

SUNBIRDS AND SPIDER-HUNTERS

Family NECTARINIIDÆ

Vol. I., p. 297; Vol. II., p. 285.

THE sunbirds form a large and conspicuous family in the Malay Peninsula, where the brilliant, flashing colours of the males and the tame, confiding habits of a number of the species in the gardens of occupied houses and bungalows have made them well known to Europeans, often under the apt, though wrongly applied, name of "honeysuckers." Fancifully, they may be regarded as the Old World representatives of the New World humming-birds, but actually, in the scheme of classification, the two families are far removed from each other.

Structurally the family is strongly characterized. It can be divided into two groups. The spider-hunters are rather larger than the sunbirds and have dull plumage, the general tone of which is greenish olive, although often with bright yellow tufts on each side of the breast. The sexes are alike and there is no metallic colour anywhere in the plumage. The true sunbirds average smaller in size and in the males the plumage is often of surprising beauty and brilliance, the colours often being highly metallic in appearance. The females are duller and approximate to the spider-hunters in appearance.

Structurally the two groups are much alike. The bill is long and curved downwards and the edges of the mandibles, at the tips, are very finely serrated, although this last character is not obvious without a hand-lens. The feet are small, with slender tarsi. The fine rictal bristles are often difficult to pick out and the nostrils are covered with an operculum and not with bristles. The tongue is very long, and sometimes bifurcated so deeply that it appears to be double. Furthermore, the edges are curled up and overlap so completely that the tongue can be described as tubular. The wing is rather short and has ten primaries, of which the first is relatively small and rounded. The tail of twelve feathers varies in shape. Sometimes it is almost square but often it is graduated. In some of the more ornamental species the two central tail quills are much lengthened and project a long way beyond the others. The exquisite, purse-shaped nests are usually suspended from twigs, and the entrance hole is often protected by an eave. The eggs may be uniform in colour but more often they are lightly spotted.

The sunbirds are, as their name implies, essentially creatures of the sun, being found in the warmer regions of Africa, Asia and Australasia. Over four hundred species are known, of which eighteen species, including eleven sunbirds and seven spider-hunters, are found in the Malay Peninsula. Three of the sunbirds are represented locally by northern and southern forms, making

twenty-one forms in all for the Peninsula. Of the eighteen species only three cannot be observed in the lowlands, where a representative of the family can be met with in almost every type of country, from the mangroves and beaches facing the open sea to the city gardens, coconut and rubber plantations and the depths of the remote virgin forests of the interior.

Wherever they are found in Malaysia the members of this family are resident and not migratory.

KEY TO THE MALAYAN LOWLAND SUNBIRDS AND SPIDER-HUNTERS

- | | | | |
|---|---|--|--------------------|
| 1 | { | With bright metallic colours in the plumage | SUNBIRDS (males) |
| | | With no bright metallic colours: general tone of plumage olive-green to yellow | 2 |
| 2 | { | Bill only moderately long: not over 0.9 in. from gape | SUNBIRDS (females) |
| | | Bill very long: over 1.45 in. from the gape | SPIDER-HUNTERS |

SUNBIRDS (males)

- | | | | |
|---|---|---|---|
| 1 | { | Under parts with bright colours | 3 |
| | | Under parts entirely greenish | 2 |
| 2 | { | Under parts heavily streaked | <i>Anthreptes macularia macularia</i> ,
p. 390 |
| | | Under parts uniform: forehead, metallic blue | <i>Anthreptes simplex frontalis</i> , p. 390 |
| 3 | { | Throat, breast and back, bright red | 4 |
| | | Throat, breast and back, not all bright red | 5 |
| 4 | { | Tail partly red: belly, greyish white | <i>Æthopyga mystacalis temmincki</i> ,
p. 383 |
| | | No red in tail: belly, blackish grey | <i>Æthopyga siparaja</i> subsp., p. 383 |
| 5 | { | Breast and abdomen, dark red | <i>Leptocoma brasiliانا</i> , p. 385 |
| | | Breast and abdomen, black glossed with violet | <i>Chalcostetha calcostetha calcostetha</i> ,
p. 382 |
| 6 | { | Breast and abdomen, olive or yellow | 6 |
| | | Throat, deep blue-black | 7 |
| 7 | { | Throat, pinkish brown | 8 |
| | | Forehead, metallic black | <i>Leptocoma jugularis microleuca</i> ,
p. 385 |
| 8 | { | Forehead, olive-green | <i>Leptocoma f. flammaxillaris</i> , p. 388 |
| | | Breast and abdomen, deep yellow washed with olive | <i>Anthreptes malacensis malacensis</i> ,
p. 390 |
| | | Breast and abdomen, dull olive-green | <i>Anthreptes rhodolæma</i> , p. 391 |

SUNBIRDS (females)

1	{	Under parts, heavily streaked	<i>Anthreptes macularia macularia</i> ,
			p. 390
		Under parts, deep yellow	<i>Leptocoma jugularis microleuca</i> and <i>L. f. flammaxillaris</i> , pp. 385, 388
	{	Under parts, yellowish olive, greenish or grey	2
2	{	Tail tinged with red.	<i>Æthopyga mystacalis temmincki</i> ,
			p. 383
	{	Tail not tinged with red	3
3	{	Throat and upper breast, whitish grey; tail, black with white tips	<i>Chalcostetha calcostetha calcostetha</i> ,
			p. 382
	{	Throat and breast, olive; if throat is greyish olive the tail is not black.	4
4	{	Small birds: wing about 1.85 to 2.2 in.; tail blackish	5
		Larger birds: wing 2.25 in. or more; tail greenish	6
5	{	Tail about 1.4 in.; abdomen more greenish and less yellowish	<i>Æthopyga siparaja</i> subsp., p. 383
		Tail about 1.1 in.; abdomen much yellower	<i>Leptocoma brasiliana</i> , p. 385
6	{	Smaller: wing about 2.25 in.; throat and sides of head washed with grey	<i>Anthreptes simplex frontalis</i> , p. 390
		Larger: wing about 2.4 in.; throat and sides of head greenish	7
7	{	Under parts, yellowish olive	<i>Anthreptes malacensis malacensis</i> ,
			p. 390
	{	Under parts, darker greenish olive	<i>Anthreptes rhodolæma</i> , p. 391

SPIDER-HUNTERS

1	{	A conspicuous yellow patch on the cheeks	<i>Arachnothera chrysogenys astilpna</i> ,
			p. 397
		A broad, conspicuous yellow ring round the eye	<i>Arachnothera flavigaster</i> , p. 400
	{	Breast and abdomen, olive-grey	<i>Arachnothera affinis modesta</i> , p. 396
	{	Breast and abdomen, greenish yellow	2
2	{	Throat, grey	<i>Arachnothera longirostra longi-</i> <i>rostra</i> , p. 395
		Throat, olive	3
3	{	Smaller: wing about 3 in.; throat and breast immaculate	<i>Arachnothera crassirostris</i> , p. 399
		Larger: wing over 3 in.; throat and breast lightly streaked	<i>Arachnothera robusta robusta</i> ,
	{		p. 398

*Chalcostetha calcostetha calcostetha***Macklot's Sunbird**

Vol. I., p. 298, pl. 23 (male and female).

