49, 49, 49, 49, 49.5, 50.

In this connection it should be pointed out that the western series was collected slightly above 5000 feet and the eastern series slightly below 4000 feet.

Abundant in brush and forest edge situations. Not seen above 6000 feet. The native Kubor Mountain name is "di-laga." Usually found in pairs of small groups. Very inquisitive and responsive to squeaking.

Four specimens, 1952: molt general, wings and tail worn, with no sign of molt; molt in female (?), tail and wing; female (?), tail and back.

*Clytomyias insignis oorti* Rothschild and  
Hartert

Common on Mt. Hagen where this species is known as the "too-lo-wan-boo." Unobserved in the Kubor, Wahgi Divide, and Bismarck Mountains. All but two of our series (four males, six females, collected during the period July 5-16) show signs of molt. Six are replacing the wing, three the tail, and four the body plumage. In all, the gonads were small, although in one male collected July 5, they were beginning to enlarge.

Measurements, in millimeters, of the Mt. Hagen material:

	WING	TAIL
Males	56, 56, 58, 58	66, 67.5, 68
Females	56, 57.5, 59, 59, 59, 60	65, 69, 69.5, 71.5, 72

*Megalurus timoriensis montanus* Mayr and  
Gilliard

For description, see Mayr and Gilliard (1951, p. 9). The type locality is the summit

grassland of Mt. Hagen, 12,000 feet. Found also above tree line on Mt. Wilhelm.

Common but quite difficult to collect because of its habit of plunging into tall grass and often refusing to be flushed.

*Megalurus timoriensis wahgiensis*  
Mayr and Gilliard

For description, see Mayr and Gilliard (1951, pp. 9-10). The type locality is the mid-mountain grasslands, Mt. Hagen, 7800 feet.

Not uncommon, but quite elusive throughout the grasslands of the Tomba, Melgavais, Wahgi, and Chimbu valleys between 5000 and 8000 feet.

One specimen; Kup; 5000 feet, April 12, 1952; adult female: 25 grams; molt, general except wings.

*Sericornis nouhuysi stresemanni* Mayr

A series from Mt. Kubor, Mt. Hagen, and the Bismarck Range agrees with Stresemann's description (1921, p. 33) of *stresemanni*, formerly *rufescens*, in the color of the upper parts and in size. However, compared with examples of *oorti* (with which Stresemann made his diagnosis), our birds below are somewhat darker, more brownish, less yellowish. No mention of this character is made by Stresemann. Actually, little importance can be attached to this difference in view of the pronounced color variability existing among closely situated populations of *nouhuysi* (Rand, 1942, p. 473).

The Wahgi specimens were collected between May 24 and July 10. In most, there is no trace of molt, and the plumage appeared unworn or slightly worn. Two (July 8, 9) had the wing decidedly worn. Four (July 2, 5, 6, 6) were renewing the secondaries, one (July 5) the tail, and two (July 4, 10) the back.

The gonads were very small (1 mm. or less in diameter) in all but four males; three (July 2, 6, 8) had the testes about 3 mm., and one (May 24) had them enlarged to 7 mm.

One of a pair of fledglings (wing and tail still partially ensheathed), apparently just out of the nest, was captured by hand on the ground in deep forest on June 17 (Mt. Wilhelm, 9600 feet). A slightly older bird was taken on May 24 (Mt. Orata, Kubor Mountains, 6000 feet).

An aberrant immature male in which the mandible is white, not black, and the throat white, not brown, was taken May 11 above Nondugl.

Iris reddish brown.

The Kubor Mountain native names are "tarem-pa" (Kup) and "pser-coi" (Omong River).

*Sericornis (rufescens) perspicillatus* Salvadori

Common in the substage of high forest. On Mt. Kubor this bird is known as the "tir-quoy."

Two spirit specimens from Mt. Kubor, April 3, 5: molt general in both. Iris dark brown.

*Sericornis papuensis bürgersi* Stresemann

A single specimen from Mt. Hagen (8200 feet) is as brown above and below as many in Rand's series from the Habbema region.

*Acanthiza murina* De Vis

Four examples of this monotypic species were obtained on Mt. Kubor (8500+ feet) and Mt. Hagen (11,000-11,300 feet).

*Gerygone cinerea* Salvadori

An adult female from Mt. Wilhelm, 8500 feet.

*Gerygone ruficollis insperata* De Vis

Common in second-growth forest about Nondugl.

*Phylloscopus trivirgatus giulianettii* Salvadori

One specimen (1950) and an excellent photograph in color (1952) of a female perched beside its nest and egg, where it was trapped by a native. Data on the latter bird: April 24, 1952, Kubor Mountains, 5640 feet; tail in molt. Iris dark grayish brown; bill black, with a dark brown ventral base; legs dark slate. The egg measured 18 by 13 mm., and was pure white.

In December, 1952, Mr. W. T. Loke presented to the American Museum one adult male from Tomba, Mt. Hagen, 8000 feet, which he had collected October 18, 1952. This specimen agrees with a series from south-eastern New Guinea (*giulianettii*) and differs from the Cyclops Mountain bird (*cyclosum*) by having the back and flanks much darker,

more olive, less yellow; and the crown darker with less yellow on the midline. In addition the Mt. Hagen specimen has the throat somewhat paler, more grayish, less yellowish. In this respect, as well as in the crown markings, the Mt. Hagen bird differs very much from the Weyland Mountain race (*albigularis*).

Junge's *paniaiae* (1952, p. 248) from the Wisselmeren region (Arabve, Bivak) has not been compared. This form is apparently very close to *giulianettii*, which is what Rand (1942, p. 476) called his Oranje Mountain birds, but is said to differ by having more golden brownish upper parts.

*Peltops montanus* Stresemann

Our only record is of a specimen collected by Capt. N. B. Blood and presented by him to the expedition. It was taken approximately 40 miles west of Mt. Hagen during the course of explorations which Blood conducted shortly after World War II. He reports that the bird was taken at an altitude of about 8000 feet. The wing measures 109 mm.

*Rhipidura brachyrhyncha devisi* North

Common but thinly distributed in the thick substage of high cloud forest between 8000 and 11,500 feet. Very inquisitive and fearless.

One was shot on Mt. Hagen at 11,200 feet, 2 feet from the ground and a few feet from the grass at tree line.

*Rhipidura atra atra* Salvadori

This friendly flycatcher of the dripping moss forest, known as the "de-gam-bo-gang" on Mt. Kubor, is common in the high mountains of the Wahgi region.

Data on a male from Mt. Hagen, 9000 ± feet; May 16, 1952: no sign of molt; testes much enlarged. In a specimen taken May 11, 1950, the testes were also enlarged.

*Rhipidura albolimbata* Salvadori

Our series, obtained from natives in the Kubor, Bismarck, and Hagen Mountains, was taken between 5200 and 10,000 feet. Those from above 7000 feet appear inseparable from *lorentzi* of the highlands of the Oranje Mountains; those from the 5000 to 6500-foot zone are smaller and lighter above

and, therefore, appear more like *auricularis* of the lowlands.

Rand (1942, pp. 479, 480) examined this species thoroughly and concluded (on the basis of the material then available): "... except in the Snow Mountains [Oranje Mountains] above 2,200 meters, the geographical variation is too slight to define subspecies." On the basis of the material now available, it is evident that the range of *lorentzi*, the high altitude representative of *albolimbata* (which differs by reason of greater wing length and darker plumage), extends eastward (in clearly recognizable form) at least to the highlands of Mt. Hagen and probably to the highlands of the Kubor and the Bismarck Mountains. Confirmation is derived from both color and size. Concerning the latter, two of the Mt. Hagen specimens have the wing larger (see measurements below) than that of any of the Oranje males of *lorentzi* recorded by Rand.

Wing measurements, in millimeters, of *Rhipidura albolimbata* are:

*lorentzi*

Mt. Hagen, 8000-10,000 feet	
♂	79.5, 82.5, 84, 86.5, 86.5
♀	77, 80
Mt. Wilhelm, 9000 ± feet	
♀?	77, 80.5
? Mt. Kubor, 7000 ± feet	
♀	80.5

*auricularis*

Behind Nondugl	
♂	78
♀	77

The native name in the Kubor Mountains is "we-neng"; in the Hagen Mountains, "eve-en-em."

*Rhipidura leucophrys melaleuca* Quoy and Gaimard

Mayr (1941, p. 131) gives the altitudinal range of this bird as "... rarely more than 100 m. above sea level, but occasionally following the rivers inland up to 1000 m." Rand (1942, p. 480) found that this species reached an altitude of 1500 meters.

We found the species common at Nondugl (5200 feet) and not uncommon in the vicinity of Kup (5000 feet). It occurred about

native gardens and in the forest. The highest record was of a male taken behind Kup on Mt. Orata (6000 feet).

The native name at both Nondugl and Kup is "denga-lap" or "deng-lap." In the Tomba region of Mt. Hagen, this "Willie Wagtail" is called "teark." In this latter area a nest was reported at more than 7000 feet, but no birds were seen.

Four nests were brought in by natives, who reported them to have been placed 15 to 40 feet up in trees of the forest edge and in lone trees growing in agricultural areas. A nest brought in May 24, 1950, had two creamy white eggs in it. These were wreathed broadly about their medial portions with spots of pale gray, pale olive, and pale cinnamon. They measured 19.8 by 16 mm. and 21 by 16. The nest is a solidly woven, glued structure of grass, lined with fine grasses and rootlets, and tightly sheathed with silvery plant down and spider webbing. Sometimes the outside is decorated with fine moss or lichens and a few feathers. It is usually placed in a slender, nearly horizontal fork or on a single narrow limb. The nest is firmly anchored by wrappings of spider webbing and "glue." Measurements of the four nests are: depth, 87 mm., 65, 76, 67; diameter, 85, 85, 83, 80; depth of cup, 28, 27, 30, 27; diameter of cup, 61, 63, 60, 57.

In April the 1952 party found an occupied nest 10 feet above and 20 feet to one side of a frequently used bower of *Chlamydera lauterbachii lauterbachii*. Both were in a "pit pit" grass swamp 30 feet from a trickling stream at Kup at 5000 feet.

*Monarcha axillaris fallax* Ramsay

Our only record is of an adult male brought to the 8200-foot Mt. Hagen camp, July 20, by a native.

*Machaerirhynchus nigripectus saturatus*  
Rothschild and Hartert

Excluding the Arfak population, the only geographically variable character we find in this species is the coloration of the upper parts in the female. Size has been shown by Mayr (1931, p. 382) and Rand (1942, p. 483) to be subject to a great deal of altitudinal variation.

Our studies are based on series from the



Weyland, Goliath, Hagen, Kubor, Bismarck, Saruwaged, and southeast New Guinea mountains. They indicate that females fall into two groups: (1) those from southeast New Guinea and the Saruwageds in which the back is grayish brown washed with olive; and (2) those from the Sepik, Bismarck, Kubor, Hagen, Oranje, and Weyland Mountains in which the female is much darker, more blackish, above.

It is somewhat surprising that the Saruwaged population (group 1) matches that of southeast New Guinea (*harterti*), rather than that of the adjacent Sepik and east central ranges. This break is accentuated by the fact that in group 2 (the dark-backed group) a pronounced east-west cline from dark to light exists with the darkest (nearly jet black) examples occurring in the east central ranges nearest to the Saruwaged Mountains.

The difference in dorsal coloration in the dark-backed group is vivid. In a comparison between series from the Weyland and Hagen-Kubor-Bismarck Mountains, it seems obvious at first that two races are involved: the very black eastern bird and a paler-backed western form. However, because the type locality of the dark-backed group (*saturatus*) is Mt. Goliath, which is situated about midway on the color cline, the two cannot be separated. Furthermore, certain specimens in the variable series from the Weyland Mountains agree quite well with the topotypical series.

On June 21 a nestling about 15 days old was seen.

The Kubor Mountain native name is "koner-peramp."

Common in bushes and low trees of open agricultural areas and the forest edge between 5000 and 7000 feet.

#### *Eugerygone rubra saturator* Mayr

Two, from Mt. O'-mar and Kubor Mountains, April 27, 30, 1952, 7500 and 7800 feet: no sign of molt.

Iris dark brownish black; maxilla black; gape and mandible Brick Red; legs and feet Dragons-blood Red; the feet are strongly washed with gray.

The Kubor Mountain native name is "tumi-kon."

Photographs confirmed the senior author's

belief that *Eugerygone* must be shifted from the warblers to the flycatchers because of the color of the juvenile plumage (which is brown as in *Microeca*, not yellow as in *Gerygone*). This shift is confirmed by the flycatcher-like postures of the birds photographed by the 1952 party (see pl. 22, figs. 1, 2).

#### *Microeca papuana* Meyer

This warbler-like flycatcher is common in the mid-mountain cloud forest, where it usually occurs in pairs or small flocks. One was seen feeding flycatcher-like in the forest crown 80 feet up, and another was observed in a short tree of the forest substage 12 feet up.

The Kubor Mountain native name is "pa-baar-bor."

Several May and July skins have the wing or the wing and tail in molt. Others taken in May, June, and July show no sign of molt. Invariably the black gonads were minute.

#### *Monachella mülleriana mülleriana* Schlegel

Heretofore this wide-ranging river flycatcher had not been recorded from above 1000 meters (Mayr, 1941, p. 140). During the surveys of 1950 and 1952, it has turned up in two widely separated regions of the central highlands at altitudes of 5600 feet or more, namely, in the Kubor Mountains, where six were collected on the Omong River above Kup (5600-6000 feet), and on the northern slopes of the Bismarck Mountains at Yandara (6000 feet). This last specimen was collected by Mr. Fred Shaw Mayer and presented by him to the expedition.

Common in the Kubor Mountains patrolling in loose pairs 10 to 40 feet above rushing mountain streams in semi-forested areas or sitting kingfisher-like on exposed perches over water. No trace of this species was found elsewhere in the Wahgi Valley. Shaw Mayer noted that at Yandara the bird often perched on fence posts around native gardens.

The native name in the Kubor Mountains is "no-guat"; at Banz, "no-guas"; at Nondugl "no-guat-te."

Two nests belonging to this species were collected by natives along the Omong River. These are constructed of mud, thin rootlets, and lichens. The rootlets and mud (in each

case enveloping a slender limb) form a hard, adobe-like foundation on the top of which is a wide, shallow cup of neatly arranged blackish rootlets. Measurements: depth of nests, 65 mm., 70; diameter of structures, 90, 95; depth of cup, 25, 25; diameter of cup, 63, 68.

Data and photographs collected by the 1952 party are as follows: three unsexed specimens; 18 grams, 19.5, 20; molt in all (April 24 through June 10), general throughout body, including wing and tail. Many color photographs were made of this species.

*Tregellasia leucops wahgiensis* Mayr  
and Gilliard

See Mayr and Gilliard (1952b, pp. 2-4) for a discussion of this species in central and eastern New Guinea. The type locality is Mt. Orata, Kubor Mountains, 6000 feet.

One female, Mt. Orata, April 21, 1952, 5640 feet; no sign of molt. Iris dark brown; base of bill pale yellowish bone; tips of bill black; legs and feet dull brownish yellow.

The native name at Nondugl is "dam-barta-bal"; in the Kubor Mountains, "dog-en-dap."

*Poecilodryas albonotata griseiventris*  
Rothschild and Hartert

Our fresh series from Mt. Hagen and the Bismarck Mountains agrees substantially with birds from the Snow Mountains, as well as with toponotypical specimens from Mt. Goliath, allowing for the fact that the latter are considerably foxed.

The Kubor Mountain native name is "dib-na."

*Peneothello sigillatus hagenensis* Mayr  
and Gilliard

For description of this form, see Mayr and Gilliard, (1952b, pp. 4-5). The type locality is Summit Camp, Mt. Hagen.

Relatively common in bushes and at the edge of the rhododendron forest at and near tree line (11,000 feet).

*Peneothello sigillatus sigillatus* De Vis

Extensive series from Mt. Wilhelm and the Bismarck and Kubor Mountains are inseparable from toponotypical birds from southeastern New Guinea.

The native name in the Bismarck Mountains behind Nondugl is "go-sip"; in the Kubor Mountains, "goi-de-berg."

Of 11 specimens (May 10-June 17) only one (male, above Nondugl, May 10) showed no indication of molt. Eight were replacing the wing, seven the tail, and four the back. None had enlarged gonads, although the testes varied in diameter from 2 mm. (May 10) to 1 mm. (June 11).

