NOTES ON PHILIPPINE BIRDS

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THE following notes are based primarily on sporadic field work on Luzon, Philippine Islands, during the last four months of 1945, while the authors were in the U. S. Army. In nomenclature we follow the recent manual of Phillippine birds by Delacour and Mayr. We are indebted to Captain Harry Hoogstrahl for encouraging our work, and to Dr. C. G. Manuel and Mr. D. S. Rabor of the Bureau of Science, Manila, for much assistance. The few specimens taken are divided among the collections of the Chicago Natural History Museum, the American Museum of Natural History, and of Stanley G. Jewett, Sr. Species that were collected are marked with an asterisk.

Observations were made in the following types of country: (1) Open lowlands—rice fields, grass, bamboo thickets and brush of the central valley and adjacent areas. (2) Broken jungle. Areas of scattered or broken jungle were visited along the road leading through the Zambales Mountains to Subic Bay; at the edge of the Sierra Madre about twenty-five miles east of Manila and five miles north of the central arm of Laguna de Bay (at the end of Sightseers' Road built by the 38th Division) and on Mt. Arayat about thirty miles north of Manila. (3) Heavy jungle, entered only on Mt. Maquiling, about thirty miles southeast of Manila, but most of the records from there are from partially logged areas. (4) Pine forests. The pine forests about Baguio at an elevation of about one mile were visited briefly but no collecting was done.

Subspecific names are used only where we have personally identified our specimens. The senior author is responsible for the taxonomic comments on *Porzana tabuensis* and *Tyto capensis*. We have included only those of our observations which seem to make a definite contribution to knowledge, rather than listing all species observed or collected.

ARDEIDAE. Herons

Butorides striatus.—A pair flushed by Igorot children along a rocky, brush-bordered creek near Baguio protested noisily as they flew to the top of a pine tree. This is considerably above the 4,000 feet listed as the upper limit for this species by Delacour and Mayr (1946: 28).

ACCIPITRIDAE. Hawks

**Accipiter virgatus gularis*.—An immature female of this migrant, shot near Manila on December 5, weighed 140 grams (stomach empty). As usual in this genus the right and left ovaries were of equal size.

Spilornis cheela.—The Serpent Eagle seemed common in broken jungle in the Zambales and Sierre Madre mountains. It attracts attention by its call, a series of increasingly shorter, clear, far-ringing whistles. When soaring, the wings appear broad with jagged primaries, the tail rather narrow and long.

FALCONIDAE. Falcons

**Microhierax erythrogonys.*—An adult male shot on Mt. Maquiling on December 3 weighed 47 grams. The stomach was crammed with insects, principally or entirely Lepidoptera.

TURNICIDAE. Button Quails

? *Turnix suscitator.*—The smaller button quails are common in grassy fields in the lowlands, wherever it is not too wet. Several will be flushed during an hour's walk in such areas. Near Lake Taal, in an old soy bean field, we saw Filipinos hunting them with long, narrow hand nets shaped like lacrosse sticks.

COLUMBIDAE. Doves

**Streptopelia tranquebarica.*—An adult male shot November 18 weighed 104 grams. One individual had been eating rice. It occurs in flocks at this season.

**Geopelia striata.*—This species is usually seen in pairs or singly, but in favorable feeding places gathers in greater numbers. Two specimens had the crop crammed with green grass seeds. In the Hawaiian Islands this ground dove (introduced) has become as tame as the domestic pigeon, but this is not true in the Philippines.

PSITTACIDAE. Parrots

**Loriculus philippensis.*—This is the commonest parrot. We always encountered it singly or in pairs and never far from the forest. An adult male taken November 18 weighed 34 grams.

**Bulbopsittacus lunulatus.*—On October 14 a large flock of this species, numbering perhaps fifty or more individuals, was seen fairly swarming on hanging vines and low limbs of a large jungle tree in the rain forest of Mt. Maquiling. The birds were moving quietly along the vines and limbs until disturbed, when a few individuals detached themselves from the flock and flew rapidly away with much scolding. The remaining birds continued their apparent search for food until a shot caused the remaining flock to take flight. The individual collected had been feeding on a soft, pulpy fruit.

CUCULIDAE. Cuckoos

Phoenicophaeus cummingi.—A pair of this handsome cuckoo was observed in a slightly cleared area among the pines near Baguio on October 6. As the birds flitted from tree to tree, the bluish back and long, white-spotted tail suggested a magpie. It hops among the pine limbs with agility and if not molested will often perch quietly for considerable periods. Though rather tame, when approached too closely it utters a whining, very high-pitched *kweeu.* The next afternoon this pair was flushed into low pines in almost the same spot. They had been on the ground or very near it. We also examined a specimen shot in the lowlands near Subic.

TYTONIDAE. Barn and Grass Owls

**Tyto capensis amauronota.*—At dusk, on November 24, a male Grass Owl was shot as it flushed from dense grass growing in abandoned rice terraces on a gently sloping hillside. Here and there were scattered small bushes, chiefly lantana, and a few rods away was a brush-bordered creek. Other birds in the field with the owl were *Lanius schach, Megalurus palustris, Locustella certhiola, Cisticola juncidis, Turnix* sp., *Centropus ?viridis,* and *Circus* sp. This field was at the eastern outskirts of Manila, two or three hundred yards from busy route 54 and many military units. In general, this area is open, either in rice or waste grass, but with considerable bamboo or other brush.