Male: plumage very dark, and except for a tuft of yellow feathers on each side of the breast appearing black at a short distance. Actually the plumage is highly metallic. Top of head, dark green; back, black; remaining upper parts, largely amethystine. Throat, coppery; breast, violet-purple.

Female: quite different and with no metallic colours in the plumage. Back, olive-green; tail, blackish, tipped with white; top of the head, dark grey; throat and breast, pale grey; abdomen, dull yellow.

There is an omission in Vol. II., p. 299, which neglects the following details:

Soft Parts.—Iris, brown; bill and feet, black. In young birds the bill is dark slaty brown and the feet are brown.

Dimensions.—Total length, 5.3 to 5.75 in.; tail, 2 to 2.5 in.; wing, 2.3 to 2.46 in.; bill from gape, 0.9 in.; tarsus, 0.6 in. Females are slightly smaller and have shorter tails: total length, about 4.75 in.; tail, 1.65 to 1.8 in.; wing, 2.1 to 2.25 in.

In the Malay Peninsula this dark sunbird is rarely seen out of the mangrove belt or coconut groves near the coast. It is very local in its distribution but where it occurs it is often extremely common. The red flowers of the "tumu" (*Bruguiera*), a tree of the mangrove association, are a certain attraction, and the birds will cross several hundreds of yards of sea to visit these trees on the coastal islets. Since the publication of Vol. I. of this work Mr A. T. Edgar has found the species breeding in Lower Peak. He writes: "I have found nests of this sunbird from January to June, none in the mangrove belt, but all in, or on the edge of, scrub, near the sea. The nests are often placed in singularly exposed positions, always on the outside of a bush or prickly stemless palm, between two and five feet from the ground. They are of the usual sunbird type, a roughly pear-shaped bag, hanging by its smaller end from a twig or palm frond. The total length of the nest is about five inches, its outside circumference at the widest part about seven inches. The entrance hole, which is in the top half of the outer side of the nest, is oval, and about one and a half inches vertically by one inch across. The depth of the egg-chamber is about one and a half inches, measured from the lower rim of the entrance hole, which is protected by a small eave. The bottom of the nest is fairly solid; the nest is somewhat loosely woven, very fine grass and fibrous material being used, and on the outside, bits of dry bark, and fragments of bamboo and palm leaves, some of which are allowed to hang down loosely. The materials used give the nests of this species a characteristic dingy brown, untidy appearance. Occasionally cobwebs are sparingly used to compact the outside nest wall, which may also be decorated with a little green moss.

"The clutch is two. Usually the ground-colour of the eggs is a pale sienna-brown, profusely overlaid with a slightly darker shade, the markings coalescing at the larger end into a zone of much darker and warmer colour. Some eggs,

however, are dingy grey, the ground-colour being much obscured by a profusion of tiny markings of dull brown, especially at the larger end. Such eggs seem to be smaller than those first described, mine averaging 0.6 by 0.45 against 0.63 by 0.45 in. Somewhat pointed ovals, they are highly glossy."

On Pulau Tioman the species nests in June (*Madoc and Ryves*).

Æthopyga mystacalis temmincki

Temminck's Scarlet Sunbird

Vol. II., p. 287, pl. 25 (*lower figures*).

Male: upper parts, and under parts from chin to breast, mainly bright carmine. Lower back with a large yellow patch; upper tail coverts, metallic violet; wing quills, olive-green. A horseshoe mark on the crown and a moustachial stripe, metallic violet. Abdomen, pale-grey.

Female: quite different. General plumage greenish olive, slightly grey on the flanks. Crown, dark grey. Wings and tail washed with bronze, and the tail tinged with scarlet.

Total length in males (including lengthened tail feathers), 5 in.; females run about an inch shorter; wing about 2 in.

This sunbird is usually common wherever it occurs, but it is extremely local in its distribution, which is, furthermore, very erratic altitudinally. Normally it is a bird of the hills and mountains, but as it also occurs in the lowlands of West Pahang, and at low altitudes in certain limited areas in the main range, I have included notice of the species in this volume.

Æthopyga siparaja siparaja

Raffles' Sunbird (Southern race)

Vol. I., p. 301; Vol. II., p. 289.

Male: crown, back, throat and breast, bright deep crimson. Forehead and tail, dark metallic violet. A yellow patch on the rump; wings, brownish; abdomen, dark grey.

Female: quite different and with no bright colours in the plumage. General tone, olive-green, darkest on the upper parts, brownest on the wings and yellowish on the under parts. Tail, dusky, the outer feathers with white tips.

Total length of male (including lengthened tail feathers), about 5 in.; wing, about 2 in. In females, tail about 1.4 in.

In the Malay Peninsula this sunbird is largely coastal in habitat, but it does occur elsewhere. It is one of the commoner Malayan sunbirds and is especially numerous in the neighbourhood of Singapore, where it frequents alike the forested hills, the city gardens and the mangrove swamps.

Æthopyga siparaja cara

Raffles' Sunbird (Northern race)

Æthopyga cara Hume, *Stray Feathers*, ii., 1875, p. 473 (south of Moulmein, Tenasserim).

Æthopyga seheriae, Eastern var. (*Æ. cara*), Gadow, *Cat. Birds, Brit. Mus.*, ix., 1884, p. 19.

Æthopyga cara, Oates, *Faun. Brit. Ind., Birds*, ii., 1890, p. 349.

Æthopyga siparaja cara, Robinson and Kloss, *Journ. Nat. Hist. Soc. Siam*, v., 1924, p. 373; Stuart Baker, *Faun. Brit. Ind., Birds* (2nd ed.), iii., 1926, p. 376; *Nid. Birds Ind. Emp.*, iii., 1934, p. 201.

Malay Names.—Burong sēpah raja; kēlichap merah.

Description.—Extremely like the southern form (*A. s. siparaja*) described in full in Vol. I., p. 301, but the gloss on the head and tail in the male, green, not violet.