All of the material from the Kubor and Bismarck ranges was obtained from native collectors.

Two specimens from the Kubor Mountains, April 17-27, 1952: no sign of molt.

*Peneothello cyanus subcyaneus* De Vis

This species divides into well-defined populations in the Saruwaged (crown blue), the Cyclops (crown blackish), and the Arfak (crown pale blue) mountain "islands." Populations inhabiting the main ranges (such as those which we have seen from southeastern New Guinea, the Bismarck, Kubor, Hagen, Oranje, and Weyland Mountains), while varying in minor degree, tend to intergrade one into the other. The head becomes less bluish, more blackish, from east to west. Birds from the Oranje Mountains westward are dark crowned, but not so dark as the Cyclops population. Those from Mt. Hagen eastward are blue headed but not so light in color as the Saruwaged population. In size the blue-headed group (*subcyaneus*) of the main range (type locality, mountains of southeast New Guinea) shows a slight increase in tail length and a slight decrease in bill length from east to west.

Measurements (in millimeters) of *Peneothello cyanus subcyaneus* are:

	WING	TAIL	BILL
Mountains of southeast New Guinea, 9 ♂	91-96	60-65.6 [69]	16.5-18.5
Saruwaged Mountains, 6 ♂	89-94	60.6-65	16.5-18
Wahgi region, 5 ♂	93-97	69-71	15-17

A series of 10 (five males, four females, one female ?) from the Kubor, Bismarck, and Hagen Mountains are for the most part in fresh plumage. In three (May 6, 8, 20) the wing is being replaced; in one (May 6), the tail; and in two (May 8, 23), the body plumage. No evidence of molt was found in five specimens (May 6, 8, 20, July 7, 10). No gonadal development was seen, except in one male with enlarged testes collected May 6.

The native name in the Kubor Mountains is "tok-um-bar." The bird is common.

Molt: April 7, flanks; April 20, tail, otherwise fresh; May 17, back, rump, under tail coverts; June 10, general excepting wings.

#### *Heteromyias albispecularis centralis* Rand

Birds from Mt. Hagen and the Bismarck Mountains agree with the type of *centralis* from the Snow Mountains (Idenburg River). Rand (1940, p. 4) based this race on a specimen which had gone unsexed in the field but which in his original description he identified as "[= ♂ ad.]," with a wing of 96 mm. A male adult (A.M.N.H. No. 341450) from the Bele River, 18 kilometers north of Lake Habbema, has the wing 102 mm. long. In view of the long wing of this specimen and the dimensions recorded below for our Hagen-Bismarck series, it seems likely that the type of *centralis* is actually an adult female.

Measurements of the wing of the Hagen-Bismarck series: males, 101-105 mm.; females, 92-98.

Our series averages somewhat more pallid on the flanks, abdomen, and under tail coverts than do the two examples of *centralis* available.

*Heteromyias albispecularis atricapilla* (Mayr, 1931, p. 681) has the wing shorter.

#### *Rhagologus leucostigma obscurus* Rand

A subadult female from Mt. Hagen (native collector) seems to be *obscurus*.

#### *Pachycephala soror klossi* Ogilvie-Grant

The 1950 party obtained a male at Nondugl (5200 feet) and a young male in female plumage in the Kubor Mountains (? 6500 feet).

The adult male agrees with Saruwaged Mountain males in being nearest to *klossi* of the west but with the upper parts averaging

somewhat darker, more greenish, less yellowish, and the tail generally lighter, less blackish, due to more extensive greenish edgings. From *bartoni* of the east, the Wahgi-Saruwaged males differ decisively by having the tail darker, more blackish, not strongly washed with green.

Saruwaged females above are slightly more olivaceous, less yellowish, than western examples (including topotypical specimens) of *klossi*.

The species exhibits a decided east-west cline, as follows: (1) tail in males from greenish olive in the east (*bartoni*) to blackish in the Weyland Mountains (*klossi*), with the only clear break occurring between the Herzog-Wharton and the Bismarck-Saruwaged Mountains; (2) upper parts in males less yellowish, more olivaceous, and upper parts in females less yellowish green, more brownish green, from east to west, without, in either case, any pronounced break.

From this study, it is evident that the Saruwaged population, while rightfully belonging with *klossi* of the west, may be said to represent a somewhat intermediate stage of development between the western bird and *bartoni* of the east.

Extensive measurements show that no size differences exist between various populations.

From the Kubor Mountains, 1952: one male, one, sex ?; 24 grams, 24; no sign of molt. Apparently uncommon.

#### *Pachycephala schlegelii obscurior* Hartert

Compared with topotypical series of both *viridipectus* and *obscurior*, Wahgi males (Mts. Hagen, Wilhelm, and Kubor) appear to be almost exactly intermediate in the coloration of the abdomen, which is the only clearly diagnostic character. In series the intermediate population stands out from both, but, when individuals are compared, the differences disappear. It would be confusing to name such an intermediate stage in the east-west cline of this species.

Common 20 to 50 feet up in the forest edge and low crown of stunted, highly adorned ridge forest (7500-9000 feet). Solitary specimens were collected in May and June.

The native name in the Bismarck Mountains is "we-co"; in the Kubor Mountains, "yiba."

From the Kubor Mountains, April 22, 1952, one male in general molt. Iris near Mars Brown.

*Pachycephala modesta hypoleuca* Reichenow

Birds from Mt. Hagen, Mt. Kubor, and the Bismarck Mountains may be considered nearly toptotypical *hypoleuca*. They differ from the Saruwaged population by having the chest darker gray and the abdomen more dull grayish, less white. However, these differences are too slight, as pointed out earlier by Mayr (1931, p. 674), to justify the naming of the Saruwaged birds.

The Kubor Mountain native name is "cora-mung." Common, although difficult to see in its favored habitat, the canopy of cloud forest about 8000 feet.

Two 1952 Kubor records: adult female, sex ?; 18.5 grams, 16; one (April 24) in complete molt except for the tail. Iris dark mahogany; bill black; legs dark gray.

*Pachycephala rufiventris dorsalis*  
Ogilvie-Grant

No comparative material of adult males of *dorsalis* is available, but the Nondugl males agree perfectly with Ogilvie-Grant's original description of *dorsalis* from the Mimika River.

Stresemann (1924) suggested considering *rufiventris* and *monacha* as conspecific. Mayr (1941) kept *monacha* as a separate species since the Rothschild Collection contained a specimen of *monacha* from southeast New Guinea, hence, presumably, from the range of *rufiventris*. A new examination of this bird, collected by Goldie behind the Astrolabe Range, actually confirms the conspecificity of the two species. The specimen is clearly a hybrid, being precisely intermediate between *dorsalis* and *rufiventris*. It has the back gray as in *rufiventris leucogaster*, not black, and the throat black as in *r. dorsalis*. Additional corroborative material was obtained by Zimmer and Rand who collected three males in the Rouna-Port Moresby region, all of which are clearly intermediate. One male (A.M.N.H. No. 420829, near Rouna, 700 meters) is quite similar to the Goldie hybrid (which also shows traces of white on the throat) except that the throat is strongly streaked with white, not nearly pure black.

Two other males (Rouna, A.M.N.H. No. 420828; Port Moresby, A.M.N.H. No. 295636), while obviously intermediate in coloration of the throat, are closer to *r. leucogaster*.

In southeastern New Guinea it appears, therefore, that the lowland form (*leucogaster*) comes in contact with the inland form (*dorsalis*) along the foothills of the Owen Stanley Mountains and forms there an intermediate population. The fact that Rand's series from Rouna Falls is quite variable indicates the probability of a secondary contact with resulting hybridization. Five males at hand from the mouth of the Aroa River, one from Lolorua (near Galley Reach), and one from Baroka are pure examples of *leucogaster*. In all the throat is pure white, the black chest band is relatively narrow, and the back is gray.

The conspecificity of *monacha* and *rufiventris* is further substantiated by the Aru Island form (*monacha monacha*) which in its grayer back also shows a trend towards the Australian *rufiventris*.

Infrequent in the forest edge and on isolated trees of the mid-mountain grasslands.

Two specimens; May 27, 30, 1952: 17 grams, 20; molt, general in both. Iris near Hessian Brown.

*Pachycephala rufinucha niveifrons* Hartert

Differing somewhat from *niveifrons* by having the upper parts averaging darker, more greenish, less yellowish, and the lower parts, particularly flanks and abdomen, more grayish olive, less yellowish olive, and also by having the white chest less frequently and less strongly washed with yellow.

Since certain individuals in the American Museum series from the Weyland Mountains agree with Habbema and Wahgi region specimens, it appears inadvisable to name the latter population.

A definite cline exists within *niveifrons* with the Weylands at one extreme and the Wahgi region at the other. Birds from Mt. Goliath and the Habbema region are intermediate.

The wing measurements of our series are: males, 88-94 mm.; females, 85-92. These measurements are approximately the same as those of Rand (1942, p. 489) of a much larger series of *niveifrons* from the Snow Mountains.

The native name in the Bismarck Mountains is "pin-oil"; in the Kubor Mountains, "om-bi-ruuck."

From the Kubor Mountains, April 29 and June 10, 1952, two females: 31 grams, 32; molt, none in one; upper back, wings, flanks in the other. The latter specimen had been trapped at its nest, which contained two eggs. From Mt. Hagen, one male, one female: 39 grams, 42; molt, upper tail coverts, tail, and back. Iris pale vinaceous cinnamon.

Common in the high mountain forest.

In December, 1952, Mr. W. T. Loke presented to the American Museum a set of two eggs of this species which he collected at Tomba (8000 feet) on the south slope of Mt. Hagen on October 17, 1952. The eggs measure 28 by 19.5 and 28 by 20 mm., are white, thinly sprinkled with tiny black and a few gray spots; incubation advanced.

*Myiolestes megarhynchus tappenbecki*  
Reichenow

Compared with topotypical material (Madang, male, two males), the Wahgi population averages darker below, particularly on the throat which is less whitish, more tawny brown, and the chest which is more strongly suffused with brown, less cinnamon. On the whole, however, these differences are of minor importance in this variable species.

The Macanderberg race (*maeandrinus*) is

generally more grayish, although one specimen (A.M.N.H. No. 657123) equals Wahgi specimens in richness of coloration.

From the Kubor Mountains, April 4 and June 5, 1952, two males: 42 grams, 43; molt, none in the former, the crown and tail in the latter which also had the testes enlarged to 7 mm. Also one female, 30.5 grams.

A breeding female trapped on its nest was brought into the Katumbag camp (5500 feet) on May 29.

*Pitohui dichrous* Bonaparte

Two examples from Nondugl are paler cinnamon below than any in the extensive series at hand. However, as pointed out by Rand (1942, p. 491), this species (for which two geographical names are available: *dichrous* for the dark Arfak birds and *monticola* for the pale eastern birds) is composed of isolated populations which vary in a most irregular manner, and therefore it is inadvisable to use subspecific designations. Rand advised handling the problem in the manner adopted by the senior author (1937, pp. 6-9) for such irregularly variable species as *Podargus papuensis*, *Cacatua galerita*, and *Psittichas fulgidus*.

A partial albino with a white spot on the abdomen was taken at Nondugl on May 1, 1950 at 5200 feet.

Our specimens were collected in the upper

TABLE 3  
MEASUREMENTS (IN MILLIMETERS) OF *Pitohui nigrescens*

	Wing	Tail
<i>nigrescens</i>		
Arfak Mountains, 4 ♀	126-129	104.5-113.5
<i>wadamensis</i>		
Wandammen Mountains (type), 1 ♀	130	104
<i>meekei</i>		
Weyland Mountains, 2 ♀, 1 ♀?	121-128	99.5-108
Oranje Mountains (type), 1 ♀	125	100
<i>bürgersi</i>		
Hagen Mountains, 1 ♀	133.5	112
Schrader Mountains, 1 ♀ <sup>a</sup>	124	—
Schrader Mountains, 1 ♂ juv. <sup>a</sup>	125	—
<i>harterti</i>		
Saruwaged Mountains, 1 ♀	120	100.5
<i>schistaceus</i>		
Southeast New Guinea mountains, 6 ♀	119-127	100-104

Measurements from Stresemann.

middle tier of an "island" of casuarina forest surrounded by native farm lands.

From Kup at 5200 feet on May 22, 1952, adult female: 63 grams, no sign of molt.

*Pitohui nigrescens bürgersi* Stresemann

Because subspeciation is usually visible only in the female, which is generally brownish, rather than in the male, which is generally blackish, 18 females, including the types of *wandamensis* and *meekei*, were used for study.

Generally speaking, the peninsular birds, namely, those of the Arfak Mountains (*nigrescens*), Saruwaged Mountains (*harterti*), and mountains of southeastern New Guinea (*schistaceus*), differ from females of the various races inhabiting the trunk of the island by being decidedly more grayish, less brownish, particularly on the abdomen.

The brownish group has been divided into three races, the westernmost of which (*wandamensis*) is dark walnut brown and very distinct, while *meekei* is brighter, more reddish chestnut brown, particularly on the throat and chest. Our lone specimen (Mt. Hagen, 8200 feet), while definitely different on under and upper parts, belongs with the brown group (nearest to *meekei*). It is duller below and decidedly more grayish olive above, thus approaching the form from southeastern New Guinea.

Since the Mt. Hagen specimen was collected some 35 miles from the type locality of *bürgersi*, it is considered nearly topotypical of that race. It is a peculiarly long-winged bird, as the measurements in table 3 show.

*Lanius schach stresemanni* Mertens

Common among tall grasses and bushes of the mid-mountain grasslands between 5000 and 7500 feet. Nestlings were seen in May at Kup.

From Kup, 5000 feet, May 22, 1952, one, sex ? : 54 grams; molt of tail only.

*Eulacestoma nigropectus clara* Stresemann  
and Paludan

This uncommon forest bird was collected in the Hagen and Kubor Mountains. In the latter, the native name is "yii-vaa."

There is a slight increase in robustness of bill from west (*clara*) to east (*nigropectus*),

coupled with a slight increase in brightness of the plumage of the throat and upper chest. On the whole, however, the races are hardly distinguishable.

The Wahgi birds are placed with the western form on the basis of their slightly smaller bill.

Iris dark reddish brown; bill black; feet dark gray; gape wattles blood red to vinaceous rose, becoming more pallid, flesh yellow in three small areas near the center of each wattle. One, sex ? : 19 grams.

*Artamus maximus* Meyer

Thinly distributed in the 5000 to 8500-foot zone. Usually solitary on exposed perches of the forest edge 20 to 40 feet up, or soaring over grasslands. Once a small flock was observed soaring over the top of a forested ridge at 8500 feet in the Kubor Range.

*Aplonis cantoroides* Gray

It was a surprise to discover this species living at an altitude of 5200 feet in the Wahgi Valley. Heretofore it had been known only from the extreme lowlands.

Flocks numbering in the thousands were observed at Nondugl in April and May, roosting in the canopy of a large patch of forest surrounded by grasslands.

There is no size difference correlated with altitude.

None had enlarged gonads. All of the 1950 series (April and May) were changing the wing and tail.

From Kup, June 5, 1952, one specimen, 55 grams, in fresh plumage. Iris bright yellowish orange.

The native name in Kup is "kukuranga."

*Pomareopsis bruijnii* Salvadori

Uncommon but widely distributed. It is a shy bird, which the junior author saw only along the courses of fast-flowing streams, where it runs about with the agility of a dipper on both dry and wet rocks.

The Nondugl native name is "da-res."

An adult was captured on July 16, 1952, on its nest of mud and rootlets in the Bismarck Mountains behind Nondugl.

*Phonygammus keraudrenii neumanni*  
Reichenow

One adult female (wing, 147 mm.) was ob-



tained from the Nondugl aviaries. It agrees with distinctively colored *neumanni* and differs appreciably in coloration from *purpureo-violaceus* and *mayri* (Greenway, 1942, p. 51). From *jamesii* and *keraudrenii* it differs also in size.

***Paradigalla (carunculata) brevicauda***  
Rothschild and Hartert

Three specimens (one male, two females) from the Hagen and Bismarck Mountains agree with series from Mt. Goliath, the Snow Mountains, and the Weyland Mountains.