This specimen had the tail frayed and soiled with excrement, suggesting nesting. A short search for a nest was unsuccessful. Upon being skinned, its testes were found to be much enlarged (18 x 6, 13 x 6 mm.), so another search was made for a nest on the 26th. Not till the 28th was the nest found. Then, just as it became dark, a sudden loud hissing revealed three young occupying a trampled pellet-strewn area beneath tall grass which concealed them from above. They differed greatly in size, with the smallest scarcely a third or quarter of the bulk of the largest. The largest was taken captive. As we left, the female sailed into the field with her left foot dangling with something in the talons. She circled in and dropped at or near the nest.

On November 29, in mid-afternoon, the female was on the nest and left at close range with awkward flapping, flew a short distance and dropped in the grass. The smallest of the two young remaining in the nest seemed very weak and had its eyes closed. The nest was next visited on December 5 when the female again flushed at close range. She flopped to a new position in the grass twenty feet away,

but then rose to approximately one hundred feet and circled briefly before disappearing over a rise. The smallest young had vanished without a trace. Probably it had been eaten by the other young or the female. There is stomach evidence of this type of nest cannibalism in *Tyto alba* (Hawbecker, 1945: 161). As we were scheduled to leave any day, the female was collected as she flushed from the nest on the afternoon of December 11. The remaining young in the nest was taken as a specimen. It was found to have had a broken wing that had healed so crookedly that flight would have been impossible. The oldest young, which had been kept in captivity until this time, was given to the Manila Bureau of Science. In addition to hissing, the young would snap the bill when badly frightened.

Seventeen pellets scattered about the nest area were collected on November 29, seven on Decmember 5, and nine on December 11. Some of these pellets were large and may have been cast by the adults. This is uncertain as the largest young on the first night in captivity cast a large oval pellet, 7 x 3 centimeters, as large as any collected later. Both adults had the stomach empty when taken. Mammals were the sole component of these thirty-four pellets. The abundant shrew, *Suncus luzoniensis,* had been taken freely, as half a dozen skulls were present. The captive young swallowed these shrews without hesitation, often two or three a day. The remainder and bulk of the pellet contents were the remains of Muridae, chiefly rats, but possibly a few mice. About our camp a third of a mile away, *Rattus calcis* and *Rattus rattus* subsp. were both abundant. *Rattus norvegicus* and *Mus musculus* also occur near by. Most of the skulls were of rats about one-half or two-thirds the size of a fully adult Norway rat.

Wolfe (1938: 211) wrote of this owl: " . . . since small mammals are so rare in the Philippines, its food runs chiefly to snakes, lizards, and frogs." The basis for this statement is not given. Our Mindoro specimen was taken by the junior author in a grassy area near the coast of that island. It was found dying while grasping a partially consumed poisoned rat.

This owl has always been poorly represented in collections and generally thought to be "rare and elusive" in nature. In the Philippines, Rabor (oral communication) considers it one of the two commonest owls. It may be more or less gregarious in the off season, as one from Panay, P. I. (A. M. N. H., no. 46154) taken in April was "shot from covey of eight or ten flushed from dry rice paddy." In India and China it seems to be common at least locally or seasonally. The tall grass frequented by this owl is difficult to penetrate. This may largely account for the small numbers usually taken.

McGregor (1909: 272) reports a nest with well-grown nestlings on February 15, and Wolfe (1938: 211) a nest with two eggs on December 18, both from Luzon.

Reasons for use of the above specific and subspecific names are given in the taxonomic notes.

MICROPODIDAE. Swifts

Chaetura (? gigantea dubia).—Only two or three specimens of the Giant Swift have been collected on Luzon, as far as we can determine. They were tentatively assigned by McGregor to *Chaetura dubia,* which he had described from two specimens taken on Mindoro. All this material was in the destroyed Manila collection.

On the afternoon of September 21 we saw a great flock of these swifts that fairly filled the sky and must have numbered several thousand, flying south along a ridge at about two thousand feet elevation in the eastern foothills of the Sierre Madre Mountains. The flight of this species is smooth and graceful, resembling that of a small, active falcon such as *Falco columbarius,* and without any of the jerkiness of small swifts. After a few minutes not a bird remained in sight.

ALCEDINIDAE. Kingfishers

**Halcyon smyrnensis.*—This species was usually seen about clumps of trees in fields. It has a high-pitched *chip,* more like a finch than a kingfisher, but also utters a noisy chuckle.

CORACIIDAE. Rollers

Eurystomus orientalis.—Delacour and Mayr (MS.) write of this species: "Lives in open country . . . Restricted to lowlands." We never saw it in the cultivated valleys, but found it upon reaching the lower patches of jungle at a considerable elevation in the foothills. Its flight is smooth and swooping, not "jerky."