Adult male.—Forehead and crown to about the level of the eyes, sides of the head, a long moustachial stripe, rump, upper tail coverts and tail, dark metallic green, the concealed parts of the tail, black without gloss. Remainder of head, nape, mantle and upper part of the back, deep crimson; chin, throat, breast and a thin stripe separating the dark moustachial stripe from the cheeks, slightly paler crimson. Lower back, black with a large yellowish-orange patch in the centre. Lesser wing coverts, crimson, remainder of wings, dull brown washed with olive. Axillaries and under wing coverts, whitish; abdomen, flanks and under tail coverts, blackish grey, darkest near the breast and faintly washed with olive on the flanks and often the tail coverts.

Adult female.—Quite different and without red or other bright colours in the plumage. Upper parts, dark olive-green, very faintly greyer on the top of the head. Tail feathers, olive at the base, then becoming almost black, slightly glossy at the tips, the outer feathers tipped with white. Wings, brownish olive, the feathers fringed with greenish olive. Under parts, dull olive, much paler than the back; axillaries and under wing coverts, white.

Immature.—Young birds of both sexes are at first like the adult female.

Soft Parts.—Iris, brown; bill, black, the lower mandible brownish, especially in females; feet, dark brown.

Dimensions.—*Male*: total length, 4.45 to 4.8 in.; tail, 1.7 in.; wing, 2.1 to 2.2 in.; tarsus, 0.6; bill from gape, 0.7 in. *Female*: slightly smaller in all dimensions; total length, about 4.1 in.; tail, 1.3 in.; wing, 1.9 in.

Range in the Malay Peninsula.—A northern form, replaced in the southern part of the Peninsula by the typical race, *A. s. siparaja*. It is common throughout the northern parts of Peninsular Siam and also occurs on all the small islands off the west coast, from Koh Yam Yai down to Pulau Mohea. Also on the islands in the Bandon Bight on the east coast of the Peninsula. True *cara* occurs as far south as Trang in the south of Peninsular Siam, but in that state birds intermediate between *cara* and *siparaja*, though nearer to *cara*, are also found. Similar intermediates are found in Perlis, on Terutau Island, the islands of the Butang group and on Pulau Mohea. Penang birds can be regarded as *siparaja*, but those from Langkawi Island are approaching *cara*. I have no specimens from Patani.

Extralimital Range.—On the western side of the Peninsula it appears to occur about as far north as Rangoon, but I cannot yet fix the limits of the range in Siam, whence another race, *A. s. seheriae*, has been recorded from the

north. Other races represent the species throughout the whole length of French Indo-China and in Yunnan. There are also Indian representatives.

Nidification.—No record from the Peninsula.

Habits.—This race is as common in suitable localities in the north of the Malay Peninsula as the southern race is in the environs of Singapore. On Terutau Island, Robinson found it common among the mangroves and in the scrubby open country on the edge of heavy jungle. Everywhere it seems to prefer the coasts, coastal islands and open country where there are flowering bushes.

Leptocoma brasiliانا

Van Hasselt's Sunbird

Vol. I., p. 300; Vol. II., p. 294.

Male: very dark and appearing black at a short distance. Top of head, dark metallic green; back, black; rump, mixed metallic green and purple; throat, metallic purplish amethystine; breast and upper abdomen, deep maroon.

Female: quite different and with no bright colours in the plumage. General colour, olive-green, darkest on the upper parts and slightly bronzed on the wings. Under parts, much yellower. Tail, blackish, the outer feathers with white tips. Very like the female of Raffles' sunbird, but the under parts more yellow and the tail noticeably shorter.

Total length, about 4 in.; wing, 1.9 in. In females, tail 1.1 in.

This sunbird is widely, but very locally, distributed along the coasts and on the coastal islands of the Peninsula, where it is partial to the mangrove belt. In inland districts it is much less common. I have found it very numerous, on occasions, at the top of Penang Hill. Occasionally it visits the gardens of houses in the centre of busy Singapore.

In Perak, Mr A. T. Edgar has found eggs in April and young birds in May. The nest is of the usual sunbird type, but with no "tail." Nests were from five to twenty feet from the ground, attached to branches. Two eggs from one nest measure 0.56 and 0.51 by 0.43 and 0.41 in. Mr Edgar describes them as brown with a zone of darker brown at the larger end. One egg has a single blackish mark on the cap. The shell is highly glossy.

In Negri Sembilan, Mr V. W. Ryves has found clutches of two eggs in February, March and April.

In Selangor, Mr G. C. Madoc has found eggs in May. The nest was attached to the tip of a palm frond and was five feet from the ground.

Leptocoma jugularis microleuca

The Malayan Yellow-breasted Sunbird

Cinnyris ornata microleuca Oberholser, *Proc. U.S. Nat. Mus.*, lv., 1919, p. 273 (Taya Island, off South-East Sumatra).

Cinnyris pectoralis (part), Gadow, *Cat. Birds, Brit. Mus.*, ix., 1884, p. 88.

Cyrtostomus pectoralis, O.-Grant, *Cat. Birds' Eggs, Brit. Mus.*, v., 1912, p. 28.

Malay Name.—Kělichap (generic).

Description.—A small species, olive-green above, bright yellow below; male with throat and upper breast shining blue-black.

Adult male.—Forehead and crown to a varying extent, but usually to about the level of the eyes, lores, front part of ear coverts, chin, throat and upper breast, metallic blue-black, bluest on the head and edges of the dark area, purplish elsewhere. Remaining under parts, bright yellow; a tuft of feathers on each side of the breast almost orange. Axillaries and under wing coverts, white, washed with yellow, and mixed with dark feathers on the edge of the wing. Remaining upper parts from crown to tail coverts, including scapulars, yellowish olive. Tail, black, all the feathers, except the centre one or two pairs, tipped with white increasingly to the outermost feather, which often has the outer web also largely white. Wings, blackish brown, the feathers, except the first and second primaries, fringed with olive.

Note.—Males have an eclipse dress, also known as the off-season, winter, or non-breeding plumage, which is little understood. In it, they are like the adult female, but have a blue-black, broad area down the chin and middle of the throat.

Adult female.—Lacks the blue-black on the head and throat, and the bright pectoral tufts. Under side, paler yellow. A faint, yellow superciliary fades to nearly white behind the eye.

Young males are at first like the adult female in plumage.

Note.—The upper parts fade very quickly, and birds in worn feather are often quite brown, or brownish grey, on the wings and crown.

Soft Parts.—Iris, brown; bill and feet, black.

Dimensions.—*Male*: total length, 4.3 to 4.5 in.; wing, 2.1 to 2.25 in.; tail, 1.4 to 1.5 in.; tarsus, 0.5 to 0.56 in.; bill from gape, 0.75 to 0.85 in. *Female*: slightly smaller; total length, 3.9 to 4.2 in.; wing, 1.9 to 2.1 in.; tail, 1.3 in.; tarsus, 0.5 in.; bill from gape, 0.7 to 0.75 in.