From Mt. Hagen, 5600 feet and 7250 feet, May 15, 1952, one male and one female: 184 grams, 155; wing, 160 mm., 145; molt, in the male, no sign; in the female, general, with the wings and tail mostly replaced.

The wattle coloration in the adult male and female is similar, but the wattles are more extensive in the male; maxillary wattles Citron Yellow; mandibular wattles a little paler than Dull Violet Blue (in one, Spectrum Blue), ventral portion of latter a little more brownish; inside of mouth Dull Opaline Green in both sexes; tongue dark gray, with a blackish tip; external maxillary hard parts black; legs sooty brown, becoming blackish on toes; iris Mars Brown.

The Mt. Hagen native name is "war-cunda-goona."

Common in the forest crown between 6500 and 8000 feet but difficult to collect.

One female is a bird that died in the Nondugl aviaries, and is a gift of Capt. N. B. Blood.

***Epimachus fastosus stresemanni*** Hartert

From the northern flank of Mt. Hagen above the Baiyer River, 7500 ± feet, May 17, 1952, one male: 318 grams; wing, 201; tail, 738; no sign of molt.

Iris Jasper Red; skin around eye dark gray; legs dark gray; feet blackish; nails dark gray; bill black; inside of mouth Light Cadmium; tongue blackish.

The native Mt. Hagen name is "karae-tumbo."

This specimen, our only record, was shot within sight of Schraderberg, 30 miles to the north, the type locality of *stresemanni*.

***Epimachus meyeri bloodi*** Mayr and Gilliard

For the description of this bird, see Mayr

and Gilliard (1951, pp. 10-11). The type locality is Mt. Hagen, 8300 feet.

Abundant in the tall forest of the 8000 to 9500-foot zone. The call is a staccato rattling like short "bursts" from a machine gun. This call reverberates through the forest for long distances each morning and afternoon (at least during May to August). It is delivered by the male as it perches 40 to 80 feet up in the thick central portion of huge trees, and each rattle is punctuated by flexing of the wings, which are opened and shut against the body with considerable violence, as though the snapping had some bearing on the noise. (Crandall, 1932, p. 82, gives a good description of a cage bird in the act of rattling and shaking.)

Males with enlarged testes were examined April 30, July 8, 15.

A nest with an egg in an advanced state of incubation was collected at an elevation of about 8000 feet (behind Kup) on Mt. Numwe, Kubor Mountains, April 21, 1952. It was brought in by Komorna, the junior author's most trusted native assistant. Following Gilliard's instructions he brought in the entire nest tree but failed in his efforts to trap the female at the nest. The nest was 12 feet up in a thickly leafed slender "kisan" tree in the forest substage on the top of a flat ridge beneath tall open trees. The female was seen by Komorna to land at the nest three times.

This structure was described in Gilliard's field notes as follows: "A cup of living moss in a fork of pencil-sized limbs near a slender trunk. Lined with fine brownish rootlets, the bottom of cup with many fragments of dead leaves, some of which appear 'skeletonized' with age. Dimensions: outside, 150 by 175 mm., inside, 95 by 63."

The egg (40 by 27.5 mm.), which is "egg-shaped," is cinnamon brown with large, dark, reddish brown, longitudinal streaks extending from the large end to just beyond the middle where they disappear. Elsewhere the surface is sprinkled with small irregular brown and lavender spots.

One nest with a three-week old nestling was collected by a native on Mt. Hagen (about 8500 feet), July 14, 1950. This nest, which was fastened to a simple crotch, is composed of much stringy furry moss, leaves, and grasses. It is lined with slender rootlets, dried

fern tips, and some small leaves. Outside dimensions: 150 mm. by 100; cup dimensions, 80 by 45.

The nestling (which was partially decomposed) has the reddish brown crown, the brown back, and the barred breast of the female. Its wings are just emerging from wax sheaths.

Specimens in spirits (two males, one male subadult), Mt. O'-mar, Kubor Mountains, April 30: 182 grams, 207, 208. Iris pale sky blue (male), brown (female); bill black; side of mouth egg yellow washed with green (male), dull greenish yellow internally near gape (female); feet black.

The native name is "tomba" on Mt. Hagen for the male; "ti-tumba" for the male on Mt. Kubor; "pan-da-biam" for the female; and "ken-ti-co" for the female on Mt. Wilhelm.

*Astrapia stephaniae ducalis* Mayr

See Mayr and Gilliard (1952a, pp. 11-12). Seventeen adult females from the Owen Stanley, Herzog, Schraderberg, and Bismarck Mountains were examined.

The eastern race (*stephaniae*) differs from all by having the upper parts more olivaceous brown, less blackish, and the wing averaging longer. Topotypical Herzog Mountain *ducalis* is somewhat intermediate between the Bismarck and Owen Stanley populations but closer to the former in having the back more blackish, not so brownish, and the wing shorter. The Schraderberg topotypical *femina* (one female examined) has the short wing of *ducalis* but differs strikingly by having the abdomen much more reddish, more bright rust colored, not buff occasionally washed with pale rust; also by having subobsolete white streaks at the base of the central tail feathers. Males of *ducalis* and *stephaniae* are indistinguishable.

Six males, two females, two, sex ?, were examined on Mt. Kubor by the 1952 party (April 27-30). Of eight examined for molt, three were not molting and two were in general molt.

Weights (in grams) of *Astrapia stephaniae* and *mayeri* are as follows:

*stephaniae*

Mt. Kubor	
♂	146, 150, 156
♀	122.5, 138
(?)	139, 139, 148

*stephaniae* × *mayeri*

Mt. Hagen (Baiyer River region)	
♂	141, 148, 152, 155.5, 159, 160
♀	121

*mayeri*

Mt. Hagen (Baiyer River region)	
♂	164
(?)	154

These few figures suggest that *A. mayeri* is somewhat heavier than *A. stephaniae*, which is in line with the general measurements of the two species (Mayr and Gilliard, 1952a, p. 12).

One male collected and one observed on Mt. Kubor (April 27-30) had the base of the central tail white for a distance of at least 75 mm. Three pairs of 31 pairs of Stephanie tail plumes examined on heads of natives in the Kubor Mountains above Kup were deeply marked with white (45 mm., 50, 85 deep).

The presence of white in the tail of the Stephanie has been noted before (Mayr and Gilliard, 1952a, p. 12), but it comes as a surprise to find that the Kubor population (above Kup) has such a high incidence of it.

Male: iris dark coffee brown; bill black; inside of bill and mouth Chrysolite Green, becoming Kildare Green near midline; legs gray; feet black; inside of mouth pale yellowish buff tinted with green and becoming pale yellow at gape; tongue black in male and female.

The native name in the Kubor Mountains for the male is "meg"; for the female, "to-golee"; in Nondugl for the male, "meck."

One male, April 27, 1952, Kubor Mountains, has the long tail plumes partially severed as though cut with scissors. Gilliard's native assistants explained that a "binatang" (insect) was responsible. "Binatang," a Malay word, is the ancestral name for insect in central New Guinea and is not a recent introduction.

Eight *Astrapia* birds were collected by the 1952 party 75 miles west of the Mt. Kubor base camp in the Hagen Mountains (above Baiyer River at 7500-8500 feet), May 13-17 (five male adults, one male immature, one female, one nestling). These resembled the Stephanie Bird of Paradise, though most of the adult males show pronounced signs of hybridity with *A. mayeri*.

One adult male had the back and tail cov-

erts in molt, with the wings and tail fresh. Most of the others were in new plumage. Two of the males had no white in the tail, two had small amounts, and one, with a tail of 839 mm. in length, was broadly streaked with white over the entire length. This exceptional specimen (May 16, 1952) is a perfect example of hybridization. It was known as the "koolup" on the northeast flank of Mt. Hagen where the Stephanie male is called "ton-gay" and the male Ribbon-tail the "toik."

On May 14, 1952, a nestling was brought in to the 7300-foot base camp. It was said to have been taken from the nest of a "ton-gay" high in a forest tree at about 8500 feet. It weighed 50 grams; inside of mouth greenish buff; bill black; legs blue green.

Adult male: iris dark, near Seal Brown; inside of mouth Malachite Green to Deep Malachite Green; bill black; legs pale blue gray; feet blackish.

The following observations of feeding and display were made on May 13, 1952, at 8000 feet (4 P.M.) on Mt. Hagen (above the Baiyer River):

A male with a long black tail was seen moving about in the crown limbs of a rain forest tree heavily decorated with arboreal plants and moss. The junior author watched this bird for 20 minutes from a position of equal height on a neighboring ridge. The bird hopped agilely about, flew twice to trees 40 to 50 yards away only to return quickly. It seemed to prefer large horizontal or gently pitched limbs. On these it worked its way along the mossy tops, dragging the giant tail like a train. Often it bent down and worked its head as though excavating in the moss. It nudged the green covering forward or pulled it back with the bill. Several times as it dug it backed up, causing the outer foot of the two long tail feathers to drop like a pendulum from the side of the limb. Once it flew to a near-by tree and ate small green fruits growing in the canopy. To get to these it crawled almost cat-like on the tiny outer limbs bearing the fruit.

At length it flew to a perfectly horizontal limb on which there was very little moss and sat across it, the tail hanging in a wide inverted V. The bird then displayed by lifting the wings in a most peculiar manner, as though stretching, so that the primaries were held up and at right angles to the body and

the wrists were held in a touching position over the back. The head was pulled down in a crook. This position was held with little motion for at least three seconds. The bird then flew off.

This wing position is very similar to the most spectacular display of *Paradisaea apoda*.

#### *Astrapia mayeri* Stonor

See Mayr and Gilliard (1952a, pp. 1-13) for a discussion of the Ribbon-tailed Bird of Paradise and its allies, which is concerned with the history, synonymy, abundance, distribution, taxonomic position, and habitat of this species.

On May 14, 1952 (8900 feet), on the northeastern flank of Mt. Hagen (above the Baiyer River) the junior author collected a subadult male in the so-called hybrid zone which appears to be a nearly pure Ribbon-tailed Bird of Paradise. In addition two adult males with long pure white tails were seen in this same area (8800-9100 feet).

These were the only pure or nearly pure examples of *A. mayeri* seen during a week of continuous hunting by one to three men between 7000 and 9500 feet on the northern side of Mt. Hagen. However *A. stephaniae* (or hybrids close to pure *stephaniae*) was common in the 7000 to 8000-foot zone, and many specimens were seen and collected. The only hybrid recognizable at a distance was taken at 8000 feet. It is the specimen with the white-streaked black tail (see above).

Subadult male: inside of mouth pale greenish gray; bill black; legs gray; feet black; molt, rump and wing; weight (see measurements on p. 356).

On Mt. Hagen the *astropias* are the most abundant of the birds of paradise and, indeed, one of the most abundant of birds. In the Tomba region on the southern side of Mt. Hagen we found pure *A. mayeri* between 7800 and 10,000 feet. For a description of the display, nest, and young, see Mayr and Gilliard (1952a).

On March 8, 1952, at the Taronga Zoological Park, Sydney, a male was heard as it emitted a raucous "qrrrow, grrr, grr," followed by hoarse cawing. This bird was perched 2 feet from an adult female (with tail and neck in molt). It stood high on its legs, tipping its head sidewise as though looking at the ground with one eye, letting the wings

droop, then holding them high over the back. Obviously excited, the male then flew very forcefully from perch to perch (6 feet), thumping the cross bars heavily with its feet, then pausing to flick the white tail from side to side in the manner of an angry cat. This took place in hot sun at 3:30 P.M.

On an average, males in July had the testes enlarged to 8 mm.

*Parotia carolae chrysenia* Stresemann

The Lordberg race (*chrysenia*) differs from all others in its larger size. A single female, brought by the natives to Nondugl as a cage bird, belongs presumably to this race, for it is quite large despite its worn dress and agrees in the essential color pattern. However, it has the forehead with a somewhat wider white band than in the single toponotypical female of *chrysenia* at hand. Also it has the crown and back darker brown; the occiput is faintly washed with white.

This species apparently does not occur south of the dividing range, not even in the vicinity of Hybrid Gap (see Introduction) near Mt. Hagen. Our specimen came from the Nondugl aviaries (as a gift to the expedition by Capt. N. B. Blood). It probably was collected in the Jimi River region.

*Parotia lawesi* subspecies?

One female or subadult male seen and photographed in color at Nondugl, July, 1952. It was most notable for its china blue eye.

*Ciccinnurus regius gymnorhynchus* Stresemann

Early on August 12, 1952, Mr. Adolph Batze of Lae, formerly a plume collector, guided the junior author to the dance tree of a King Bird of Paradise. It was situated in the midst of high original forest 10 miles southeast of Lae in the Markham Valley.

Tape recordings of the dance songs were made at about 7:45 A.M. They sounded surprisingly like the repertoire of the Greater Bird of Paradise (*Paradisaea apoda salvadorii*) but were much higher pitched and less powerful. The male (the only bird seen) was observed, not as it sang but moments later, on its dance perch 40 feet up in a thickly leafed tree. The floor of the forest, which was about 50 feet above sea level, was soggy and

deeply shaded. Mr. Batze reported that the King Bird of Paradise is fairly common in the Lae region.

*Lophorina superba feminina* Ogilvie-Grant

In a comparison of females, a series from Mt. Hagen and the southern Bismarcks differs from the Sepik Mountain race (*pseudoparotia*) by having the back darker olive, less brown; from the Herzog bird (*connectens*) by having the outer wing edges darker, more deep rufous, less light chestnut.

Three adult males from the Wahgi region agree with a series from the Habbema-Idenburg region (nearly toponotypical *feminina*) in size and coloration. The range of *feminina* is thus extended eastward to include the Wahgi region.

Our toponotypical males (Mt. Hagen) and two nearly toponotypical males (Mt. Kubor) of Iredale's *addenda* (1948, p. 162) have been examined critically for characters of diagnostic value. None could be found.

Two male adults, one male (?) subadult, one female, and one [female ?] were examined by the 1952 party in the Kubor Mountains, April 26-May 5: 79 grams, 79, 81, 54, 59; molt, one male was in completely fresh plumage. In 1950 (April 20) a spirit specimen from the Nondugl aviaries had the crest cape half replaced, and a July 30 male was in fresh plumage.

Iris dark brown; skin around eye dark slate gray; inside of mouth yellowish green; bill and feet black.

The Kubor Mountain native name is "kongeral."

Common in the riverine forests bordering the Wahgi (5000 feet) and in the Kubor foothills up to 7300 feet, which is apparently the ceiling for the species. Near Mt. Hagen (July 30, 1950) a male was shot from a perch (6 feet up) in the forest edge facing a garden. Three dance trees (5000, 5600, and 7250 feet) were found in the Kup region by the 1952 party.

*Diphylloides magnificus hunsteini* Meyer

Common in high riverine forests along the Wahgi River to an altitude of 5000 feet. Five display grounds were found, and photographs of displaying birds were made.

The 1952 party obtained two skins and two native prepared specimens from Cambia, south slope of Kubor Mountains, and two males, April 16, June 17, from Kup: 82 grams; testes much enlarged (10 mm., April 16) and slightly enlarged (June 17). All plumage fresh in the former except the spiral tail plumes which were four-fifths replaced; no sign of molt in the latter which was in completely fresh plumage.

Iris dark brown, the pupil with a cellophane gray sheen; inside of mouth Night Green; bill Columbia Blue; naked postocular stripe Light Columbia Blue; legs and feet Deep Dull Vinaceous Blue.

Our series, which is virtually toptotypical of Iredale's *D. m. extra* (1950, p. 111), was compared with a series of toptotypical *hunsteyni*. No differences could be found, and therefore we cannot recognize Iredale's race, for which, incidentally, no type was designated.

The native name in the Kubor Mountains is "kombok," which is the same as that for *Amblyornis macgregoriae*.

#### *Paradisaea apoda salvadorii* Mayr and Rand

The 1950 party secured a series of females and young males. Those proved inseparable from a nearly toptotypical series and from birds from the middle and lower Fly River. The range of *salvadorii* was therefore provisionally extended to include the Wahgi region.

In 1952 several adult males without plumes were collected and two native prepared skins were obtained from a local district officer. The officer, at our request, took the skins from a native hunter who shot the birds in display trees in the Kubor Mountains (Katumbag) where we had long observed them in life. These matched a series from the Port Moresby region and thus doubly confirmed our earlier analysis.