CAPITONIDAE. Barbets

Megalaema haemacephala.—The tapping of its bill directed our attention to a barbet clinging to the lower side of a stub about forty feet up a jungle tree on Mt. Maquiling. It remained working more or less constantly for at least ten minutes and apparently was commencing a burrow, though perhaps feeding. This was on Nov. 22.

MOTACILLIDAE. Pipits

Anthus hodgsoni.—Pipits, presumably Oriental Tree Pipits, were found commonly in the pines at Baguio on November 26. Not only did they alight in the pines when disturbed, but they were frequently

found feeding there. At such times the species has the unusual habit of walking along the limbs, picking and probing for insects among the needles and cones.

HIRUNDINIDAE. Swallows

Hirundo striolata. — Unlike the Philippine Barn Swallow (*H. tahitica*), which is to be seen everywhere, even over Manila, the Striolated Swallow seems rather local. Numbers were flying along a grassy ridge overlooking Lake Taal and one bird was seen north of Manila in the valley. We also saw four or five about the pier at Corregidor, where they were associated with *tahitica*. Mr. Rabor informs us that *striolata* seems partial to small rocky islands.

CAMPEPHAGIDAE. Cuckoo-shrikes

**Coracina striata.*—A pair shot December 13 weighed: ♂, 99.5; ♀, 101.5 grams. In the stomach contents, a spider (Misumeridae) and beetles (weevils, cerambycids) were identifiable. Quite common and noisy in the jungle.

**Pericrocotus roseus divaricatus.*—This migrant is usually reported to be one of the less common or even rare minivets in the Philippines, but is said to occur in flocks. We saw large flocks frequently on Mt. Maquiling and one flock during a short visit to Mt. Arayat. It usually stays in the crowns of tall trees. In flight the flocks are compact; the flight note is reedy, lisping, and not loud. Though the tail is graduated, this is misleading as a field character. The tail feathers are held closely together and the tail from below appears very narrow and rather long. A female weighing 22.9 grams had eaten a mantid.

PYCNONOTIDAE. Bulbuls

**Pycnonotus goiavier.*—The Guava Bulbul fairly swarms in brushy areas in the lowlands, where it is the commonest bird. It also extends into brushy areas in the forest. We found lantana berries in its stomach. One was seen to make a short aërial sally after an insect. Near sunset, twenty or thirty could be seen each night at an old quarry, gathering in the tops of scattered bamboos preparatory to flying to roost. The common note is a rather mellow *quirt,* given at various tempos and inflections. The native name is *'culcul.'* A female weighed 27.2 grams (December 9, Mt. Arayat).

**Microscelis gularis.*—This is the commonest, or at least noisiest, bird in the jungle. It has a variety of harsh, rasping and cat-like notes, also some clear whistles, at times reminiscent of the Bluebird, *Sialia sialis.* It is more gregarious than *P. goiavier.* At times flocks

visit open areas in the foothills or valleys but avoid the vicinity of man. At such times we have seen them feeding on lantana berries on a road bank with *P. goiavier*. Weights: ♂, 35.2, 41.5, 43.0; ♀, 39.5; ♀ ?, 37 grams.

MUSCICAPIDAE

TURDINAE. Thrushes

**Saxicola caprata*.—The Pied Chat is rather common, usually in pairs, in open areas in the lowlands and foothills. It perches on rocks, low wires and similar places to watch for insects, then flies and picks them from the ground or vegetation. The slightly burred call note is not loud but is distinctive when learned.

SYLVIINAE. Warblers

**Phylloscopus borealis*.—This migrant is common in bushes in the lowlands as well as in the tops of jungle trees in the mountains. It flirts its wings like a kinglet (*Regulus*). Some species of these two genera are so much alike that it is difficult to find generic, much less family differences. The call is a high-pitched *chip*. Weights of three birds, sex unknown: 8.8, 9.0, 9.4 grams. One of these birds is buffy and rather short-billed, suggesting that it might be the Alaska Willow Warbler (*P. b. kennicotti*), but we lack good comparative material.

**Megalurus palustris*.—The Striated Canegrass Warbler is the most conspicuous warbler in the lowlands and extends in suitable areas well into the hills. It frequents grassy areas near hedgerows or scattered bushes, for it spends much of its time on conspicuous perches. It likes to perch on telephone wires, often with its tail hanging vertically like that of a jay or a great wren. The call note has been stated to be "sharp, clicking"; rather, it is a loud, vibrant chirp. The commonest song is a series of such chirps. Other more elaborate songs such as *wit-ta-weir,* repeated three times, are given, especially in the ecstatic flight songs. It frequently sings when flying slowly upwards at a sharp angle from a perch. Again, at the conclusion of a flight, it will burst into a flight song as it slowly parachutes down to a perch with its wings thrown at a high angle above the back. Although the species was in song throughout our period of observation, the gonads of a pair collected were but slightly enlarged, and no signs of nesting were seen. A female weighed 34.3 grams. The stomach of a male contained Orthoptera.

Megalurus timoriensis.—We eventually realized that certain call notes heard from the depths of tangles of bushes, vines and bamboo

and attributed to the preceding species, differed by being louder and sharper, almost metallic. After much effort we finally traced them to this species which, unlike its congener, is a great skulker. Unlike many such species, it often continues to call even when noisily followed through the brush. Whitehead found this species at considerable elevations, but contrary to some impressions, it is also common in suitable dense cover in the lowlands. We also noticed it on the hot lower slopes of Mt. Arayat in bamboo and bracken.