Range in the Malay Peninsula.—The lowlands of the southern part of the Peninsula south of about the latitude of Penang. Singapore and the numerous neighbouring islets. The islands of the Tioman group. The coastal islands in the Malacca Strait. Replaced in the north of the Peninsula by the bird next to be described.

Extralimital Range.—Sumatra and Borneo with the neighbouring small islands. The Natuna Islands. A form inhabiting the numerous islands of the Javan province is very closely allied. The typical form is Philippine. Closely allied forms occur in the Andamans, Nicobars, Hainan, Celebes and through the islands to North Australia. The form next to be described (*flammaxillaris*) is the north-western representative of the species.

Nidification.—The nest is roughly the shape of an elongated bottle or pear, and is suspended by its thin end to the end of a branch, sometimes many feet from the ground, or on the other hand perhaps placed in a low bush, where its conspicuous size and shape are at once responsible for its destruction.

Nests are also commonly attached to convenient places on the outside of occupied bungalows: telephone wires form a favourite base. For a detailed description of the nest I cannot improve on Mr A. T. Edgar's published account of a nest seen by him in Lower Perak. It was "in a low coconut-palm, near a Malay house. Nine feet from the ground, one of the leaves of an overhanging frond had been selected, and the midrib stripped bare of leaf for about eighteen inches of its length, six inches or more at the tip being left in its natural state. The nest and its extensions, above and below, were firmly bound to the midrib, with fibre, moss and a little cobweb, for the whole eighteen inches, giving the impression of a bunch of kampong [village] refuse caught by and dangling from the frond. The nest proper was an inverted pear, four inches from top to bottom, the entrance furnished with an eave. The whole inside of the nest, and the eave, were thickly lined with soft cotton down, and the flimsy transparent outer wall of fine fibres only served to hold the downy lining in shape. The top of the nest was continued as a narrow cone, for four inches above the eave, tapering to a point just where the stripping of leaf from midrib commenced; below the nest there was a long tail, quite ten inches long, made of slivers of decaying wood, pieces of dry coconut leaf, bits of bark and combings from the hair of some kampong lady. The whole structure from top to tail tip was decorated with wood refuse, blobs of down, strands of sewing-cotton, skeleton leaves, green moss, spider castings and fragments of other kampong rubbish."

In Singapore this sunbird breeds freely in the town gardens, the nest often being placed in a conspicuous position, and certain sites are occupied for several years in succession, although new nests are built each year. In Singapore, February is a favourite month for eggs, but I have seen many occupied nests during the first five months of the year. In Lower Perak the season extends at least from December to May. From Negri Sembilan Mr V. W. Ryves reports nests in January and April. In the west of Selangor Mr G. C. Madoc has found eggs from January to May.

The two eggs "are pale green or greenish white, blotched with dull brown and dull purplish grey, with some tiny specks, and, at the larger end, some short, very fine writing marks of very dark brown, almost black. Some eggs have the brown and grey markings fairly evenly distributed, others being more heavily marked at the larger end. Pointed ovals, without gloss, they measure about 0.6 by 0.43 inches" (*A. T. Edgar*).

Habits.—This is essentially a bird of the sea-coasts, small coastal islands and coastal plains of the mainland, and it is not commonly found in the far inland districts. It is more numerous in the southern parts of its range than in the north, but is inclined to be local in distribution and is rarely as common anywhere as is its northern representative (*L. f. flammixillaris*) in some places. It is particularly abundant in Singapore, where it is the common sunbird of the cultivated gardens, and on the small islands near Singapore. It breeds freely even within the environs of the busy city, and on account of its boldness is well known by sight to most residents. It will fly into the verandahs of occupied houses, hanging to the cords of the sunblinds, before

systematically searching for spiders by fluttering a few inches below the ceiling of the room. Like some other sunbirds it has the habit of perforating the base of canna-flowers.

*Leptocoma flammaxillaris flammaxillaris*¹

The Burmese Yellow-breasted Sunbird

Vol. II., p. 294.

Nectarinia flammaxillaris Blyth, *Journ. Asiat. Soc. Bengal*, xiv., 1845, pp. 557 and 979 (Tenasserim).

Cinnyris flammaxillaris, Gadow, *Cat. Birds, Brit. Mus.*, ix., 1884, p. 83.

Arachnechthra flammaxillaris, Oates, in Hume's *Nests and Eggs Ind. Birds* (2nd ed.), ii., 1890, p. 260; Oates, *Faun. Brit. Ind., Birds*, ii., 1890, p. 362.

Cyrtostomus flammaxillaris, O.-Grant, *Cat. Birds' Eggs, Brit. Mus.*, v., 1912, p. 26.

Cyrtostomus flammaxillaris flammaxillaris, Herbert, *Journ. Nat. Hist. Soc. Siam*, vi., 1923, p. 220.

Leptocoma flammaxillaris flammaxillaris, Robinson and Kloss, *Journ. Nat. Hist. Soc. Siam*, v., 1924, p. 377; Stuart Baker, *Faun. Brit. Ind., Birds* (2nd ed.), iii., 1926, p. 403; *Nid. Birds Ind. Emp.*, iii., 1934, p. 221.

Malay Names.—Kêlichap (generic); nok kin-plea lek (*Siamese*).

Description.—Very like the preceding subspecies, but the yellow paler in both sexes. Male without the metallic patch on the forehead. A chestnut band across the breast borders the blue-black zone.

Adult male.—Upper parts from forehead to upper tail coverts, olive in fresh plumage, rapidly fading to brownish grey as the plumage wears, but apparently never with the almost golden bloom seen in newly moulted examples of *L. jugularis microleuca*. Tail, black, all feathers except the centre one or two pairs tipped with white, the outermost feathers most so. Wings, blackish brown, the feathers fringed with olive. Chin to upper breast, glossy black with purple reflections, and separated from the pale yellow abdomen by a double narrow band across the breast, that nearest to the throat chestnut, or rich bright chocolate, the other dull black. A conspicuous tuft of feathers on each side of the breast is deep orange, sometimes almost fiery. The *eclipse* (or winter) plumage is like the plumage of the adult female, but there is a broad blue-black patch running down the middle of the chin and throat.

Adult female.—Without the characteristic markings of the male. Dull olive above, pale yellow below, tail black, tipped with white. A faint yellowish superciliary stripe. In very worn plumage, grey-brown above and almost cream-colour below.