Six display trees of the "bunde" were found in the Kup region between 5000 and 5600 feet. Extensive observations involving tape recordings and color film photography were made.

On June 28, 1952, the junior author made the following observations above Katumbag in the Kubor Mountains at 5600 feet, in an "island" of tall, mixed, second-growth forest,

where on a slightly pitched limb 70 feet above the ground the *Paradisaea apoda* danced every day.

"At 8:03 A.M., after having heard birds in the general vicinity for some time, a highly adorned male with plumes thrown upward like shimmering golden fans leaped to the dance limb. Often the plumes hid the head. Soon, about 10 females and young males, all highly excited and cawing strongly, darted about the immediate vicinity of the resplendent male. This bird seemed to 'defend' the dance limb against all comers as a veritable 'drone' of activity surrounded him. Females and probably young males landed on either end of the perch or in neighboring limbs. Each such advance would seem to infuriate the owner of the dance stage and there would follow immediately a postured mock attack with the golden plumage in gorgeous disarray—almost a ball-like mass of plumes.

"As soon as this male had driven off a transgressor it would spin about and dash in the other direction to attack real or imaginary intruders coming from that direction. Much sharp 'ki-ing,' cawing, and guttural growling rose like a crescendo, as though from the throats of maddened crows and jays.

"Flying through the tempestuous scene were birds which darted from above and from below, sometimes to pause and be chased. The whole thing reminded me of a fox at bay before a pack of dogs.

"Once an excited male had hung upside down in one of its postures. This pattern of behavior had heretofore been known only for the Emperor of Germany and Blue Birds of Paradise.

"When it had assumed an inverted position, it hung with head pointed to the ground for a second or two, as though trying to gauge its flight if it fell. At that moment a female dove down, landed on the limb directly above the suspended male so that the feet of the two birds appeared to touch. This brought on an immediate fencing match with the male pecking ferociously at the female from below.

"Such antics often brought other plumed males into the vicinity to land near or on the display limb, only to be driven off with a superlative display of bravado. As many as three adult males have been seen simultane-

ously in a display tree but nevertheless each dance arena or limb is the property of a single male. The dance revolves around him; when he is killed, the dance limb is deserted."

The junior author knew that three males had been killed while on their display perches, and in each instance the dance ceremonies ceased completely at those trees, at least for a period of several months.

Before having learned that one of these males had been killed, Gilliard spent a number of mornings unsuccessfully awaiting its dance. The only pictures he obtained were made four days after the death of the adult. They were of a young male which, after hopping about quizzically for some time, finally "got up nerve" enough to sit on the dance limb, which the junior author noted shone from long use by the now-dead owner.

This young bird, still in female plumage, then proceeded to elevate the wings characteristically and thump them at the wrists over the back, then to posture with the wings stretched back-to-back above and well in front of the head. It performed this dance in absolute silence, interrupted only by the whirring of the 16-mm. motion picture camera.

An adult female examined May 22, 1952: 135 grams; iris Olive Lake; bill Sky Gray; skin around eye dark slate; legs vinaceous brown. A nestling was brought into Kup, May 30, 1952. It was in a flimsy nest of rootlets which the native collector said had been found about 35 feet up in a casuarina tree growing in a small "island" of trees in grasslands near Kerowagi (5000 feet).

*Paradisaea apoda augustaevictoriae* Cabanis

On August 12, 1952, Mr. Adolph Batze (see p. 358) guided Gilliard to the dance tree of this bird. Tape recordings of its dance calls were made at about 9 A.M. They were closely similar to those of the Wahgi population (*salvadorii*). A male and several females were observed playing about in a huge tree which protruded slightly above the 100-foot crown of the luxuriant Markham River forest (10 miles southwest of Lae). The male, which remained close to a particular limb which was nearly horizontal and about 2 inches in diameter, displayed with the wings held aloft and tapped at the wrists, as described for *salvadorii*.

This species may be regarded as abundant in the Markham forest.

*Paradisaea minor finschi* Meyer

One male, July 15, 1952, collected on or just west of Schraderberg in the Schrader Mountains by "shoot boy" Mal, who reconnoitered that area very briefly for the expedition.

*Paradisaea rudolphi margaritae* Mayr  
and Gilliard

For description, see Mayr and Gilliard (1951, pp. 11-12). The type locality is the Kimil River near Nondugi, 5800 feet.

Very uncommon and locally distributed up to 6300 feet in dense forest. Vast areas formerly covered with forest, in which this species was doubtless abundant, have been reduced to grassland by the relentless activities of the native farmer. Once "farmed out" and allowed to become grassland, the forest is unable to replace itself because of man-set fires. Thus the Blue Bird population is threatened with extirpation in the Wahgi region.

In the Kubor region, several small colonies numbering from 10 to perhaps 50 birds still exist at the top fringe of precipitous valleys not yet farmed.

One female at Mt. Hagen, 5000 ± feet, May 17: 124 grams; no sign of molt.

Iris dark brownish (?); bill pale grayish white; inside of mouth pale Viridine Green; legs and feet dark gray, with blackish scutes.

*Paradisaea bloodi* Iredale (1948, pp. 161-162) from Minyip, Mt. Hagen, is a hybrid between *Paradisaea apoda salvadorii* and *P. rudolphi margaritae*. The ranges of these two birds overlap inside and along the forest edge in the Wahgi region.

The native names for the Blue Bird in the Kubor region are "goy" for the male and "manga" for the female.

*Pteridophora alberti hallstromi* Mayr  
and Gilliard

For description, see Mayr and Gilliard (1951, pp. 12-13). The type locality is above Tomba, Mt. Hagen, 8200 feet. Thinly distributed in a band between 7000 and 8000 feet on Mt. Hagen (south watershed), Mt. Kubor, and the southern watershed of the Bismarcks. Not observed on the northern



watershed of Mt. Hagen above the Baiyer River.

About a dozen dance trees were examined by the junior author during 1950 and 1952, and photographs were made in still and motion pictures (color) of the dance performance; also tape recordings of the many-syllabled hissing call were made.

The 1952 party critically examined five males and two females taken on Mt. Kubor, April 25, 26, 29: males, 83.5 grams, 84, 84, 84, 86; females, 67.7, 68.5. Molt: one male was just completing the replacement of occipital plumes; otherwise both were in fresh plumage. A male observed April 25 had new plumes (3 inches long) just emerging. In 1950 in April and early May in the Bismarcks, three males were in process of changing the head plumes, while several July specimens were in completely fresh plumage.

Males with enlarged testes (up to 18 mm.) were examined May 27, June 11, July 2, July 14.

On July 7, 1950, a male nestling was brought into the Mt. Hagen base camp (8200 feet). It is mouse brown above, gray with mouse brown scalloping below, and has buffy chestnut under tail coverts. Hidden on the crown are two wax sheaths 4 mm. long, encasing the occipital plumes. Incidentally all females have a pair of noticeably elongated, "spike-like" occipital plumes.

The native name for the male is "kis-ba" in the Bismarck Mountains behind Nondugl and "kis-a-ba" in the Kubor Mountains behind Kup; for the female, "am-bum" in the Kubor Mountains.

Adult male: iris Carob Brown; inside of mouth pale aqua green (between Cendre Green and Emerald Green); bill black; skin around eye sooty black; legs and feet blackish.

#### *Loria lorae amethystina* Stresemann

Compared with series from southeastern New Guinea and Mt. Goliath, Wahgi region males have the iridescent coloration of the secondaries darker, more dull purplish, less bright greenish blue. This is the character on which Stresemann (1934, p. 144) based his Schraderberg race (*amethystina*).

Commonly but thinly distributed in the high forests on Mt. Hagen, Mt. Kubor, and

the Bismarcks where it was not encountered below 7300 feet.

A displaying male was observed nearly every afternoon on Mt. Hagen during July, 1950. At about 4 P.M. it would perch on a 6-inch horizontal section of a heavily leafed limb 90 feet up in the canopy of original forest. The branch was more a singing than a display perch, although the bird often moved about as though in excitement. The call, a ventriloquistic ringing bulge or tolling, was very penetrating and melancholy. Telephoto photographs were made of this bird as it stretched its neck in song.

Males with enlarged testes were collected July 13 and 27, 1950. A male and two females, April 29–May 17, 1952: 86 grams, 69, 70; no sign of molt.

Adult male: iris dark brown; gape wattle pure white; bill black; inside of mouth white except hard inner surfaces which are black. Adult female: legs dusky olive; inside of mouth whitish tinted with yellow at gape.

#### *Cnemophilus macgregorii kuboriensis*, new subspecies

TYPE: A.M.N.H. No. 748584; adult male; Mt. Orata, above Kup, Kubor Mountains, Mandated Territory of New Guinea; May 2, 1952; 9000 ± feet; E. T. Gilliard.

DIAGNOSIS: Similar to *sanguineus* but upper parts paler, particularly back, rump, and upper tail coverts which are duller, more cinnamon brown, less orange. Dark under parts more blackish, less brownish black in sunlight.

RANGE: Known only from the Kubor Mountains above Kup.

REMARKS: Type: weight, 93.5 grams; molt, none; perishable colors, iris brown, bill and legs black; testes enlarged to 10 mm. Total length in life (of two males), 255, 255.

Both the 1950 and 1952 expeditions carried out extensive searches for this uncommon species, with particular emphasis on learning something of its habits. Literally hundreds of natives were enlisted in the search. Many were well versed in local natural history. All insisted that the "wougle-bogamp" (Kubor Mountain name) did not build a bower and did not display in a preselected spot either on the ground or in trees. It was just a perfectly normal bird, they said.

TABLE 4  
MEASUREMENTS (IN MILLIMETERS) OF MALES OF *Cnemophilus macgregorii*

	Wing	Tail
<i>macgregorii</i>		
Mountains of southeast New Guinea	110, 110, 112, 112, 112, 115, 114.5, 116.5	88.5, 89.5, 90, 92, 93, 94, 97
<i>kuboriensis</i>		
Mt. Kubor	110, 112, 114	86, 87, 87
<i>sanguineus</i>		
Mt. Hagen	109.5, 111.5, 113, 113, 114, 114, 114.5, 115, 117.5	85.5, 85.5, 88, 88, 88, 88.5, 87, 94

This raises the question as to the family allocation of this bird. It had been placed in the bower birds owing to its reputed similarity to *Amblyornis*. Actually the crest of *Cnemophilus* is totally different from that of *Amblyornis*, and the coloration of the female suggests relationship to *Loria*, one of the birds of paradise. On the other hand the absence of a bower is in itself not conclusive, since *Scenopoeetes*, a generally acknowledged bower bird, does not build bowers, nor does *Ailuroedus*. There is finally the possibility that the bower birds and birds of paradise are more closely related than admitted by Stonor, and that *Loria*, *Cnemophilus*, and perhaps *Ailuroedus* and *Scenopoeetes* belong near the stem of these families where the separation is not yet well defined. Only further anatomical investigations can shed light on this problem.<sup>1</sup>

*Cnemophilus macgregorii sanguineus* Iredale

For description, see Iredale (1948, p. 162). The type locality is the Mt. Hagen district.

On July 23, 1950, William Lamont shot an adult male near the summit of Mt. Hagen (11,000 feet). Gilliard was within earshot and examined the perch from which it fell. It was a dripping wet, nearly horizontal, moss-covered limb about an inch in diameter, 20 feet up in thick, gnarled rhododendron forest growing in a narrow ravine amid the summit grasslands. This male had some aberrant markings. Its left face and left side of crown and neck were streaked with blackish brown in areas which should be rich orange red.

<sup>1</sup> Dissections made since the present paper was written have shown that *Cnemophilus* is a typical bird of paradise, and *Ailuroedus* a typical bower bird (Mayr, MS).

On Mt. Hagen this species appeared rather common at the 8200 to 8700-foot level where many females and a few males were seen. Several were shot in our base camp area from the canopy of 100-foot forest, and one was shot from a similar situation within 20 yards of the bower of *Archboldia papuensis sanfordi* minutes before we discovered the latter.

The Mt. Hagen name is "wo-glia-bora." Specimens collected at Mt. Hagen July 11, 18, 21 and on Mt. Kubor on May 2 had enlarged testes.

*Archboldia papuensis sanfordi* Mayr  
and Gilliard

For description, see Mayr and Gilliard (1950, pp. 1-3). The type locality is the southwestern slope of Mt. Hagen, 8500 feet.

This remarkable new race was named in honor of the late Dr. Leonard C. Sanford, the 1950 expedition sponsor, who was long in the forefront of Pacific ornithological exploration. Dr. Sanford examined the bird at Old Lyme, Connecticut, with great pleasure shortly before his final sickness.

A series of 11 (seven male adults, one male subadult, two females, one female [?]) was obtained at the southern foot of Mt. Hagen just west of Tomba. All were trapped in runways leading into a single rudimentary bower clearing (see pl. 13). This dance arena was composed of a mat of dried fern fronds, sticks, and grasses. It was situated on the floor of deep wet mountain forest thickly overgrown with ferns, which lent a "lawn-like" look to the ground. Amid this, the brown dance arena stood out noticeably. About the edges of the dance ground were many snail shells and, in two spots, little

heaps of black beetle wings, also several small blue berries (from a tree called "yombie") some of which were later found in the stomach of one bird. Five feet from the bower itself, a slanting, slender trunk rose 4 feet into the air. This appeared well worn. A trail led from its base to the snail shells and bower. A blue berry was found on the rotted top of this dead trunk.

All of the birds were snared during the period July 12-27 at this dance arena—the only one that we found. In view of the sexes and the short period of time involved, it seems probable that the dance arena of this species is in the nature of a community gathering place and is not the property of a single male, as is the case with the two other bower birds found in the central highlands (*Chlamydera* and *Amblyornis*).

At least a month after the departure of the junior author from New Guinea in 1950, Capt. N. B. Blood, to whom Gilliard had shown a specimen in Sydney, sent Kaiber (who had been with Gilliard at Mt. Hagen) to trap live specimens of *Archboldia*. He succeeded, Captain Blood informed Gilliard in 1952, in obtaining an adult male alive at the same bower where the 11 specimens had previously been trapped. The live bird was forwarded to the Taronga Zoological Park at Sydney where it died. Mr. John Hallstrom had the great kindness to send us kodachromes of the living bird, which were most helpful to Dr. George M. Sutton when painting this species (pl. 13).

Adult male and female: iris Carob Brown; bill black; feet gray to blue gray. The diameters of the testes were 3 mm., 6, 7, 7, 10, and 15. All were white except in the smallest specimen which had one testis yellow and one black.

Bodies of two specimens (one male and one female) were saved.

#### *Amblyornis macgregoriae*

Study of a large series, incorporating all but one of the known races, has revealed several fairly distinct populations. However, in our opinion, the differences, which are mostly of a clinal nature, do not warrant further dismemberment of the species.

It was found, for example, that crest length increases steadily from east to west and wing

length varies considerably from population to population, with the longest occurring in the Mt. Hagen-Mt. Kubor-Habbema region (see measurements). Also, this latter group differs by having the lower parts generally lighter, more buffy, than those of the east (*macgregoriae*), and close to but lighter than those of the west (*mayri*).

The wing measurements (in millimeters) are as follows:

#### *macgregoriae*

##### Mountains of southeast New Guinea

5 ♂	129.5, 130, 131, 133, 134
1 ♀	131

#### *aedificans*

##### Herzog Mountains

1 ♂ (Mayr)	130
1 ♀	130

#### *germanus*

##### Huon Mountains

5 ♂	123, 125, 129, 131, 132
3 ♀	124, 128, 128

#### Subspecies?

##### Bismarck Mountains (above Nondugl)

3 ♂	137, 136, 136
1 ♀	126.5

##### Mt. Kubor

2 ♂	139, 143
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##### Mt. Hagen

8 ♂	135, 135, 135, 135, 136, 136, 137.5, 142
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1 ♀	132
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##### Habbema region

3 ♂	137, 137, 141
6 ♀	131, 133, 133, 134.5, 135, 135

#### *mayri*

##### Weyland Mountains

5 ♂	132, 134, 135, 135, 137
3 ♀	128, 129, 132

Crest measurements (in millimeters; averages in parentheses) of *Amblyornis macgregoriae* are as follows:

#### *macgregoriae*

Mt. Victoria	50, 50, 54 (53.3) <sup>1</sup>
Mt. Tafa	58

#### Subspecies?

Mt. Hagen	51, 53, 56, 60, 61, 62, 62, 65, 65, 66 (60.1)
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Mt. Goliath	67, 72 (69)
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Habbema region	65, 75 (70)
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#### *mayri*

Weyland Mountains	71, 71, 71.5, 73 (72)
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Two males from Mt. Kubor and one fe-

<sup>1</sup> Average of Mt. Victoria and Mt. Tafa birds.

male from Mt. Hagen were examined by the 1952 party, May 4, June 5, May 22: 112 grams, 114.5, 82; molt, the two males were in general molt including the golden crest, which in the May 4 male was four-fifths grown and in the June 5 male freshly replaced, with a few wax sheaths still adhering.