MUSCICAPINAE. Flycatchers

**Hypothymis azurea.*—Weight of a female, 10.0 grams. It had a species of Homoptera in its mouth.

**Terpsiphone rufus.*—Weight of a female, 21.9 grams.

**Rhipidura javanica.*—This flycatcher is commonly found in patches of dense brush along creeks or gullies in the cultivated valleys. The alarm note is a *tshack;* two birds pursuing each other through dense bambo also gave short, bright whistles. The click of its bill when catching insects is often audible for some distance.

Rhipidura cyaniceps.—This blue and rufous species is one of the most attractive birds about Baguio, especially against the usual background of pine boughs. Like others of the genus it is often seen with mixed flocks of birds (*Parus* sp., *Muscicapa panayensis, Zosterops* sp., and others).

PARIDAE. Chickadees

Parus elegans.—This is most noticeable bird in the pine forest about Baguio, but is also to be seen in jungle. A typical chickadee in most respects, this species lacks the curiosity or tameness of the American ones.

SITTIDAE. Nuthatches

Sitta frontalis.—Found both at Baguio and at lower elevations. One was seen to hang from the bottom of a branch by one foot while scratching itself with the other foot.

CERTHIIDAE. Creepers

**Rhabdornis mystacalis.*—We are able to add very little to the life history of this aberrant creeper. On December 3, a small bird was noticed occasionally coming into view about the base of an epiphytic fern three or four feet tall, growing in the crotch of a tree forty feet above the ground. After we waited about ten minutes, it hopped briefly into view and was shot. Another flew away, though until then we did not realize two were present. We saw no signs of creeping in the manner of *Certhia.* Our bird, a female weighing 29.8

grams, was collected just before dark on Mt. Maquiling. The stomach contained only four tiny seeds, narrow and about four millimeters long. These may have been taken accidentally, but Whitehead's observations (quoted by Delacour and Mayr, 1946: 220) suggest that this species may differ in diet from other creepers.

DICAEIDAE. Flower-peckers

Dicaeum ignipectus.—We saw a pair of this species on November 18 on a steep road bank, densely overgrown with brush, chiefly lantana. They stayed out of sight in the bushes but occasionally the male hopped to a conspicuous twig, four or five feet from the ground, and sang a bright little song. Though the bird could not be found after it was shot, it was first viewed with ten-power glasses, when the scarlet throat was, of course, very conspicuous.

Dicaeum papuense.—Two seen near the forestry school on Mt. Maquiling were hopping around very actively among the twigs, uttering a rather unpleasant *chip-chip.*

Zosteropidae. White-eyes

Zosterops sp.—Members of a large flock of white-eyes (probably *Z. nigrorum aureiloris*) were sucking nectar very avidly from small red flowers hanging in pendent racemes from an ornamental tree on an estate near Baguio.

STURNIDAE. Starlings

**Acridotheres cristatellus.*—The notes of this introduced mynah are not quite so harsh as those of *A. tristis* (as heard in Hawaii), and it has some mellow whistles more like those of *Sturnus vulgaris.* It is often seen on the backs of water buffalo and one bird seen by us seemed to be picking food (presumably ticks) from a buffalo's back. This is interesting in view of the great modification that has taken place in the African starlings of the genus *Buphagus* for similar feeding.

PLOCEIDAE. Weavers

**Lonchura punctulata.*—Weights: ♂, 10.8, 11.1; sex ?, 10.2, 11.0, 11.1. These birds, taken November 18, were in very worn plumage.

DICRURIDAE. Drongos

**Dicrurus balicassius.*—Common in the forest, especially about clearings. A female shot December 3 (gonad little if at all enlarged) was singing from a low perch in a brush pile. The song was rather discordant, consisting of loud whistles and gurgling and wheezing notes. The specimen weighed 69.4 grams. Its stomach was full of beetles, including some weevils.

ARTAMIDAE. Wood Swallows

**Artamus leucorhynchus*.—Weights: sex ?, very fat, 47, 48.5 grams. Common in clearings in the forest, in the grassy foothills among scattered trees and sometimes in the valley; seen also at Baguio. The one-syllabled call note is rather harsh.

LANIIDAE. Shrikes

**Lanius schach*.—Weights: ♀, 38.2, 39.5 grams. Rabor (1936: 340) found that this species sings throughout the year, though it nests in the spring. We would sometimes see one on a sunny perch, singing a squeaky song—a series of disconnected notes, often repeated two or three times. The song sometimes tapers off into scolding notes, or fades to a whisper song, only to be resumed again.

TAXONOMIC NOTES

1. The race of *Porzana tabuensis* occurring on Luzon

Porzana tabuensis tabuensis (Gmelin)

Rallus tabuensis Gmelin, Syst. Nat., 1 (pt. 2): 717, no. 20, 1789.—Tonga Tabu [Tonga Islands].

Porzana plumbea filipina Hachisuka, Birds Phil. Is., 1: 234, 1932.—Luzon, Philippine Islands.