Immature.—Young birds of both sexes are, at first, like the adult female.

¹ For the purpose of this book I continue to use the name already adopted by Robinson in Vol. II., but, nevertheless, regard *flammaxillaris* as only a northern subspecies of *Leptocoma jugularis* (i.e. *Leptocoma jugularis flammaxillaris*).

Soft Parts.—Iris, brown; bill, black; feet, black, sometimes with a greenish tinge; soles, greenish yellow.

Dimensions.—*Male*: total length, 4.25 to 4.5 in.; wing, 1.9 to 2.1 in.; tail, 1.3 to 1.45 in.; tarsus, 0.5 to 0.6 in.; bill from gape, 0.7 to 0.8 in. *Female*: slightly smaller; total length, 4 to 4.3 in.; wing, 1.8 to 2 in.; tail, 1.2 in.; tarsus, 0.46 to 0.55 in.; bill from gape, 0.65 to 0.75 in.

Range in the Malay Peninsula.—Peninsular Siam and its west coastal islands, including the Junk Zeylon group; the northern part of the Malay States down to about the latitude of Penang. The islands in the Bandon Bight. The islands of the Butang, Terutau and Langkawi groups. Penang Island. The Redang Islands off the coast of Trengganu, and no doubt the Perhentian Islands also, although there is no formal record from this latter group.

Note.—The division between *flammaxillaris* and *microleuca* is rather vague in the north of the Peninsula. Even as far south as Singapore males sometimes have a few chestnut or chocolate-coloured feathers bordering the blue-black breast, thus approaching the northern form in appearance. Sometimes males from the Malay States lack the blue-black forehead. In some cases this is obviously because they are sub-adult and the frontal band is the last of the adult feathers to be assumed; but this seems not always to be the case, and two birds collected in Pahang seem to be adult although they lack the frontal band. Another male from the coast of Selangor has the pectoral maroon band quite as strongly developed as in true *flammaxillaris*. On the other hand, odd males from Peninsular Siam have the forehead broadly metallic, or with a few metallic feathers, although in other respects resembling *flammaxillaris*. The two forms are clearly geographical representatives of one widely spread species which is unstable where its races meet.

Extralimital Range.—From Arakan across Burma and Siam to the southern part of French Indo-China. A closely allied form occurs in Hainan and Central Annam.

Nidification.—I know of no record from the Malayan area. In Central Siam, Mr E. G. Herbert found the species breeding commonly in fruit gardens. He states that the season is almost continuous, nests having been found in every month, but most plentifully from early February to the end of August. The nest seems much like that of *Leptocoma j. microleuca* described above. It is suspended by the tip from an outer branch of a tree, usually about ten to twenty feet from the ground.

The two eggs, which measure 0.62 by 0.44 in., are rather variable in colour. One type has a "yellowish or greenish-white ground-colour, which is clouded or thickly speckled about the large end with a purplish hue, often forming an irregular zone, and on this there are blurred spots of a dark purplish brown." At the other end of the series are eggs with "the whole surface closely freckled with yellowish or greenish brown, more dense at the large end, the greenish-white ground-colour being only discernible at the smaller end. There are generally a few scattered black specks or hair-lines to be seen on these eggs, though they are not always present" (*E. G. Herbert*).

Habits.—This sunbird is common in Peninsular Siam, especially on the coast and the coastal islands, where flowering shrubs are a sure attraction. In the southern parts of its range it seems to be entirely coastal in distribution. In Penang I have collected it near the summit of the hill at about 2700 ft. The habits seem essentially the same as those of *L. jugularis microleuca*.

Anthreptes macularia macularia

The Banded or Purple-naped Sunbird

Vol. I., p. 304, pl. 22 (*lower figures*); Vol. II., p. 292.

Adult: upper parts, bright, dark olive-green. Under parts, much paler olive, heavily and broadly streaked with blackish green. Tail, blackish, the outer feathers tipped with white. Males have a narrow collar on the hind neck and the whole of the lower back, rump, and upper tail coverts deep metallic blue.

Total length, about 5·6 in.; wing, 2·5 in.

Common and widely distributed in the lowlands, but rather less common in the north than in the south. Normally it is not found in gardens, in settlements, plantations, the mangroves, or thin swamp jungles. It prefers the old forest and has a submontane bias.

Mr V. W. Ryves has found the nest in Johore (three eggs on 27th March).

Anthreptes simplex frontalis

The Plain-coloured Sunbird

Vol. II., p. 293.

Adult: whole plumage olive-green, darker and very slightly bronzy on the upper parts, much paler on the under parts, and the throat often greyish. Males have a metallic greenish-blue patch on the forehead.

Total length, about 4·8 in.; wing, 2·4 in.

This sunbird is one of the less common members of the family in the Peninsula, although far from rare in certain restricted localities. In the south of the Peninsula it seems to be almost confined to the old, tall forest, especially in submontane districts, but in the north Robinson and Kloss found it attracted by shrubs flowering on the sandy plains of the coast of Peninsular Siam.

The nest and eggs have been described but there is no record from the Malay Peninsula.

Anthreptes malacensis malacensis

The Brown-throated Sunbird

Vol. I., p. 302, pl. 22 (male and female).

Male: upper parts very dark, black at a distance, but actually highly metallic, the head and back mixed greenish and amethystine, the rump and tail purple. A maroon patch on the inner wing coverts. Throat, pinkish brown, with a purple border at the sides. Remaining under parts, deep yellow tinged with olive.

Female: quite different and with no bright colours. Upper parts, olive-green; lower parts, much paler, almost greenish yellow.

Total length, about 5.5 in.; wing, 2.8 in.

This is certainly the commonest sunbird of the coastal plains of the Malay Peninsula, where it is almost invariably associated with coconut-palms.

Since the publication of Vol. I. of this work Mr A. T. Edgar, writing about Lower Perak, has recorded: "Curiously enough, I have never found a nest in the situation which Robinson gives as the most usual one, *viz.* hanging from the end of a leaf of a coconut or betel palm. A number of nests were in mango trees, between ten and fifteen feet from the ground; as many more in bushes, in scrub, from five to eight feet; one, twenty feet from the ground, in a rubber-tree; several, on the coast, in low *baru* trees (*Hibiscus tiliaceus*); and one in the mangroves, forty feet from the ground, in the top of a young *perepat* tree. This last seemed to me remarkable, both by reason of the height and situation, and because out of some twenty-five nests examined this season, it was the only one not placed in a site already infested by red ants. The nest is of the same pear-shaped type as that of *Chalcostetha*, but slightly less in depth and a little larger in circumference. The entrance hole is rather larger and has a much more pronounced eave. The walls are thin, but the inside is well lined with *lalang* [coarse grass] down. Some cobweb is used on the outside, and a few of the usual slivers of wood, bits of dry bark, and so on, ornament it. The nest has a much more tidy appearance than that of the last described [*Chalcostetha*]. Generally great care seems to be taken in making firm the lower rim of the entrance, on which the bird alights for a moment before entering the nest. In almost all nests this rim is tightly and strongly woven."