Iris dark coffee brown; bill blackish, the mandible with a gray bottom at base; legs and feet blackish.

Total lengths in life (1950 series): two males, 272, 275; two females, 245, 264. Enlarged testes (up to 15 mm.) were found in three males (July 15, 24, 28).

A nest with egg was brought into the Mt. Hagen base camp July 9, 1952, by a native who called it a "kitzie-kombok" (on Mt. Kubor it is called simply "kombok"). He said it was placed 7 feet up in a small forest tree in deep forest. The nest consisted of a cup of black, wire-like rootlets and appeared very solidly constructed. Its base was made of dried leaves (some thin palm leaves) and a few strips of black bark. The outside dimensions were 165 mm. by 100; the cup measured 100 by 60 mm. Incubation of the egg was well advanced. The embryo was saved. The egg was buffy white, with a dull, slightly roughened surface and roughly oval (but slightly larger at one end). It measured approximately (one end was broken) 45 mm. by 28.5.

Bowers were photographed on Mt. Hagen (9000 feet) when a 16-mm. color film was made of the bird in attendance, in July, 1950; on Mt. Kubor above Katumbag in June, 1952, where two bowers were observed and photographed. However, these photographs are inferior to the picture by Rand (1937, p. 206) of a Mt. Tafa bower and that by Mayr (1932, p. 91) of *Amblyornis inornatus*, which are discussed in detail by these authors in their respective papers.

One of the Kubor Mountain bowers was in process of construction; the other, which was collected, consisted of 412 separate sticks. The locality was above Katumbag at 7800 feet, in tall forest on a rounded, sharply dipping (38°) narrow ridge sloping downward to the northeast. The dimensions were: total width of round moss platform, 3 feet, 2 inches; width of convex rim, 8½ inches; height of rounded rim (maximum), 5 inches; height of tree in middle of bower, 3 feet 6½

inches; size of trunk, ½ inch. There were three spindly limbs growing from this tree, to which were attached about 10 living leaves, which had the texture and general arrangement of hemlock petals, but were larger. The tree was broken off at a height of about 2 feet 8 inches. The shaft was straight and smooth from use. The foundation of the stick tower averaged 8 inches in diameter. On June 12 it was only about 2 inches high (at that time the junior author observed a male, building). On June 17 the tower was 12½ inches tall, to the tip of the longest stick. The tower broadened to 11 inches some 6 inches above the base, but averaged about 9 inches in diameter. On June 12 the bower consisted of about 66 sticks and on June 17, of about 412 sticks. On June 17 the upper four-fifths of the bower consisted of dry, slender sticks, some of which had traces of gray lichens attached. At the downhill edge of the bower platform, just outside the moss wall, were two sticks with broad white patches of fungus growing around their somewhat more stocky shafts. These were lying on their sides as though to be used later.

The bower was situated 5 feet up-slope from a huge moss-cloaked forest tree 2 feet in diameter which rose 90 feet on the ridge center. About 5 inches from the east side of the bower a dead shaft, the size of a broom handle, had been shined by continuous perching. Two vertical perch areas were clearly visible, one 2 feet, the other 3½ feet, above the ground. The forest on the slopes at either side of the bower were high but rather open, so that shafts of sunlight could reach the bower.

Excellent color still photographs were made of *Amblyornis*, some when the crown was raised in display. While in attendance at the bower, the Gardener Bower Bird emits a series of ventriloquistic notes which are scratchy and bubbling, but musical. In the dance area it flexes its golden crown nervously, reminding one somewhat of the nervous movements of a wasp.

*Chlamydera lauterbachii lauterbachii*  
Reichenow

Compared with two specimens of *unifformis* (one male, one female, Siriwo River, inland from Geelvink Bay, Dutch New Guinea), we find that a Wahgi female differs

exactly as noted by the senior author when he compared the type of *lauterbachi* (Sepik River) with these same Siriwo specimens in 1936. Thus the racial identification of the Wahgi specimen appears certain, and the range of *lauterbachi* is extended to the southern watershed in the central highlands. However, this female lacks the reddish hue of the type of *lauterbachi*.

This grass-loving species may have worked its way into the Wahgi Valley from the Sepik-Ramu Gulch by way of Hybrid Gap (see Introduction, p. 321).

Abundant throughout the mid-mountain grasslands. Sixteen bowers were found within 5 miles of Kup, and eight were within 20 minutes' walk of the base camp at 5000 feet. All were in tall grass, usually near running water, and all were adorned with colorful berries, fruits, and assorted stones and lumps of bluish clay. One contained nearly a thousand pale slate-colored pebbles weighing nearly 10 pounds. Over three thousand sticks and a thousand hair-like strands of grass were used in building the structure, which had an approximate weight of 7 pounds (without stones). The grass was used to line the vertical walls facing the innermost chamber. The twigs, some of which were 25 or more inches in length, were stood on their ends so as to form orderly walls. So firmly interlocked were these that the entire structure adhered together with the rigidity of a box.

The most interesting feature of the bowers was their similarity of construction and design. For example, in the 16 bowers measured, the central chamber varied only from 2½ to 3 inches in width.

The bower is constructed of four fence-like partitions which are arranged so that the separating passages take the form of an H with a long cross bar. The central part of the central passage or chamber is usually not visible from the exterior. At this invisible point a cluster of round stones and blue marble-sized berries are gathered rather like eggs in a nest. At each end of the central passage, where it intersects the end passages, there are smaller clusters of stones and colored berries. The berries range in color from dark brown through deep green to bright red. All are of about the same size, both stones and berries. The male, who is in

attendance intermittently all day but most active in the morning, usually announces his arrival by a series of rasping "chilp, rattle, chilps," uttered every two or three seconds. He approaches quickly, usually perching in bushes over the bower for a moment on the way in.

In the bower he plays with the berries and stones, holding them in his beak and moving ostentatiously about. Often the seeds are rolled about or shuffled from place to place. The sticks are rearranged, the bower cleared. When a female appears in the arena there is a great deal of gawking and posturing on stretched legs and much metallic chipping, and the male often holds red seeds overhead to attract the female.

A single egg was found in a nest of sticks and rootlets 12 feet up in a tall grass swamp, April 10, 1952. Another with a young bird was found in a similar swamp on July 15. Both were at 5000 feet. One was 400 yards from an occupied bower; the other, 15 feet from a deserted bower. Both were photographed in color.

Two females were examined by the 1952 expedition, from Kup, April 5-14: 94 grams, 98; molt, one with no sign of molt, plumage worn; one with back, wings, and tail in molt.

Iris sepia; bill black; feet and legs pale greenish gray.

The native name in Kup is "till"; in Nondugi, "cell."

*Daphoenositta miranda kuboriensis*  
Mayr and Gilliard

For description, see Mayr and Gilliard (1952b, pp. 5-6). The type locality is Mt. O'-mar, Kubor Mountains, 8800 feet.

Uncommon in the crown of the high moss forest. The only specimens are four birds collected from a flock of perhaps six which were found feeding on a ridge in deep forest. No others were seen by either the 1950 or 1952 party.

*Neositta papuensis* subspecies?

The identification of our single specimen (adult male, south slope of Mt. Hagen above Tomba, 8300 feet, July 9, 1950) must await the collection of additional specimens.

It differs from *albifrons* by having the forehead, crown, and ocular areas whitish,

TABLE 5  
MEASUREMENTS (IN MILLIMETERS) OF *Toxorhamphus poliopterus*

	Wing	Bill
<i>poliopterus</i> Southeast New Guinea, 5 ♂	65.5, 68, 68, 68.5, 69.5	33, 33
<i>septentrionalis</i> Huon Peninsula, 4 ♂	69, 71, 71, 72	30
Wahgi region, 4 ♂	67, 71, 71, 72.5	29, 30, 30
<i>maximus</i> Weyland Mountains, 2 ♂	73, 78	35, 36

not dark sooty brown, and from *toxopeusi* by having the hind crown (from point between eyes) uniformly whitish gray, not coarsely streaked with black. It differs from all by having the auriculars paler, more grayish, not sooty brown as in *albifrons*, not blackish with whitish edges as in *toxopeusi*. Below, the throat streaking is intermediate between boldly streaked *albifrons* and weakly streaked *toxopeusi*. The primaries virtually lack white spotting of the inner vanes, although this marking is plainly distinguishable on other New Guinea races. We have not seen the *intermedia* of Junge (1952, p. 249) from the Wisselmeren region.

Apparently rare. No differences in size were found between *albifrons*, *toxopeusi*, and our single specimen.

The measurements are: wing, 82.5 mm.; tail, 37.5; bill from nostril, 9.5.

Eye ring pale lemon yellow; bill and feet pale lemon yellow, the former with a black tip.

*Timeliopsis fulvigula* subspecies?

One spirit specimen from the Wahgi region.

*Myzomela adolphinae* Salvadori

Common in flowering trees of the forest edge and gardens up to 6000 feet.

Four birds from the Kubor Mountains were examined by the 1952 party: molt, (April 7-17) body and tail, (April 9) no sign of molt, wings and tail fresh. One male (May 5) had huge testes (6 mm.).

The native Kubor Mountain name is "din-donk." Excellent color pictures were obtained.

*Myzomela rosenbergii rosenbergii* Schlegel

Abundant in flowering trees of the forest edge and in gardens and probably in the crown of the cloud forest. One specimen was shot on Mt. Hagen at 10,800 feet in a stunted flowering rhododendron tree.

Molt general in five specimens examined (April 3-22), one (April 3) was in fresh plumage. A male (April 16) had enlarged testes (4 mm.).

The native Kubor Mountain name is "ged-up"; the Nondugl name is "dringe."

*Toxorhamphus poliopterus septentrionalis*  
Mayr and Rand

In size, Central Highlands (Wahgi region) specimens match those of the Saruwaged Mountain "island," rather than the "mainland" races to the east (*poliopterus*) or west (*maximus*).

From Kup one male taken March 30, 1952, and one female taken April 3, 1952: no sign of molt.

Common in spaced-out trees and at the forest edge. An adult was observed incubating a single white egg in early May at Kup. The nest, which was composed of fine green vegetation, was in a crotch in a shaded glen 6 feet above a rippling brook at 5000 feet. In late June a nest with one fledgling was brought to base camp by a native.

*Melipotés fumigatus* Meyer

Two distinct populations occur in the Wahgi region: a large-sized (see table 6), light-bellied population from Mt. Hagen, and a small-sized, low-mountain one from the Wahgi Divide behind Nondugl. Another



TABLE 6  
MEASUREMENTS (IN MILLIMETERS) OF *Melipotes fumigatus*

	Wing	Tail
Mt. Goliath, 5 ♂	108-118	95.5-102
Mt. Hagen, 4 ♂	120-126.5	109-114
Mt. Kubor, 2 ♂	108-118.5	108
Wahgi Divide, 6 ♂	113.5-119	98-104
Mt. Wilhelm, 4 ♂	112-117	100-110
Mt. Tafa, 4 ♂	105-116	95-104

population difference, though of minor import, is that birds of the high forests of Mt. Wilhelm have somewhat darker chests than those of the Wahgi Divide, although the latter were taken only 30 miles to the west in the same range (and 3000 feet lower down). The following weights, in grams, taken by the 1952 party demonstrate the magnitude of these population differences: Mt. Kubor, female (?), 35, 42.5; male (?), 52; Mt. Hagen, female, 57; male, 70, 71, 71.

A careful analysis indicates that these differences, while very interesting, are probably not broadly geographical but are due to local altitudinal variation.

Abundant. Usually solitary during May, June, and July. A female taken June 17 on Mt. Wilhelm (9500 feet) was observed hop-

ping excitedly from side to side on a thin horizontal perch 80 feet up in the crown of open mountain forest. Its activity was such that it was mistaken for a bird of paradise.

Bill black; legs and feet dark gray; skin around eye usually orange yellow but sometimes dull reddish yellow, brown, or even deep blood red; iris dark brown near Argus Brown.

In late May above Katumbag, Kubor Mountains, 6300 feet, Gilliard observed a bird of this species as it hung head down in a flowering tree for several seconds. When it had righted itself, its yellow face had turned to brownish red. A photograph was made soon after, as it perched in a casuarina nearby. As it was being watched, the red faded and gradually became yellow again. The color

TABLE 7  
MEASUREMENTS (IN MILLIMETERS) OF *Melidectes fuscus*

	Wing	Tail	Culmen	Tarsus
<i>occidentalis</i>				
Orange and Nassau Mts.				
1 ♂ <sup>a</sup>	105	105	23	29
5 ♀ <sup>a</sup>	92-96	97-100	20-22	28-30
1 ♀ (Bele River)	94	102	26	31
<i>occidentalis</i> × <i>fuscus</i>				
Central Highlands				
7 ♂, 2 [♂?]	107-114	113-118	29-31.5	31.5-35
7 ♀	95.5-101.5	101-105	26-30	30.5-32.5
<i>fuscus</i>				
Eastern New Guinea				
♂	4 ♂, 112-117 <sup>b</sup>	7 ♂, 110-121	6 ♂, 32-35	4 ♂, 34-35
♀	6 ♀, 100-104 <sup>b</sup>	5 ♀, 104-110	8 ♀, 30-33	6 ♀, 31.5-34
♀	103 <sup>a, c</sup>	109 <sup>a, c</sup>	—	—

<sup>a</sup> Measurements from Junge.

<sup>b</sup> Mayr and Rand measurements.

<sup>c</sup> Measurements of a large specimen recorded by Junge (1939, p. 59) are not included because they seem to have been based on a missexed male.

change was undoubtedly due to a kind of blushing, as is also noted in certain vultures.

The native name in the Hagen Mountains above Tomba is "mong-ol-yo." In the Kubor Mountains the name is "cat-pang."

An April 2 spirit specimen bore no sign of molt. Five specimens (April 21, May 14, 16) were in medium to advanced stages of body and tail molt. Only the May specimens were molting the wings.

*Melidectes fuscus fuscus* De Vis

A series from Mt. Hagen and Mt. Wilhelm and a single specimen from Mt. Kubor (behind Kup) are intermediate in size between Junge's small race *occidentalis* (Oranje and Nassau Mountains) and the nominate form from southeastern New Guinea. Since no differences other than size distinguish these races, critical measurements have been made of all available material.

Data on a spirit specimen collected on Mt. Kubor, 10,000 feet, May 22, 1952, male adult: 45 grams; tail in molt.

*Melidectes princeps* Mayr and Gilliard

For description, see Mayr and Gilliard (1951, pp. 13-14). The type locality is Mt. Wilhelm, 11,800 feet.

The native name in the Kubor Mountains above Kup is "gui-yap"; on Mt. Wilhelm above Kegalsugl, "pao-na-eng-guioir."

The 1952 party secured only one specimen, a female, on Mt. O'-mar, Kubor Mountains, May 22: 42 grams, no sign of molt; a spirit specimen.

Fairly common between 10,500 and 12,000 feet in bushes and trees at and near tree line (11,000 ± feet).

*Melidectes belfordii* De Vis

For a discussion of hybridization between black-billed and wattled populations of this perplexing species, see Mayr and Gilliard (1952c, pp. 325-337).

Data for spirit specimens collected by the 1952 party on the north flank of Mt. Hagen, between 7500 and 8500 feet above the Baiyer River, May 14 to May 17: three males, four females, one, sex ?, one nestling: 76 grams, 82, 87, 55, 58, 69, 76, 65, 42; molt, only two showed no sign of molt, in six there was advanced

molt including usually the wing or tail or both. One male had the testes much enlarged (10 mm.).

Perishable colors of Mt. Hagen "black-bill" birds: bill black; skin around eye pale blue gray, near Pale Cadet Blue; gape wattle pale whitish (no throat wattle); legs dark gray; iris near Burnt Umber; legs dark gray; testes white.