In a recent review of this species by the senior author (1942, no. 1175: 10–11) no Philippine material was available, but it was suggested that Hachisuka's race is probably invalid. Through the courtesy of Mr. Boardman Conover we are now able to compare six Luzon specimens from his collection and two from that of the Chicago National History Museum. These specimens were purchased in the Manila or near-by markets in August and September. They are all badly worn, so the wing measurements as given below are a trifle short. As noted in the above review, the plumage of this species is especially subject to fading and foxing both in nature and subsequent to collection. The present birds are extreme examples of this, but so far as determinable bear out the lack of geographical variation in color in this species that is found elsewhere.

In size, the Philippine birds evidently average slightly smaller than topotypical material of *tabuensis,* but adequate series would undoubtedly show great overlap, judging from the measurements of specimens from elsewhere in Polynesia.

TABLE 1.—Measurements of *Porzana tabuensis tabuensis*

	Wing	*Tarsus*	*Culmen*
Luzon, P. I.	♂ 75+, 76 , 78 , 80?	24, 24, 25, 27	18, 18, 18, 18.5
	♀ 73+, 75+, 76?, 78?	23, 25, 26, 27	17, 17, 17, 18
Tonga Islands	♂ 79, 79	29.5, 30	18, 19
	♀ 78, 79	26 , 27	18, 18

This species varies somewhat in size geographically, yet, except for the birds of New Zealand and Australia which are perhaps enough larger to uphold a weakly characterized race, *plumbea,* the differences are too slight and randomly distributed to make it advisable to recognize any of the additional races that have been named from Fiji, New Caledonia, the Philippines and elsewhere. For detailed citations of these names as well as for additional measurements to be compared with those in Table 1, see Amadon (1942).

The only other race not examined in preparing the previous publication was *richardsoni* Rand (1940) from Lake Habbema, 3,225 meters, New Guinea. We have compared the typical series with other material and find that the color characters attributed to this population are, in our opinion, not geographical. *Richardsoni* does have a relatively short bill, but the difference is so slight it is a moot question whether the race should be recognized.

2. A REVISION OF THE INDO-AUSTRALIAN GRASS OWLS

The grass owls are distinguished from other species of *Tyto* chiefly by their habit of nesting on the ground in tall grass and by their relatively longer legs. Two species have been recognized, *T. capensis*[1] of Africa and *T. longimembris* of Asia and Australia. In size and proportions they are the same. *Capensis* has more dark pigment, evidenced by heavier markings below and by reduction of light areas in the primaries and central rectrices. Still, the differences are not greater than occur in many forms now considered to be subspecies. This owl occurs on several islands (Fiji, New Caledonia, Formosa, etc.) giving it a discontinuous distribution, so it seems unnecessary to keep *capensis* specifically separate on this basis. It seems probable that all the populations of grass owls are still so little differentiated that they would interbreed if opportunity presented. Accordingly,

[1] Austin Roberts (Ann. Transvaal. Mus., 18: 268, 1936) contends that *Strix capensis* A. Smith is antedated by *Bubo capensis* Daudin, Traité d'Orn., 2: 208, 1800). Daudin, who was merely naming various owls figured by Levaillant, listed *Bubo capensis* (spelled throughout with capitals) on a page in which *Strix* occurs as a more or less general heading at the top of the page. He never used the combination *Strix capensis.* Roberts seeks to infer that Daudin was using trinomials but there are other interpretations that are more plausible. Accordingly, we do not have the clear-cut evidence now required by the rules for changing an established name and may continue to use *Strix capensis* Smith as the oldest name for the grass owls.

they are here united under the oldest name, *capensis*. The African group is not included in the following revision of the species.

Stresemann (1939: 343) has mapped the range of this species and concludes that it reached Australia via the Philippines and Celebes. This is probable, but it occurs in southern Indo-China, so there seems still a possibility that it will be found somewhere in Malaya.

The wings of this species are subject to abrasion from the coarse grass it frequents. Collectors in trying to make a compact skin often bend its long wings quite sharply. After years of drying it becomes impossible to take the length of the straight wing. The Philippines are the only area from which we have enough material to understand the size variation. In the figures given for the various subspecies the individuals are arranged in the same order for each measurement, thus permitting all the data for each specimen to be correlated. We have taken the width of the two central and conspicuous tail bars (omitting those at the base and the tip of the tail which are often poorly developed) at a point half way between the shaft and the edge of the vane (where the bars are of average width) on the central pair of rectrices. The widths of these two tail bars for each specimen are given below, separated by a diagonal stroke; the width of the upper (proximal) bar is given first. For example, 7/9.5 means that the proximal one of these two tail bars measured 7 mm., and the distal one 9.5 mm. in the specimen in question. The chord of the culmen was measured from the cere, and the tail length was taken from the slightly longer outer feathers.

Several of the specimens are unsexed. They are placed with the sex that the size would seem to indicate, and the measurements are italicized to indicate this. In a few specimens the sex given on the label is probably wrong, but the material is too scanty and the size variation of too little subspecific importance in this species to make this serious.