Local eggs measure about 0.7 by 0.49 in.

Anthreptes rhodolæma

Shelley's Sunbird

Vol. II., p. 294.

Anthreptes rhodolæma Shelley, *Monogr. Nectariniidæ*, 1878, p. 313, pl. 101 (Malacca); Robinson and Kloss, *Journ. Nat. Hist. Soc. Siam*, v., 1924, p. 381; Stuart Baker, *Faun. Brit. Ind., Birds* (2nd ed.), iii., 1926, p. 411.

Anthothreptes malaccensis (pt.), Gadow, *Cat. Birds, Brit. Mus.*, ix., 1884, p. 122.

Anthothreptes rhodolæma, Oates, *Faun. Brit. Ind., Birds*, ii., 1890, p. 367.

Malay Name.—Kêlichap (generic).

Description.—Both sexes so closely resemble the common brown-throated sunbird (*Anthreptes malaccensis*) that the species are probably indistinguishable in the field except at very close range. Comparing males, that of *rhodolæma* has the prevailing sheen of the crown and mantle green, not blue; the cheeks redder and less olive; the throat pinker and less brown; the under parts greener and less yellow; and, most important of all, much more red on the

wing coverts and scapulars. The female of *rhodolæma* is greener and less yellow than that of *malacensis*, especially on the under parts.

Adult male.—Top of head, nape, sides of neck and mantle, dark metallic green, with bluish reflections in certain lights. Back, rump and upper tail coverts, metallic bluish purple. Tail, blackish, the centre pair of feathers with shining fringes. Lesser upper wing coverts, metallic bluish purple; median and greater series, blackish brown with broad maroon fringes; scapulars, maroon. Primary coverts and wing quills, blackish brown, all except the outer two primaries edged with yellowish olive, the edge on the innermost secondaries sometimes faintly washed with maroon. Chin and throat, dull brownish pink, reddest at the sides; a long, thin, metallic blue, or violet, moustachial stripe separates the pink of the throat from the cheeks, which are dark olive strongly overlaid with dark red. Remaining under parts, yellowish olive. Under wing coverts, whitish, washed with olive. A bright yellow tuft of feathers on each side of the breast.

Adult female.—Upper parts, dull olive, the darker centres of the feathers producing a very slightly squamate appearance most noticeable on the crown. Wings, tail, and scapulars, dull blackish brown, the feathers edged with olive. Under parts, much paler, yellowish green. Under wing coverts and axillaries, whitish, washed slightly with green. In many birds, presumably old, the throat and sometimes even the breast and upper wing coverts are faintly tinged with orange or orange-red. Young males also pass through a stage in which their appearance is like this.

Immature.—Young birds of both sexes are, at first, like the adult female.

Soft Parts.—*Male*: iris, dark red; bill, usually brownish black, the upper mandible often nearly black, lower mandible always paler, sometimes pale brown; tarsus, brownish olive to olive; feet, yellower.

Dimensions.—*Male*: total length, 5.1 to 5.5 in.; wing, 2.65 to 2.75 in.; tail, 1.75 to 1.8 in.; tarsus, 0.6 to 0.7 in.; bill from gape, 0.75 to 0.8 in. *Female*: smaller; total length, about 4.9 in.; wing, 2.4 to 2.6 in.; tail, 1.55 to 1.65 in.; tarsus, 0.55 to 0.6 in.; bill from gape, 0.67 to 0.75 in.

Range in the Malay Peninsula.—The state of Trang, in Peninsular Siam. The Malay states of Perak, Selangor and Pahang.

Extralimital Range.—Sumatra and Borneo. The south of Tenasserim.

Nidification.—Unrecorded.

Habits.—This little-known sunbird is common at Chong in the interior of the state of Trang, in Peninsular Siam, but elsewhere in the Malay Peninsula it seems to be a rare bird and we have seen very few Malayan specimens. It occurs both near the coast and in the interior of Perak, and a few other specimens have been obtained at Ginting Bidei, in Selangor, and in the foothills of Gunong Tahan, on the Pahang-Kelantan border. Hartert recorded these last-mentioned birds as from an altitude of 2000–5000 ft., but it is more than doubtful if the skins actually came from as high an altitude as the latter figure. The species has also been recorded from Penang, but the record is based on a misidentification of a young male *Anthreptes malacensis*. The localities "Malacca" and "Singapore" given by Hume and Davison were

afterwards admitted by these authors to be based on trade skins, although there is no reason why the species should not occur in the former locality. It seems commoner wherever it occurs in Sumatra and Borneo than in the Malay States. Little is known of the habits, but it seems at least certain that it is a bird of the primary thick forest and not of the open spaces and coconut groves beloved of the very similar but much commoner *Anthreptes malacensis*. From Chong, Robinson and Kloss describe it as exceedingly abundant, feeding in large numbers on trees in flower in park-like country made by clearing the undergrowth and small trees from primary forest.

The Feeding Habits of Sunbirds and Spider-hunters

Most Europeans in Malaya know the birds of this family, some of the species of which are common and conspicuous in town gardens, as "honey-suckers," but although the name is, strictly speaking, a misnomer, and properly applied to birds of another family, the *Meliphagidæ* found in the Moluccas, Polynesia, Australia, etc., its local application is very apt, for honey-nectar and pollen form the greater part of the diet in some species and are largely eaten by the others. The long tubular tongue is well adapted to this method of feeding.

The honey-suckers *par excellence* are the tiny species of the genera *Leptocoma* and *Æthopyga*, and indeed it is my belief that the honey-nectar of flowers is the main food of these beautiful little birds. *Leptocoma brasiliiana* seems to feed mostly on nectar. Nevertheless, the birds of the above two genera will also eat, readily, spiders, small insects and tiny caterpillars. Spiders I should put as the second item on the menu, second only to nectar, and to obtain them the birds will hover in front of a web and, in the case of *Leptocoma jugularis*, will occasionally enter a bungalow and methodically search the cobwebs, etc., on the ceiling and in the corners of a room. Among insects, tiny flies and minute beetles are usually chosen. The birds usually seek their food on flowering bushes and garden flowers at no great height from the ground, preferring these to the inflorescences of higher trees. The sight of the scarlet or carmine males of the several species of *Æthopyga* flitting about a bed of bright red canna-flowers or a bush of red hibiscus is not one soon forgotten.