Data for spirit specimens collected on the north flank of Mt. Kubor between 6500 and 8500 feet, April 9 to June 24: two males, one female, one, sex ?, one nestling: 62 grams, 73, 42.5, 80, 34; molt general in two adults and no sign in two. One male (June 24) had the testes enlarged (8 mm.). A nestling and nest were brought in and photographed April 23.

Perishable colors of Mt. Kubor "wattle-bird" birds: bill pale gray; skin around eye Pale Russian Blue or, in other words, pale gray washed with blue; gape wattle whitish to pale yellowish gray tinted with green; neck wattles brick red to orange; legs pale gray; iris Blackish Brown.

This common species, besides its bugle-like squeaking call (its rasping note), has a crow-like call, "kew kew kew," very penetrating and sharp and with the volume of an off-note "caw caw."

The Kubor Mountain native name is "arua."

*Melidectes torquatus polyphonus* Mayr

Similar in size and coloration to the distinct Herzog form.

Very common in the forest edge and in the tops of spaced-out trees. Not seen above 6000 feet.

The native name in the Nondugl area is "go-leng"; in the Kubor Mountains behind Kup, "go-sip" or "go-sit."

Bill grayish blue with a pale greenish base; gape wattle pinkish purple near Light Perilla Purple; naked ocular area Primuline Yellow; naked malar area Cadmium Orange; legs and feet pale blue gray; nails blackish; iris Clove Brown.

One adult female (March 29, 1952) and one male (April 12) had the body and coverts in molt. One male (April 2) was in worn dress with no sign of molt. Weights: male, 52 grams, 40; female, 43.5; sex ?, 54, 49, 40.

*Oreornis subfrenatus salvadorii* Hartert

There is a definite east-west cline from dark to light in this species. Wahgi region birds are nearest to, but slightly lighter than, toptypical *salvadorii*. However, they are generally darker than *melanolaema* of the Sepik Mountains westward.

Two males, April 14 and May 17: 34 grams, 33.5; body and tail in molt; testes minute.

Skin around eye near Straw Yellow; gape bright yellow; legs pale amber.

*Xanthotis chrysotis giulianettii* Mayr

Two records from the exceptional altitude of 4500 to 5000 feet.

*Meliphaga montana* subspecies?

One specimen, Nondugl, July 15, 1952.

*Ptiloprora perstriata-guisei* group

When Rand rediscovered *perstriata*, Mayr and Rand (1937) decided to treat it as an altitudinal representative of *guisei*, in view of the small differences and the strict altitudinal representation. Since that time much additional information has been accumulating, in particular the material obtained during the Mt. Hagen expedition, and it has led to the conclusion that two species are involved, a black-backed one (*perstriata*) and a brown-backed one (*guisei*).

The following considerations support this conclusion.

If both forms were members of a single species, which is strongly subject to altitudinal variation, one would expect that the species is also subject to much geographical variability. However, the black-backed species extends through the enormous area from the Weyland Mountains to southeast New Guinea without pronounced geographical variability (see below).

If the difference between the black-backed and the brown-backed forms were a matter of altitudinal variation, one would expect a similar variation to occur throughout the range of the species. This is not the case. The two species overlap only in the region between the Hagen Range and southeast New Guinea. In the Huon Peninsula and the Cyclops Mountains only the brown-backed species occurs, while in the Snow, Weyland, and

Wandammen Mountains only the black-backed species is found.

If the two closely related forms are species, one would expect them to be in competition and to affect each other's vertical range. This is indeed the case. In southeast New Guinea they strictly exclude each other altitudinally, while in the Hagen area there may be a slight overlap. On the other hand, the high-altitude, black-backed species descends to 1800 meters in the Snow Mountains and to 1400 meters in the Wandammen Mountains, where the low-altitude species (*guisei*) is absent.

Most important is the fact that there is no sign of any intergradation along the slopes of the mountains where the two species co-exist. Gilliard obtained both species in all three mountain ranges (Hagen, Bismarck, and Kubor), but he has no conclusive evidence that the two were found together, since most of his material was collected by natives. However, none of the black-backed birds was taken below 8000 feet, and, with the exception of one doubtful skin, none of the brown-backed birds was taken above that altitude. The possible exception is an immature male which was brought by natives to the base camp at 11,000 feet on Mt. Wilhelm, but, since the natives who visited this camp all lived below 8300 feet, it is quite probable that this specimen is actually a representative of the mid-mountain population.

In view of all this evidence it becomes necessary to rearrange the forms hitherto included in *guisei* as follows:

*Ptiloprora guisei* (lower altitudes)

*P. g. guisei* De Vis, southeast New Guinea and Saruwaged

*P. g. umbrosa* Mayr, Hagen-Sepik Mountains

*P. g. mayri* Hartert, Cyclops Mountains

*Ptiloprora perstriata* (higher altitudes)

*P. p. perstriata* De Vis, mountains of southeast New Guinea

*P. p. lorentzi* Van Oort, Weyland Mountains to Bismarck Range

*P. p. praedicta* Hartert, Wandammen Mountains

*Ptiloprora perstriata lorentzi* Van Oort

The sample from the Wahgi region of the black-backed species *perstriata* differs from *lorentzi* of the west and from *perstriata* of the

east by being somewhat darker below, particularly on the throat and chest. However, since this population appears more like *lorentzi* and since the two existing races are at best very finely differentiated, we have included the Wahgi bird with the western form.

Two females from Mt. Hagen and one, sex ?, from Mt. Kubor, 8000-9000 feet, April 27-May 15: 25 grams, 29, 26; molt, wing and tail (April 27).

Iris Courage Green; bill black; legs and feet near Pallid Violet Blue.

One male was collected in 1950 from a mixed party of small birds feeding in the canopy of thick, high rain forest at 8400 feet.

The native Kubor Mountain name is "dulish"; on Mt. Hagen, "oro-pwee."

A nest with a single egg, which probably belonged to this species, was collected by a native on Mt. O'-mar, probably at about 8000 feet, on April 26, 1952. The nest measured on the outside, 110 by 130 mm.; the cup 48 by 46 mm. It was lined with feathers and straw-like strands of light brownish grass; the foundation was coarse grass, leaves, and twigs. It was decorated with green "strings" of "Spanish" moss. The egg measured 22 by 17 mm. and was pinkish brownish buff, with fine cinnamon flecking around the larger end.

A nest with a single young in wax sheathing was collected on Mt. Hagen above Tomba at 8300 feet, July 4, 1950, by the junior author. The female parent was shot at the nest, which was 18 feet up on a limb against the trunk of a slender tree of the lower half of high rain forest. The nest measured on the outside, 95 by 125 mm.; the cup, 55 by 35 mm. This nest is similar to the one described above except that the bottom of the cup is padded with fine black hairs.

#### *Ptiloprora guisei umbrosa* Mayr

Our series from the Wahgi region agrees in coloration with a single topotypical male of *umbrosa* from Schraderberg, as well as with the measurements given by Stresemann (1923, p. 62) for 26 Schraderberg specimens.

Common. From the Kubor Mountains, 5600 feet, April 22, 1952, one male: heavy body molt. One with enlarged testes, May 30.

Iris Kildare Green; bill black; legs pale blue gray.

The native name in Nondugl is "co-la-moga"; in Kup, "jewel."

#### *Pycnopygius cinereus marmoratus* Sharpe

From Kup, 5000± feet, May 7, 1952, one male (skin) and one, sex ? : 43 grams, 41; molt, one the back and one the tail.

Apparently very uncommon and local in the lowest portion of the Wahgi Valley.

#### *Dicaeum geelvinkianum rubrocoronatum* Sharpe

Three specimens (two males, one female) were obtained from natives in 1950 (probably from 5000 to 8000 feet). The males compare fairly well with those of *rubrocoronatum* from southeastern New Guinea, although that race is composed of a number of populations which vary in dorsal coloration and bill size. Our Wahgi examples represent a somewhat less brightly colored population. They differ from *centrale* of the west by having the bill considerably more slender and by being somewhat more bluish above, less olivaceous. From *rubrigulare* they differ by having the chest patch smaller, the throat more grayish, and the upper parts more bluish, less violet. No comparisons have been made with *obscurifrons* (Junge, 1952, p. 249).

#### *Melanocharis versteri virago* Stresemann

In a comparison of females, a series from the Wahgi region and a single topotypical female of *virago* (Schraderberg) have the central abdomen somewhat more grayish buff, less yellowish, than it is in either the Cyclops (*virago*) or southeast New Guinea (*maculiceps*) populations. Like the latter they have the throat dusky grayish olive, not light grayish olive with buff streaking as in the Cyclops series. Males (Mts. Hagen, Kubor, and Wilhelm) have the under parts distinctly lighter gray than those of *meekei*, almost as light as in *maculiceps*.

Since Rand (1942, p. 512) has described much altitudinal variation of size in this species, we unite the studied population with *virago* with which it agrees in coloration, although the measurements of *virago* are smaller.

The population from the Cyclops Mountains was placed by Hartert (1930, p. 52) with *versteri*, by Mayr (1941, p. 215) with

*virago*. Actually it differs from both and may have to be separated after more topotypical material of *virago* becomes available.

Common. April 8 and May 7 birds were molting. A May 17 male showed no sign of molt, and July specimens were in fresh plumage.

*Melanocharis longicauda umbrosa* Rand

Males are needed for critical identification. Uncommon. An adult male (Nondugl) is indistinguishable in color and size from both a series of females from the Idenburg River (*umbrosa*) and a series from Papua (*orientalis*). Our only other specimen is a male in female plumage.

in the only specimens seen (one male adult, one male immature).

The native name in the Kubor Mountains is "co-ga-mong"; in the Bismarck Mountains behind Nondugl, "ko-dau-munga."

The measurements of males are: wing, 71, 72; tail, 49, 51; bill, 19.5, 20; tarsus, 20, 20.

*Oreocharis arfaki* Meyer

Common in the upper tier of the Hagen, Kubor, and Bismarck forests between the altitudes of 6500 and 8500 feet.

*Paramythia montium montium* De Vis

With the exception of the cave swiftlets, this curious mountain species was the most

TABLE 8  
MEASUREMENTS (IN MILLIMETERS) OF *Paramythia montium*

	Wing	Tail
<i>montium</i>		
Southeast New Guinea mountains		
14 ♂	99 -108	96 -109
Central Highlands		
19 ♂	98.5-112.5	96.5-107
<i>brevicauda</i>		
Saruwaged Mountains		
5 ♂	101 -106	89 - 96
3 ♀	103 -105	91, 92, 96

*Melanocharis striativentris striativentris*  
Salvadori

For a discussion of the species and a description of a new race (*albicauda*) from the northern watershed of the Owen Stanley Mountains (Bihagi), see Mayr and Gilliard (1952b, pp. 6-7).

Uncommon. Two males from the south slope of the central divide above Nondugl (6500± feet) appear inseparable from three nearly topotypical males from south central Papua.

One male (May 6) has the wing in molt. An adult (May 31) showed body molt, while another (May 26) showed no sign of molt.

*Rhamphocharis crassirostris piperata* De Vis

Similar in size and coloration to males from southeastern New Guinea.

Apparently uncommon. Natives brought

abundant bird of the highlands (9500-11,500 feet) of Mts. Wilhelm, Kubor, and Hagen. It was found in flocks of from three to 10 in the upper half of moderately tall trees at the 9500-foot level, and in isolated clumps of stunted rhododendrons near tree line (11,500 feet). At the latter location it sometimes perched within 2 feet of the grass.

From the Kubor Mountains, April 27, 29, 1952, two males: 46 grams, 44; molt, one the back and wing, the other the back; testes minute and white. From Mt. Hagen, May 15, two males: 36 grams, 41; no sign of molt, fresh plumage; both with enlarged testes (7 mm., 5). Iris dark slate brown; bill and legs black.

The species is known from two distinct races, one (*montium*) from southeastern New Guinea and the Saruwaged Mountains, the other (*olivaceum*) from Dutch New Guinea.

Central Highland populations are similar to each other and nearest to the eastern bird. They differ slightly by having the crissum and under tail coverts lighter, more lemon yellow, less dull golden yellow, and the wing somewhat longer (see table 8).

Above, freshly collected specimens appear darker green, less yellowish, than comparative examples collected in 1933. This may be due to foxing.

During a study of this collection it was found that the population from the Saruwaged Mountains is sufficiently distinct to require naming.

*Paramythia montium brevicauda*,  
new subspecies

TYPE: A.M.N.H. No. 699236; adult male; Saruwaged Mountains, Huon Peninsula, Mandated Territory of New Guinea; August, 1914; 12,000 feet; Keysser collector.

DIAGNOSIS: Indistinguishable from *P. m. montium* in coloration, but tail conspicuously shorter (see table 8). Relative tail length: southeast New Guinea, 96-101 per cent of wing length; Hagen area, 92-98 per cent; Saruwaged, 86-93 per cent. Of the same wing length as typical *montium*, but with shorter wing than Hagen birds.

RANGE: Saruwaged Mountains.

We are greatly obliged to Dr. E. Stresemann for supplying the tail measurements of specimens collected by E. Mayr (1931, p. 652).

*Zosterops novaeguineae wahgiensis* Mayr  
and Gilliard

For description, see Mayr and Gilliard (1951, p. 14). The type locality is Nondugl, Wahgi Valley, 5200 feet.

April and May skins are in fresh plumage. A male (April 26) shows wing molt. None had enlarged testes.

Common in flocks in wild fig trees in gardens and in trees of the forest edge between 5000 and 6000 feet.

Some April and May birds were in fresh plumage. However, five males (April 4, 7, 8, 26) were in advanced stages of molt. Two (April 4, 8) had the testes greatly enlarged.

*Zosterops novaeguineae crissalis* Sharpe

For reference, see Mayr and Gilliard (1951, p. 15).

Two nestlings, of this or of the preceding race, were brought in to Kup on April 24, 1952.

The native name at Kup is "we-gak."

*Zosterops novaeguineae shaw-mayeri*  
Mayr and Gilliard

For description, see Mayr and Gilliard (1951, pp. 14-15). The type locality is Yandara, north slope of Mt. Wilhelm, Bismarck Mountains, 6000 feet.

*Erythrura trichroa sigillifera* De Vis

A small green and red bird observed twice in short rhododendrons growing in sparse grass near the summit of Mt. Hagen (12,087 feet) may have been this species. Other specimens were secured in the mid-mountain forests of Mt. Kubor, Mt. Wilhelm, and Mt. Hagen.

One female, one, sex ?, May 17, 26: 14 grams, 15; molt, one in full molt including tail and wings, the other showed no sign of molt.

The native name in the Kubor Mountains is "tum-bi-na."

*Lonchura spectabilis wahgiensis*  
Mayr and Gilliard

For description, see Mayr and Gilliard (1952b, p. 7). The type locality is Kegalsugl, Mt. Wilhelm, 8000 feet.

No sign of molt was found in birds examined April 5 (two specimens) and April 14 (two specimens). Birds examined April 16 and 21 had the wings, tail, back, throat, and flanks in molt.

On April 3 at Kup a nest with two nestlings about ready to take wing was brought in by a native trapper.

Very common in tight flocks of up to 30 birds in the mid-mountain grasslands.

*Oreostruthus fuliginosus hagenensis*, new  
subspecies

TYPE: A.M.N.H. No. 704650; subadult male; south slope, Mt. Hagen, Central



Highlands, Mandated Territory of New Guinea; July 28, 1950; 10,000± feet; William Lamont.

DIAGNOSIS: Nearest to *fuliginosus* but generally lighter, more rufous brown, less drab brown, particularly on back, flanks, and abdomen. Differing from *pallidus* by more rufous brown, less tan, under parts and richer, more reddish brown, less dull brown, upper parts. Differing from both *pallidus* and

*fuliginosus* by having back thinly suffused with blood red, not solid brown.

REMARKS: Only two specimens were encountered by the 1950 and 1952 Mt. Hagen expeditions (one male subadult [type], one female adult). *Oreostruthus* is apparently uncommon to rare in the substage of high open forest. It seems to prefer low bushes of semi-open ridges and forest amphitheatres between 8500 and 10,000 feet.