The only revision of the Indo-Australian grass owls is that of Hartert (1929), which is tentative and cursory because of scarcity of material. He was unable to dispose of Philippine birds satisfactorily. Since then, little has been added except the description of two supposed new subspecies from southern China, whence Hartert had already described *chinensis*. At present it seems possible to separate the following races:

(a) **Tyto capensis amauronota** Cabanis

Strix amauronota Cabanis, Jour. f. Orn., 20: 316, 1872.—Philippines.

Diagnosis.—Very similar to *T. c. longimembris* of India, but differ-

ing as follows: tail bars, especially the two most conspicuous ones near the middle of the tail, wider and with hazy, less well-defined edges; subterminal and basal tail bars usually better developed; general size (especially that of the bill as expressed by chord of culmen) evidently somewhat greater; color of upper parts averaging slightly more grayish, less brownish than in *longimembris;* buffy areas on feathers of upper parts averaging slightly more yellowish, less tawny.

Measurements.—Wing: ♂, 345, *348,* 349; ♀, *360, 360+,* 366. Tail: ♂, 129, *131,* 128; ♀, *135, 137,* 139. Tarsus: ♂, 89, *87,* 83; ♀, *95, 91,* 94. Culmen: ♂, 25, *24,* 24; ♀, *25, 27,* 27.5. Width of tail bars: ♂, 7.5/9, *8.5/9,* 8.5/11; ♀, *9.5/9.5, 7/9.5,* 10/10. Weight: ♂, 360, —, —; ♀, —, —, 582 grams.

The male with wing 348 is from Panay, and that with wing 349, from Mindoro; the other four birds are from Luzon. Our pair of mated birds (wings, ♂, 345; ♀, 366) with weights 360 and 582 grams reveal a very significant sexual size difference which is interesting in view of the absence of such dimorphism in *Tyto alba.* The weight of the male is only 62% that of the female. In addition to the above six adults we examined nestlings.

Range.—Philippine Islands.

Remarks.—In this race the under parts are either clear white or white washed lightly with buff across the breast and on the flanks. The ventral black spots tend to be few and small, but some specimens are moderately spotted. The ground color of the central rectrices, viewed from above, is whitish or at most very slightly washed with yellow. In nestlings, the down is whitish and the feathers, as soon as they come in, seem to be like those of adults, as McGregor has already noted (1909: 272). The general coloration in this population is quite uniform. We have not seen any conspicuous variants or found reference to such in the literature. If Formosan birds should prove to be of the same race as those of the Philippines, the subspecific name *amauronota* will be replaced by *pithecops* (see below).

(b) **Tyto capensis longimembris** Jerdon

Strix longimembris Jerdon, Madras Jour. Lit. Sci., 10: 86, 1839.—Neilgherries, southern India.

? *Strix pithecops* Swinhoe, Ibis, 1866: 396.—Formosa.

Diagnosis.—Very similar to *amauronota,* but with the tail bars narrower and more sharply defined; for other slight differences, see diagnosis of *amauronota;* see also diagnosis of *walleri.*

Measurements.—Wing: ♂, *325+, 340,* 340; "♀" (?), 322+. Tail: —, *127,* 133; ♀, 116. Tarsus: ♂, *84, 83,* 93; ♀, 86. Culmen: ♂, *20.5, 22,* 21; ♀, 20.5. Width of tail bars: ♂, *4.5/4.5, 6/7,* 5.5/5.5; ♀, 5/5.

The four skins examined are all old, two of them trade skins, and none in good condition for measuring. Yet it would seem that this race is undoubtedly somewhat smaller than *amauronota,* especially in bill size.

The one Formosan bird available, a male, measures as follows: wing, 335+; tail, 122; tarsus, 90; culmen, 22; tail bars, 6.5/6.5. Thus, in measurements, it seems like *longimembris.* The tail bars are sharp and narrow as in the latter race. Hartert (1929: 104) said that this specimen is blackish above, but this is discoloration due to grease. According to Hartert, other Formosan specimens in the British Museum are like Indian birds. Sharpe (1875: 309) wrote of the one Formosan bird in the British Museum at that time: " . . . differs from Indian examples only in its rather large size, and in having five bands on the center tail-feathers; the greater series of under wing-coverts also are barred across with greyish brown." These differences are not borne out in the specimen examined and are further refuted (as individual variation) by Hartert's statement. Apparently *pithecops* must be listed as a synonym of *longimembris,* pending comparison of sufficient specimens. There is no record of rufous birds in Formosa. It may be asked how Formosan and Indian birds can be the same when the range of *chinensis* intervenes. The latter is no more than a rufous color phase, sufficiently localized to warrant recognition as a race but probably of less genetic import than many less noticeable differences. In width of tail bars and other important characteristics, *chinensis* is like *longimembris.*

The latter race, like *amauronota,* seems constant in color type. The only exception is a buffy bird like *chinensis,* from Raipur (Central Provinces), India, in the British Museum. Hartert questions the locality, but such buffy mutants can be expected to turn up occasionally here and there, since such coloration is widespread in various other Tytonidae as well as in this species.

Range.—Suitable areas in India (presumably intergrading with *chinensis* in eastern India or Burma); ? Formosa.