All these birds are very active when feeding, flitting from flower to flower like bees, even during the hottest hours of the tropical day, thrusting their long bills, and even their faces, which are sometimes smeared with pollen, into the flowers, and sucking up the nectar with their long tubular tongues, stretching out from precarious perches and performing amazing acrobatics in order to reach the opening of the flower. Repeated sips are often necessary to exhaust a flower. Very often the birds will seek the nectar by hovering in front of the flower, especially, of course, when no convenient perch is handy, but the hovering is not sustained for long, and although the wings are whirred rapidly, the hovering of sunbirds cannot be compared with the finished performance of the humming-birds. Insects are numerous in the vicinity of the nectar and are greedily snapped up, and tiny flies, etc., will also be caught inde-

pendently among the foliage of trees. I have never seen a sunbird on the ground. In the search for nectar, birds of both genera will puncture the base of flowers, and Robinson has contributed the interesting observation that a mountain species, Wray's sunbird, has acquired the habit of perforating the bases of the corollas of the introduced fuchsias and salvias in the gardens on the Larut Hills, Perak.

The pollination of flowers by birds is a common event. In America the humming-birds are the conspicuous agents in the process, and in Malaysia the sunbirds are much to the front. In a recent paper Dr L. van der Pijl, working in Java, points out that "bird-flowers" all over the world, adapted as they are to the same kind of visitor, have so much in common that American flowers can attract Asiatic birds. Nevertheless, there is much disharmony when the Old and New Worlds meet, for the American bird-flowers are arranged for the convenience of hovering birds, and the Malaysian flowers with regard to the needs of perching birds. This difference is said to exist even in the flowers of a genus. It will be remembered that, whereas the humming-birds hover before flowers when drinking, the sunbirds usually extract the nectar when in a hanging or sitting position. Dr van der Pijl considers that the curious flower of *Amherstia* can be understood only when it is regarded as constructed for birds that visit it hanging head downwards on the long stalk. The orientation of the anthers and the yellow spots on the upper petals seem meaningless otherwise. It must be noted that not all flower-birds in America are hoverers, but for the others that extract the nectar when on their feet, sterile branches between the flowers are said to form convenient perches. Certain American flowers imported into Malaysia are regularly punctured in the flower tube, or reached by other short cuts, without being pollinated by the relatively short-billed sunbirds, although the long-billed *Arachnothera longirostra* is said to visit the flowers of *Sanchezia* in a legitimate way. This lack of accord between introduced flowers and native birds, based on the position or structure of the flower, is an interesting study for further investigation.

The larger and heavier sunbirds of the genera *Chalcostetha* and *Anthreptes* are also nectar- and pollen-eaters, but the insects attracted to these sweet foods and also in other situations form a more important part of the diet than in *Leptocoma* and *Æthopyga*. The birds also show a preference for the inflorescences of higher trees, usually with a strong specific bias, the brown-throated sunbird for coconuts, and Macklot's sunbird for the flowers of trees of the mangrove association, especially the red, bell-like blossoms of *Bruguiera*. These larger sunbirds will also hover in front of flowers, but they hover less and perch more often than do the smaller species when feeding, a habit perhaps to be correlated with their heavier bodies and the slender support offered by most flowers. They are certainly less active than the smaller species but, nevertheless, still more sprightly than most other birds of their size. In the case of the heavier and more robustly built spider-hunters (*Arachnothera*), more specially directed observation is needed to determine their main food. Davison, a most accurate observer, maintained

that the diet consisted chiefly of nectar, but I feel a little doubtful about this, and have often watched birds when they were clearly foraging for living food, collecting insects, among the foliage, and spiders, the latter maybe by hovering in front of the web. Even the largest species will hover in front of a flower if this is a convenient way of getting at the opening. Robinson has described another characteristic method of feeding, the birds running up the midribs of large banana leaves in a creeper-like fashion, searching for insects, etc. Mr H. N. Ridley saw *Arachnothera a. modesta* pursue a large cricket. Writing of the same species, Robinson recorded: "Their food, in part at least, consists of vegetable matter, and they are particularly fond of the purple seeds of a shrubby plant probably belonging to the *Sterculiaceæ*." Dr E. Jacobson found a seed in the stomach of *Ethopyga s. siparaja*, but suggested that it might have come there accidentally. The part played by vegetable matter in the food of birds of this family is a suitable subject for detailed investigation.

Arachnothera longirostra longirostra

The Little Spider-hunter

Vol. I., p. 305; Vol. II., p. 295.

Adult: sexes alike. Upper parts, dark olive-green; the tail blackish, with the outer tail feathers tipped with white. Throat, greyish; breast, lemon-yellow; remaining under parts almost pure yellow. Males have a bright yellow tuft on each side of the breast.

Total length, about 6·2 in.; wing, 2·6 in.; bill from gape, about 1·6 in.

The commonest spider-hunter in most parts of the Malayan lowlands, but in a few localities perhaps yielding this position to the grey-breasted spider-hunter (*A. affinis modesta*). It is usually found in forest, especially where broad-leaved plants are growing in a small open space, or on the sides of a ravine, but it also enters gardens and other cultivated areas.

Mr A. T. Edgar sends the following note from Perak: "20th Oct. A nest with two young birds in jungle, six feet from the ground, attached to the under side of the leaf of a sapling. The leaf was twenty inches long and five and a half inches broad. The nest was six inches long, about three inches across and about two and a half inches deep, externally. The actual egg-chamber was two inches deep and two inches in diameter. The front wall of the nest was very strong and over an inch thick. The nest was made of soft, well-teased, fibrous material, with a bottom layer of dry leaves, and on the outside a number of skeleton leaves. The whole was attached to the leaf by stitches of cobweb and cotton, the leaf being pierced and the sewing material drawn through and knotted. Eighty-eight stitches were used altogether, and many other holes had been pierced but not sewn."

On 1st March Mr V. W. Ryves took a clutch of two eggs in Negri Sembilan.

In Selangor, Mr G. C. Madoc has seen a nest sewn to the under side of a wild banana leaf. He describes an egg taken at the end of December as pure white and glossless, with madder-brown spots almost entirely confined to a thick ring near the blunt end of the egg. Measurements, 0·71 by 0·49 in.

*Arachnothera affinis modesta***The Malayan Grey-breasted Spider-hunter**PLATE 24 (*upper figure*)

Vol. II., p. 297.