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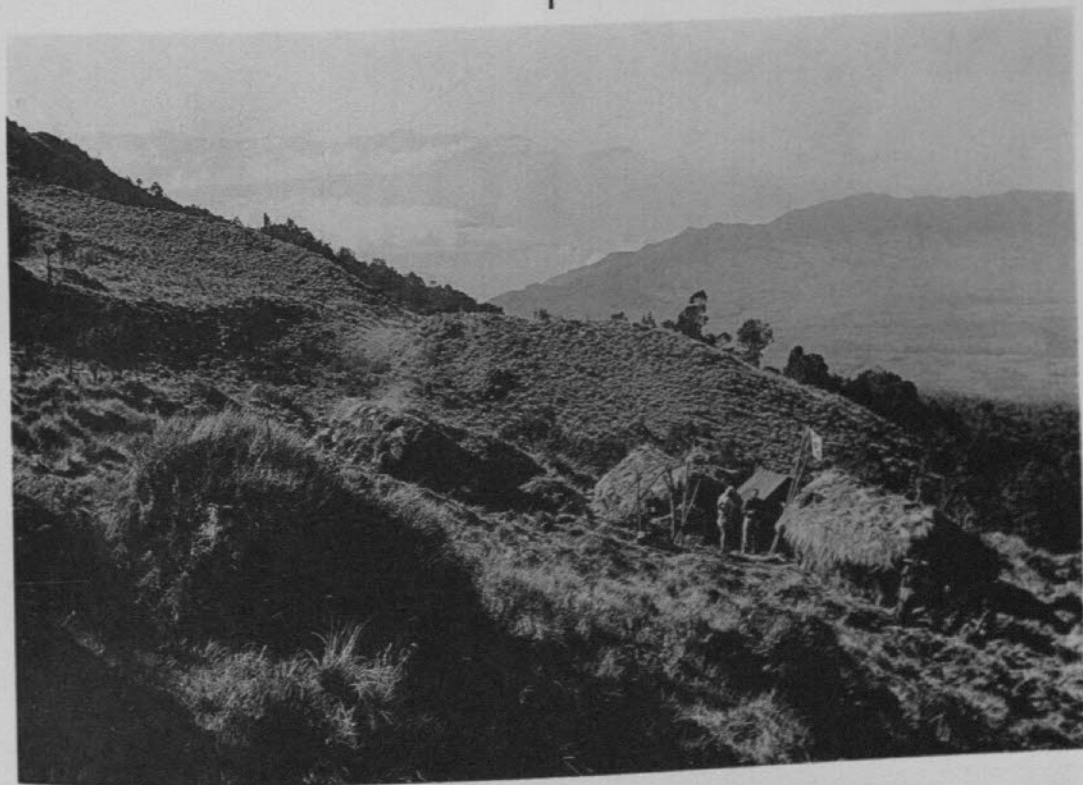
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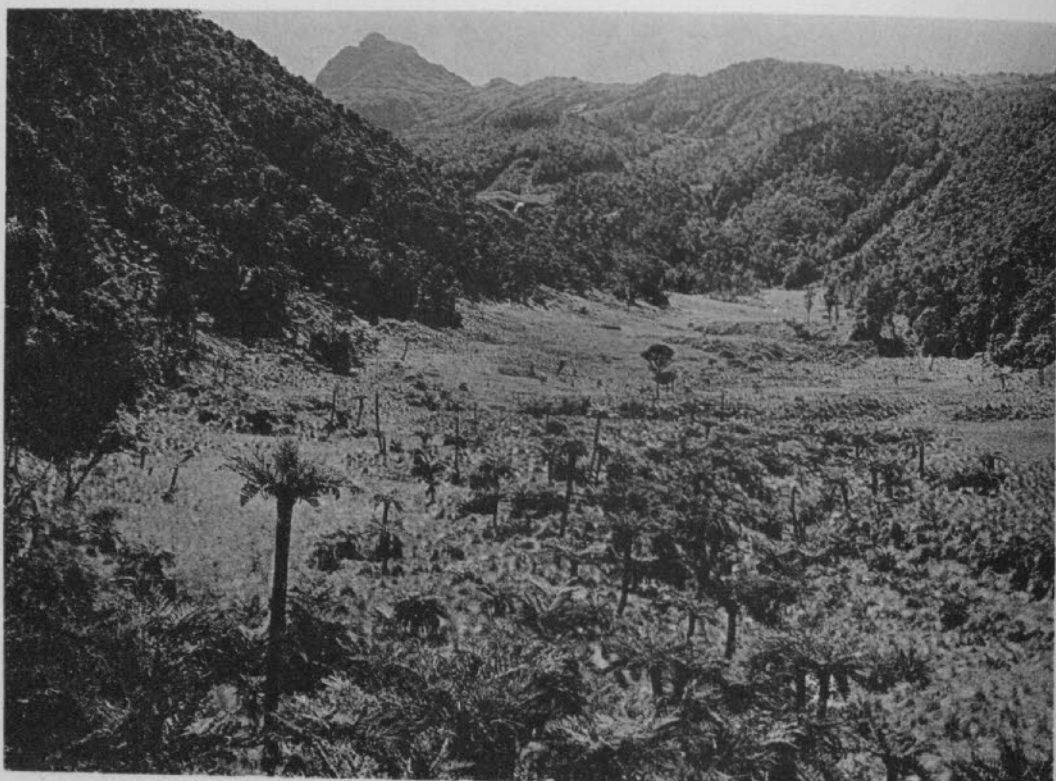


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2

1. Landscape at 14,000 feet, Mt. Wilhelm. Rock fields beneath summit. Near horizon, the upper Chimbu gorge. Grass line (median left foreground), 13,000 feet. Tree line (in distance), 11,000 feet.
2. Landscape at 12,000 feet, Mt. Hagen, southeastern aspect. Upper limits of tree line, 11,400 feet. Tomba Valley, far right, Upper Wahgi Valley, center background. Center horizon, the western end of Kubor Range



1



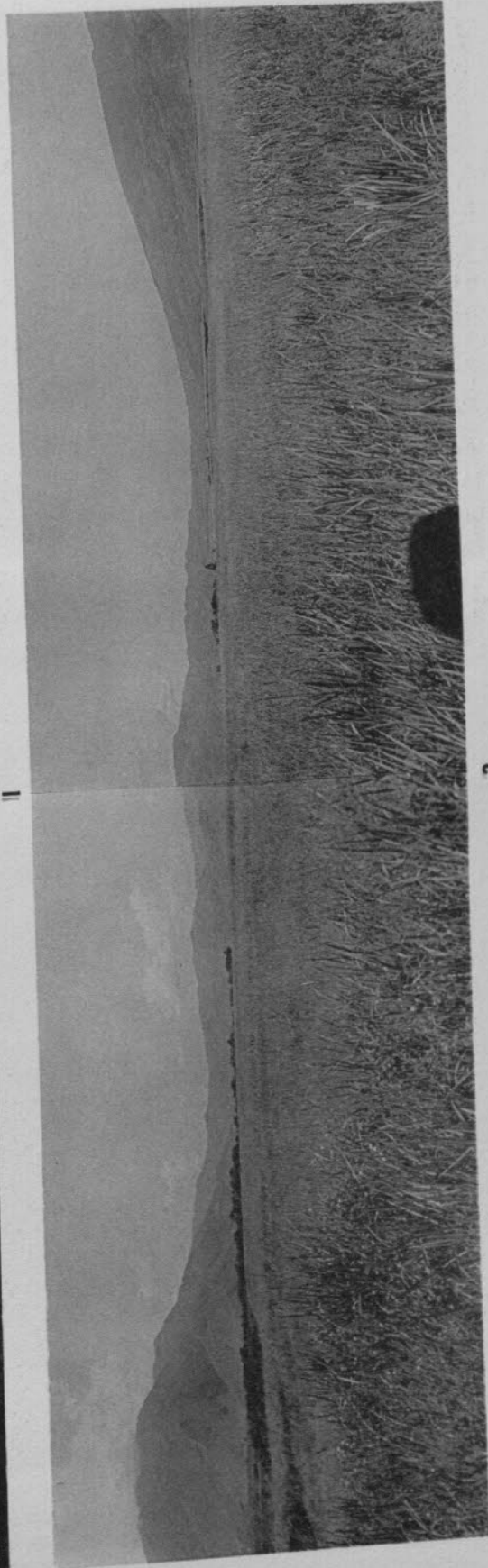
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1. Landscape at 10,000 feet, Mt. Wilhelm, looking north to central divide from a grass valley near the head of the Chimbu River  
2. Beech forest at 8000 feet. Northeastern flank of Mt. Hagen looking southeast towards (left) Hybrid Gap



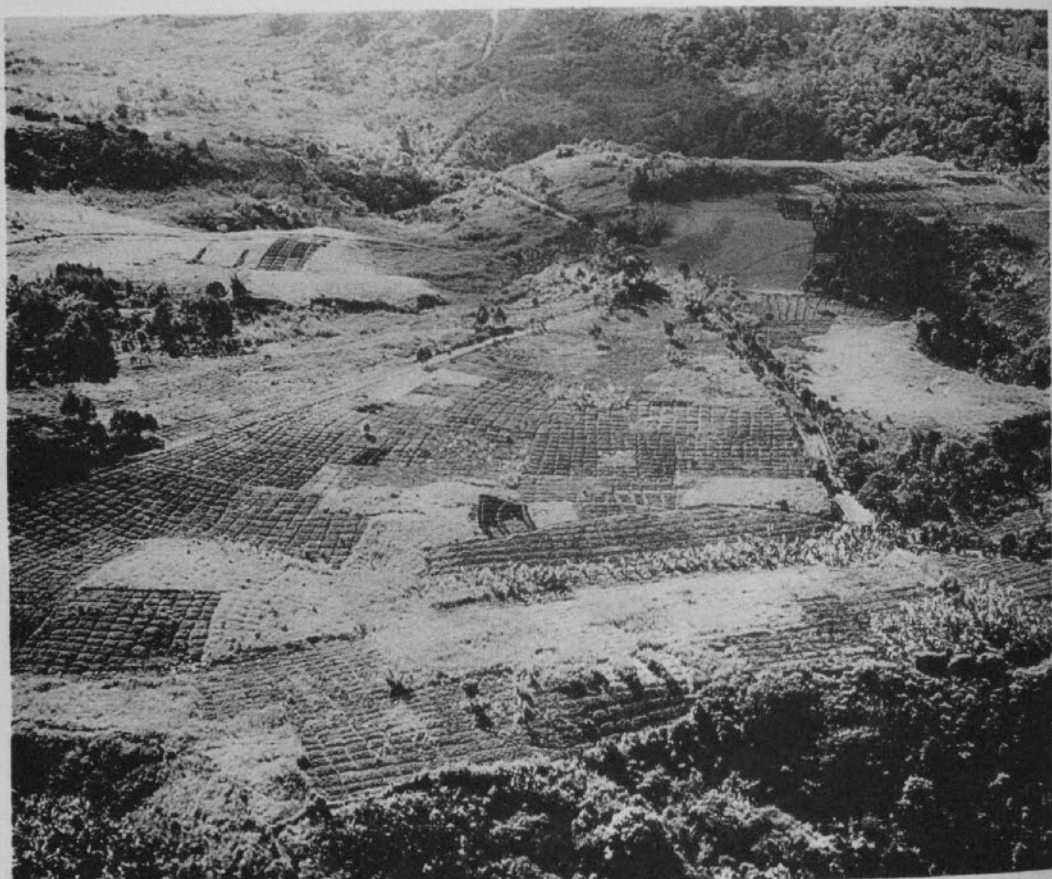


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2

1. View from 6000 feet northward. Flank of Mt. Kubor above Kup overlooking central Wahgi Valley (5000 feet). The Wahgi Divide spur of the Bismarcks in background
2. Landscape at 4000 feet. South view from upper Baiyer Valley to Hybrid Gap (low point, 5500 feet, at right of center). Wahgi Divide terminus at left, eastern terminus of Mt. Hagen at right. Deforested gap 12 miles wide. Forest in east descending to 4000 feet, in west to 7300 feet



1



2

1. Native farmlands, near Kup, Wahgi Valley, 5000 feet  
2. Grass Owls (*Tyto longimembris papuensis*) from Kup





1



2

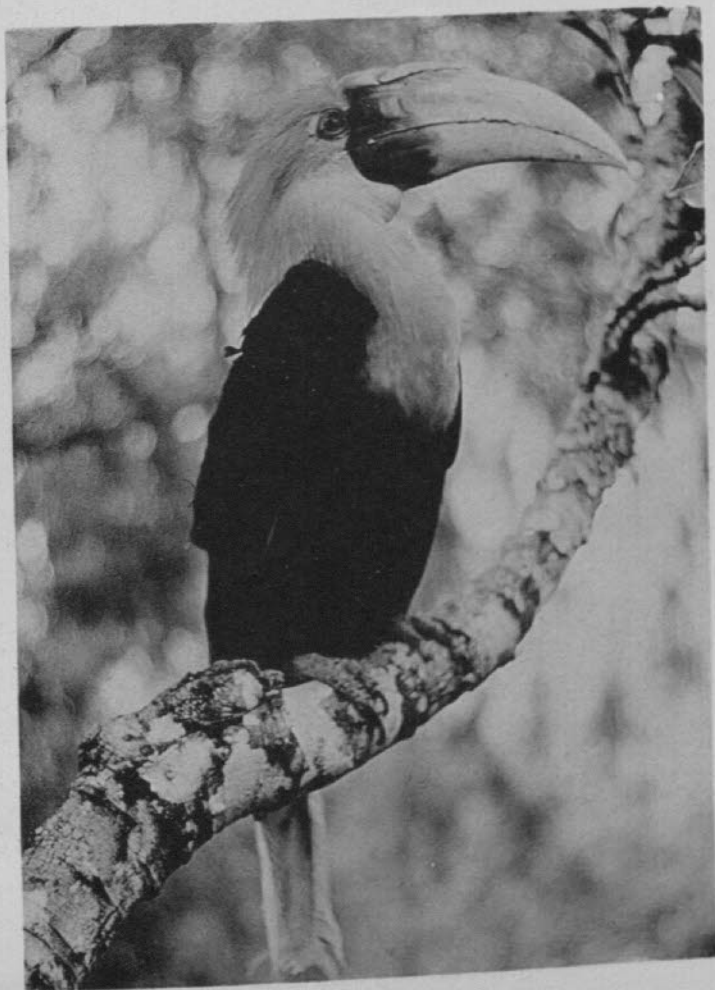
1. *Ninox theomacha*
2. *Aegotheles insignis*



*Podargus papuensis*

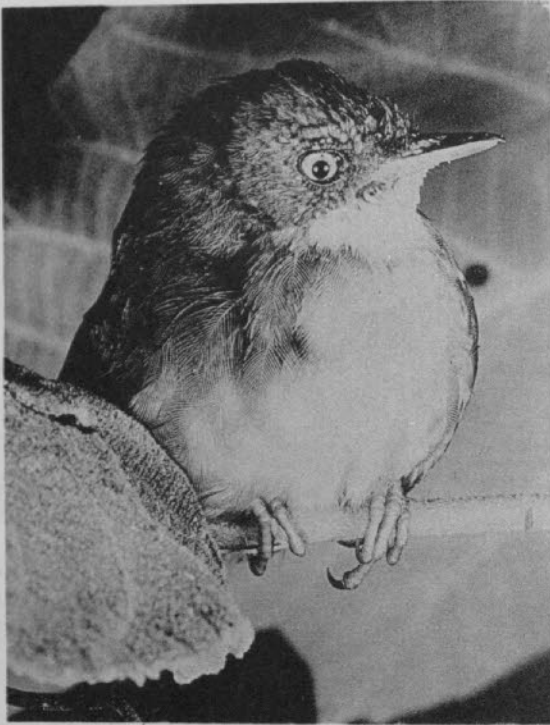


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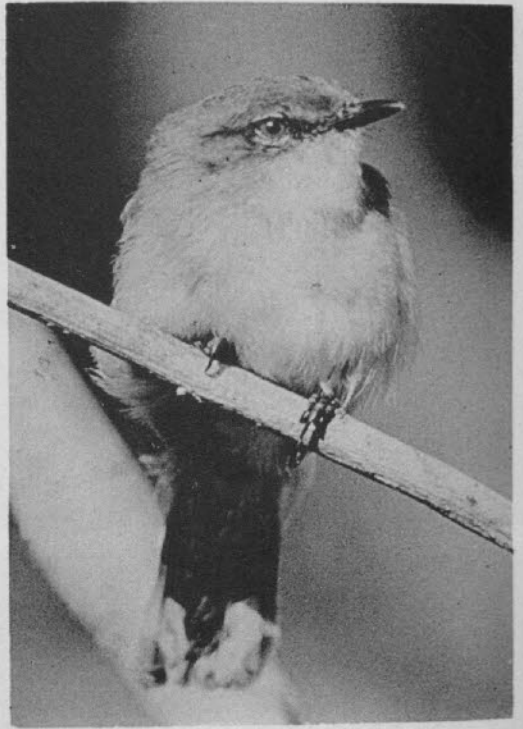