(c) **Tyto capensis chinensis** Hartert

Tyto longimembris chinensis Hartert, Nov. Zool., 35: 104, 1929.—Suey Kow [Shuikow, Fukien], China.

Tyto longimembris albifrons, Caldwell and Caldwell, South China Birds: 232, 1931.—Futsing, Fukien, China.

Tyto longimembris melli Yen, L'Oiseau et Rev. Franç. d'Orn., (n. s.) 3: 242, 1933.—Yaoschan [range, Kwangsi, China]. (Yen lists two birds collected by Mell in Kwangtung as "cotypes" [= para-

types]. This, together with the fact that the race was named after Mell, led Peters (1940: 85) to give the type locality as Kwangtung).

Diagnosis.—Like *longimembris* but entire plumage more or less suffused with tawny buff (see description of specimens below).

Measurements.—Wing: ♂, *335*+, 342, —. Tail: ♂, *125*, 123, 118. Tarsus: ♂, *81*, 84, 83; downy nestlings, 79, 90. Culmen: ♂, *20*, 21, 21.5. Tail bars: ♂, *4/5.5*, 8/8.5, 6.5/6.

The bird with wing 335 is the type of *chinensis*. That with wing 342 is from near Foochow, Fukien, taken in February (U. S. N. M.). The other adult is a January bird from northwestern Kwangtung (M. C. Z.). One of the downy nestlings was taken on the River Min, Fukien, in "October or November" (M. C. Z.), and the other in January at 4,500 feet near Dalat, southern Annam, Indo-China (U. S. N. M.). Presumably the nestling with tarsus 90 mm. (Dalat) is the only female in the above group. The tarsus attains its full length at a relatively early age. We are indebted to Dr. Herbert Friedmann for the loan of two specimens in the United States National Museum and to Mr. James C. Greenway, Jr., for the loan of two in the collection of the Museum of Comparative Zoölogy (Harvard). The type of *chinensis* is the only specimen of this race in the American Museum of Natural History.

Description of specimens.—The type of *chinensis* has the entire plumage suffused with tawny buff. On the facial disc the buff is of a brownish or smoky tinge, and confined to the top layer of feathers; those beneath are white. This specimen is without ventral spotting except a few barely perceptible dots. Dorsally the white spots are few and tinged with buff.

The other male from Fukien is slightly less buffy. Its belly is whitish; the buff of the upper parts is slightly paler and the white spots are not tinged with buff. This specimen is rather heavily spotted below. The male from Kwangtung is similar to the one just described but the buffy suffusion below is slightly paler and the spots both above and below are smaller, though just as numerous. In the downy nestling from the Min River, the tail and facial disc are strongly buffy showing that it was definitely of *chinensis* type. This specimen is described in detail by La Touche (1931–1934: 102). The nestling from Annam, which was larger, almost ready to fly, was also a buffy bird, quite heavily spotted above and below like the most spotted Fukien male. It is of interest that the down in *chinensis* is buffy like the adult plumage, while in the Luzon nestlings it is whitish. Thus the color of the down is a subspecific character though

if the races of Australia and New Guinea were included, intermediates might occur.

Literature on chinensis.—As *chinensis* is hardly more than a color phase, lighter birds would be expected to occur. Evidently they are rare. The race described by the Caldwells as *albifrons* is based on a light bird, but even so the central tail feathers are said to be rufous which would separate it from Philippine or Indian specimens. The type locality is only about sixty miles from that of *chinensis.* The Caldwells had only this one bird which they described because it did not precisely fit Jerdon's description of *longimembris.* They do not mention Hartert's race. Hartert stated that two other specimens from China (British Museum, Foochow, Fukien) are both rufous like the type of *chinensis.*

Mell (1922: 78) examined 25 birds in the winter in Fukien and found them all to be buffy. He believed these buffy birds (*chinensis*) to be migrants from the north to Fukien, but was probably mistaken. In the first place, the nestlings described above show that *chinensis* nests not merely south to Fukien but to southern Indo-China. There are no Chinese records of the species north of Fukien. The species apparently breeds in the winter when Mell thought it was migrating. In the Philippines, the species is known to flock at times and this might give an erroneous impression of migration.

Mell collected three birds in May, in Kwanktung, which had more or less white under parts; this was one of his reasons for believing *chinensis* to be a migrant. These birds, or two of them, Yen made "cotypes" [paratypes] of his race *melli;* the type is a bird collected by Yen in the Yaoschan of neighboring Kwangsi. It seems possible that *melli* is based on specimens of *T. alba* rather than *T. capensis. T. alba* is unkown from southern China, but probably occurs there since it is found in Tonkin, just across the border, and in northern Siam. One of Mell's birds was collected on the roof of a house, which suggests the barn owl rather than the grass owl. Unfortunately we are not told of the nest-site of a clutch of eggs taken with one of Mell's other Kwangtung birds. It is true that Rickett (1890: 57) reported catching a Chinese grass owl in a barn. Again, Mell gives the tarsal length of *melli* as 75 mm. and mentions that its tarsus is much shorter than in *longimembris.* Our measurements make it doubtful if the tarsus is ever less than 80 mm. in this subspecies; in *alba* it is about 75 mm. Rickett gave 3.00 inches (76.2 mm.) as the length of the tarsus in the specimen mentioned above, which was examined by Hartert. Some of the color characters of *melli*—

the white facial disc, buffy under parts and large size of the ventral spots—also suggest *T. alba.* Professor Stresemann has generously examined Mell's series in the Berlin Museum and writes that they are all *T. capensis.* It is uncertain, however, whether the two or three light birds collected by Mell in the summer and examined by Yen are with this series in the Berlin Museum.