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*Rhyticeros plicatus*. 1. Adult female hopping on ground. 2. Young male



1



2



3

1. *Crateroscelis robusta*
2. *Gerygone ruficollis*
3. *Psittacella brehmi*, fledgling and nestling from same nest, Mt. O'-mar, June 7, 1952





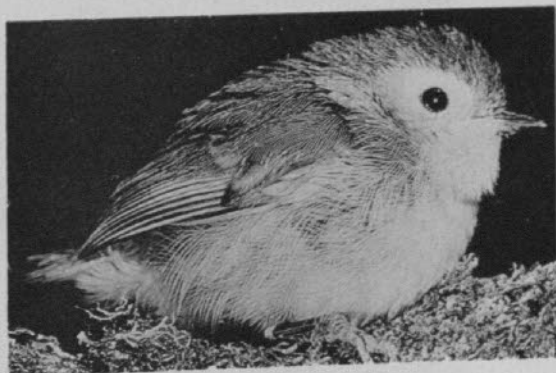
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- 1, 2. *Eugerygone rubra*, showing its relationship to the flycatchers (*Microeca*, *Petroica*)  
3. *Machaerirhynchus nigripectus*  
4. *Sericornis nouhuysi*



1



2



3

1. *Pitohui dichrous*
2. *Monachella mülleriana*
3. *Pomareopsis bruijni*, adult on nest, July 15, 1952, Nondugl



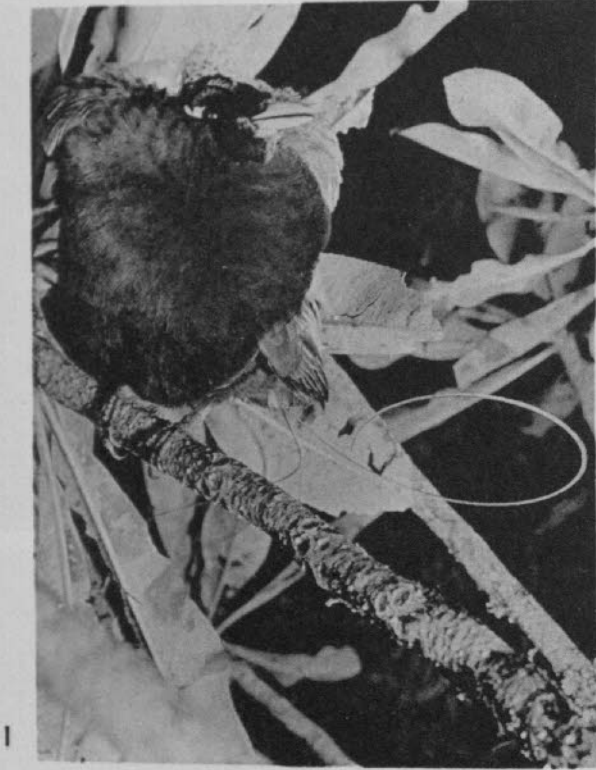


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1. *Myiolestes megarhynchus* on nest
2. *Pachycephala rufinucha* at nest and eggs



*Diphylloides magnificentus*. 1. Male with chest shield expanded. 2. Female. 3. Male displaying



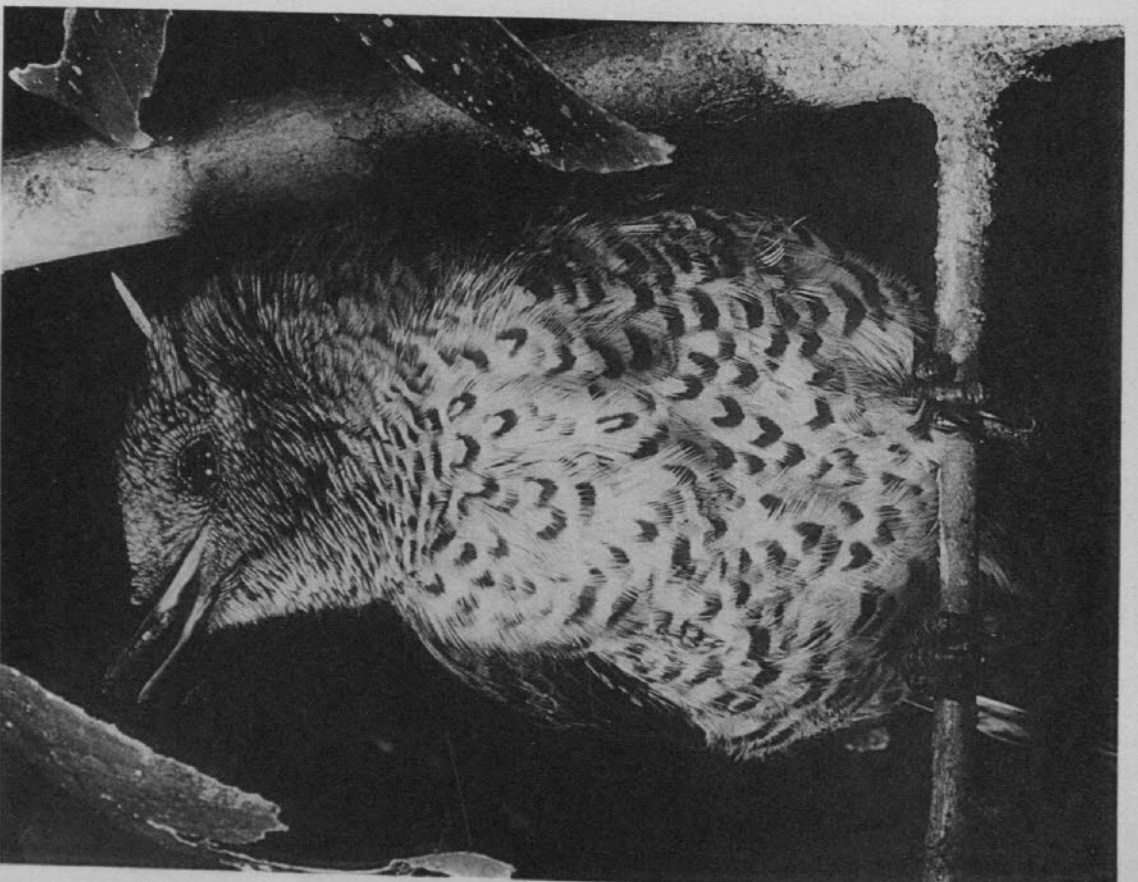
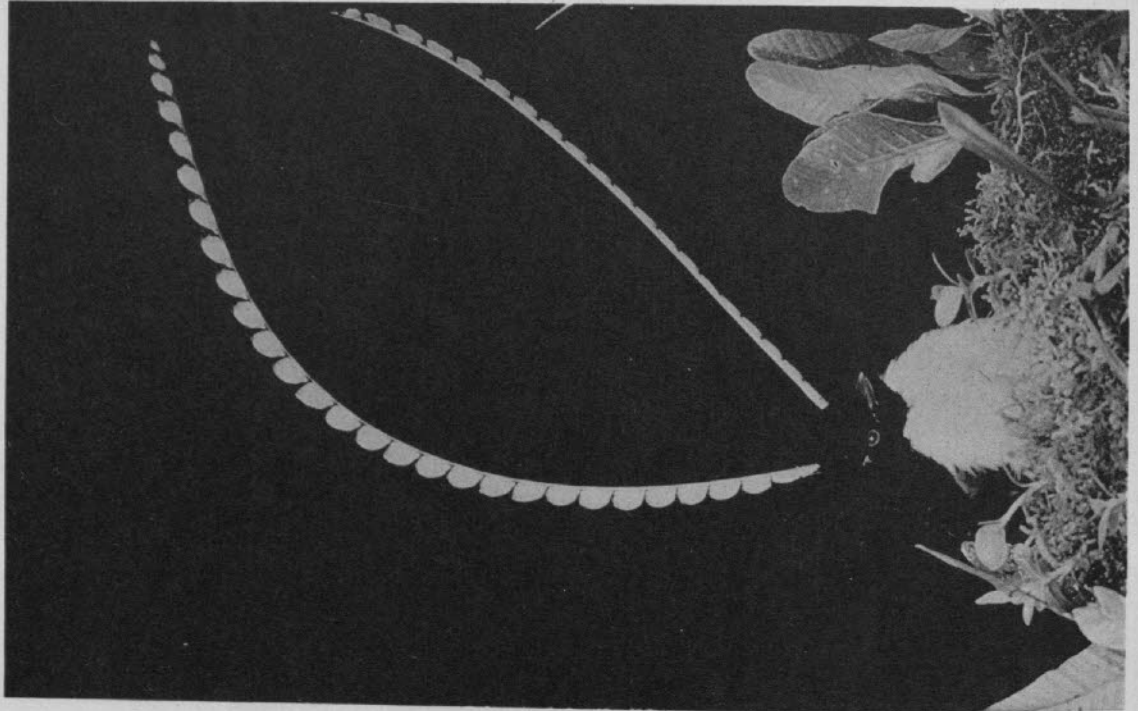
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1. *Epimachus meyeri*, adult female
2. *Lophorina superba*, adult male





2

*Pteridophora alberti*. 1. Adult female with spike plume showing. 2. Adult male displaying



2

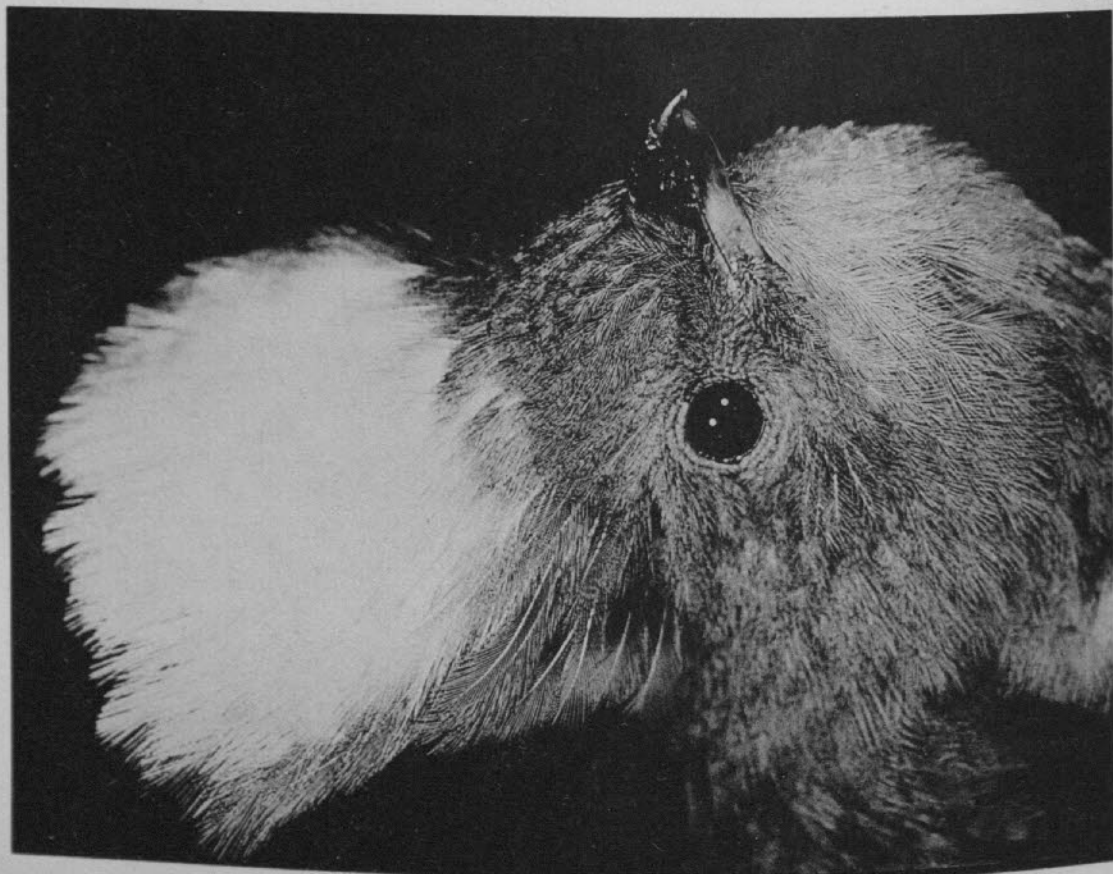


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1. *Cnemophilus macgregorii*, subadult male  
2. *Astrapia stephaniae* display tree, 9500 feet, Mt. Wilhelm. A native plume hunter is ascending to his blind in tree crown



2



1. *Amblyornis macgregoriae*, adult male displaying  
2. *Chlamydera lauterbachii* in bower, Kup. June, 1952, 5000 feet





Bower of *Chlamydera lauterbachii* with usual assortment of round red, blue, and green seeds and blue clay or stone pebbles, Kup, 5000 feet



*Chlamydera lauterbachii*. Female at nest with young. The egg is shown in the inset



1



2

1. *Paramythia montium*. Mt. O'-mar, Kubor Mountains  
2. Dance arena of *Archboldia papuensis sanfordi*, Mt. Hagen, July, 1950. Note sprung snare trap at center with tail feathers of *Archboldia*



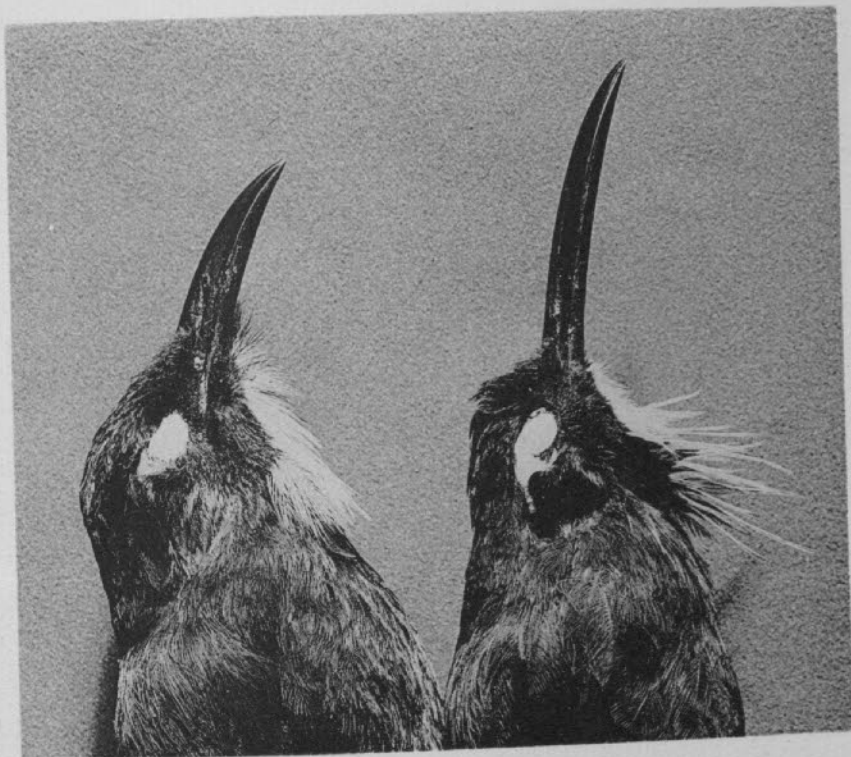


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1. *Zosterops novaeguineae*. Kup, 5000 feet. Abundant
2. Nest of *Toxorhamphus poliopterus*, with one nestling, July, 1952, Kup, 5000 feet



*Melidectes princeps* Mayr and Gilliard (right row, with long bill), compared with its nearest known relative, *Melidectes nouhuysi* Van Oort (left row, with short bill)