Even if Yen's specimens do prove to be grass owls, the name *melli* will fall as a synonym of *chinensis,* as it was evidently based on individual variation in the degree of buffiness. Yen states that *melli* is definitely buffy below (" . . . les parties inférieures sont d'un fauve uniforme", p. 242) though not so buffy as *chinensis.* The occurrence of true *chinensis* as far away as southern Annam makes it very unlikely that any appreciable geographical variation occurs in this wide-ranging species within the portion of its range which lies in China.

Delacour and Jabouille (1940: 127) referred Indo-Chinese specimens to *longimembris,* but Mr. Delacour advises us that lack of comparative material made this decision tentative.

Range. — Southern China (Fukien, Kwangtung, Kwangsi), Indo-China, and probably parts of Siam and Burma though unrecorded from either. Presumably intergrading with *longimembris* to the westward.

(d) **Tyto capensis walleri** Diggles

Strix walleri Diggles, Orn. Austr., 1 (pt. 7): 14, 1866.—Brisbane, Queensland [Australia].

? *Strix oustaleti* Hartlaub, Proc. Zool. Soc. London: 295, 1879.—Viti Levu [Fiji].

Tyto longimembris georgiae Mathews, Austr. Av. Rec., 1: 75, 1912.—Victoria River, Northern Territory [Australia].

Diagnosis.—Dorsal white spots and ventral black spots averaging larger and more numerous than in the other (Asiatic) races. Plumage buffier than in *longimembris* or *amauronota;* the central rectrices, as viewed from above, obviously buffy. This separates it at a glance from any specimens seen from the Philippines or India. The Australian race is less buffy than *chinensis,* but some of the paler variants of the latter might be hard to separate on this basis alone. The upper parts in *walleri* are grayer, less brownish, than in *longimembris* or *chinensis.* In this respect *amauronota* is intermediate. On the other hand, as regards narrowness and definition of the tail bars, *walleri* is like *longimembris* and *chinensis.*

An old specimen from New Caledonia, long mounted, agrees with Australian specimens but seems small, perhaps the result of wear

(Amadon, 1942, no. 1176: 14). The species has not been taken on Fiji in many years, and the few specimens from there have never been critically compared. Judging from the characters of the New Caledonia specimen and the general trend of Hartlaub's description, it is best tentatively to consider *oustaleti* a synonym of *walleri*.

A specimen from Kalidupa, Tukang Besi Group, near Celebes, is typical of *walleri*. The species has once been taken from Celebes proper.

Measurements.—Wing: ♂, 325+; ♀, 310+, 332+, 332+, 337+. Tail: ♂, 114; ♀ 112, 121, 123, 120. Tarsus: ♂, 81; ♀, 80, 78, 84, 83; sex ?, 83. Culmen: ♂, 24; ♀, 21, 22, 24.5, 24; sex ?, 20. Width of tail bars: ♂, 4/5.5; ♀, 5/5, 5/7.5, 7/8, 5/7; sex ?, 7.5/7.

The female with wing 310+ is from New Caledonia; that with wing 337+, from Kalidupa. The others are from Australia. The specimens examined include the type of *georgiae* Mathews.

Range.—Celebes, Kalidupa, and perhaps other islands north of Australia; northern Australia; New Caledonia (subspecies ?), Fiji (subspecies ?).

(e) **Tyto capensis papuensis** Hartert

Tyto longimembris papuensis Hartert, Nov. Zool., 35: 103, 1929.—Owgarra, Angabunga River [near Hall Sound, southeastern New Guinea].

Diagnosis.—Dorsal white spotting reduced and modified to narrow streaks, like shaft-streaks. Back of a clearer gray than in any other race (nearest *amauronota*). Buffy and yellow basal areas of feathers on back reduced, especially in the neck region (in this respect approaching the African subspecies). Ventral spotting moderate. Amount of buff below and on tail more variable than in most races; two specimens are nearly white, the third (type of *papuensis*), strongly washed with buff. Apparently a large form, approaching *amauronota* in size. Tail bars rather indistinct and wide, as in *amauronota*.

Measurements.—Wing: ♂, 353+; ♀, 357+; sex ?, 345+. Tail: ♂, 124; ♀, 132; sex ?, 125. Tarsus: ♂, 83; ♀, 90; sex ?, 90. Culmen: ♂, 23; ♀, 24; sex ?, 23. Width of tail bars: ♂, 5/8.5; ♀, 7.5/10; sex ?, 5/8.

The female is the type of the race. The specimen marked "sex ?" is from the mountains east of Huon Gulf. Mayr (1941: 77) through an oversight listed the race as known only from the type locality.

Range.—(Eastern) New Guinea.

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