Anthreptes modesta Eyton, *Proc. Zool. Soc.*, 1839, p. 105 (Malacca).*Arachnothera affinis* (pt.), Gadow, *Cat. Birds, Brit. Mus.*, ix., 1884, p. 106.*Arachnothera modesta*, Oates, *Faun. Brit. Ind., Birds*, ii., 1890, p. 370.*Arachnothera affinis modesta*, Robinson and Kloss, *Journ. Nat. Hist. Soc. Siam*, v., 1924, p. 385; Stuart Baker, *Faun. Brit. Ind., Birds* (2nd ed.), iii., 1926, p. 418; *Nid. Birds Ind. Emp.*, iii., 1934, p. 234.**Malay Name.**—Uncertain; probably kēlichap jantong.**Description.**—Yellowish olive above, greyish green below; tail with white spots. Bill long and curved; culmen ridged.**Adult.**—Sexes alike. Upper parts, including wings and tail, bright olive. Dark centres to the feathers on forehead and crown produce a slightly scaly appearance. Hidden parts of wing and tail quills, blackish. Shafts of quills, black above, white beneath. Tail with an ill-defined, black, subterminal bar, the three outer pairs of feathers with square, white spots on the inner web near the tip. Under parts, greenish grey, with faint, short, blackish shaft marks on the throat and upper breast, and sometimes with faint indications of larger, dusky streaks on the remaining under parts. Edge of wing, yellow. Under wing coverts, mixed dull green and whitish. Under tail coverts with a few obsolete, dusky bars.**Immature.**—Very like the adult, but top of the head and under parts without dusky markings.**Soft Parts.**—Iris, brown; bill, brown, under mandible paler, upper mandible often nearly black; feet, fleshy, yellowish or very light brown.**Dimensions.**—Total length, 6.5 to 6.8 in.; wing, 3 to 3.4 in.; tail, 1.7 to 2 in.; tarsus, 0.7 in.; bill from gape, 1.45 to 1.6 in. Small birds are usually females.**Range in the Malay Peninsula.**—Throughout the whole length of the Peninsula, including Singapore Island. Stoliczka mentions having seen one in Penang.**Extralimital Range.**—North to Central Tenasserim and south to Sumatra and the greater part of Borneo. On the lowlands of the northern part of Borneo and in montane districts elsewhere in the island it is replaced by another subspecies, *A. a. everetti*. Recorded by Tirant from Cochin-China. The typical form is found in Java.**Nidification.**—The following published note by Mr H. N. Ridley refers to the Botanic Gardens in Singapore: "*A. modesta* haunts the large-leaved gingers, and *Heliconias* in the gardens, and I found a nest made of skeletons of leaves and fibres and bast, apparently from the lining of a squirrel's nest, and bark, between two leaves of these plants which had been pegged together by bits of stick, by some person." I suspect that the leaves were pegged together by the bird itself.

On 19th April Mr A. T. Edgar found a nest, in a Perak valley, covered with light jungle. The nest was four feet from the ground and attached to the under side of a large, firm leaf of a low-growing plant. The leaf measured sixteen inches long by six inches broad. From outside, the nest appeared as a layer of skeleton leaves eight inches long, five inches wide and two inches deep at the front end, sloping upwards to the leaf-stalk. These skeleton leaves were attached to each other, where they overlapped, by thin strands of cobweb, and sewn, by stronger strands, all round the edge of the leaf except on the entrance side. Altogether about one hundred and ten stitches were used. Between this layer of skeleton leaves and the roof of living leaf was the nest proper, a shallow cup, four and a half inches from front to back, made of soft inner bark, finely shredded. The entrance was very small, a space of about an inch between the rim of the nest and the growing leaf, and masked by the ends of the skeleton leaves. The eggs were long, glossless ovals; dull white and marked with very small spots of brown and reddish brown. Measurements, 0.73 and 0.72 by 0.5 in. The above information was supplied by Mr Edgar.

Habits.—With the exception of *A. longirostris* this is the commonest of the genus in the Malay Peninsula, where it is especially numerous in the south. It is a lowland bird, with a bias to submontane localities, and it is usually numerous on the hills up to about 3500 ft. Essentially a bird of the forests, it also enters the secondary growth, orchards and gardens, but forest clearings where coconuts have been planted, and above all, as in the case of other spider-hunters, damp gullies where there are wild bananas, gingers and other broad-leaved plants, are favourite haunts. It is usually seen alone or in pairs. The food consists largely of small insects and spiders, but seeds are also eaten. Ridley mentions having seen one bird pursue a very large cricket.

The bird figured in the plate is a female from Kuala Tahan, Pahang.

Arachnothera chrysogenys astilpna

The Yellow-eared Spider-hunter

Vol. I., p. 306; Vol. II., p. 296.

Adult: sexes alike. General colour of plumage, olive-green, darkest on the upper parts; abdomen and under tail coverts conspicuously yellower than the remainder of the plumage. Centre of abdomen almost pure yellow. A bright yellow ring round the eye and a patch of slightly lengthened, silky, yellow feathers on the cheeks, below the eye.

Total length, about 7 in.; wing, 3.4 in.; bill, about 1.7 in.

This spider-hunter is fairly common in the forests of the lowlands. I cannot improve on Robinson's apt description of the habits: "Its favourite situations are gullies and the banks of small streams, and places where huge trees have fallen down and permitted the growth of wild bananas, tall gingers and other broad-leaved plants, amongst which the spider-hunter finds its food, which is principally flies, spiders and small beetles. It is particularly

fond of hunting upon the pear-shaped inflorescences of bananas, which are always full of insects of various kinds, and is generally seen in pairs, often running up the midribs of the larger leaves, almost like a creeper or nuthatch."

Arachnothera robusta robusta

The Long-billed Spider-hunter

PLATE 24 (*lower figure*)

Arachnothera robusta Müller and Schlegel, *Verh. Nat. Gesch., Zool. (Aves)*, 1845, p. 68, pl. xi., fig. 1 (Sumatra); Gadow, *Cat. Birds, Brit. Mus.*, ix., 1884, p. 101; Robinson and Kloss, *Journ. Nat. Hist. Soc. Siam*, v., 1924, p. 382.

Malay Name.—Uncertain; probably kělíchap jantong.

Description.—Very dull green above, yellower below; throat and breast streaked; outer tail feathers tipped with white. Bill exceptionally long, curved; culmen feebly ridged.

Adult male.—Forehead to upper tail coverts, including scapulars, dark, dingy olive-green, the scapulars edged rather paler olive; forehead and crown and, to a lesser extent, the rump and upper tail coverts, squamate in appearance owing to darker centres to the feathers. Wings, blackish brown, the outer edge of all quills (except the two outermost primaries) and the exposed edges of the other wing feathers narrowly yellowish olive. Tail quills, dull black, narrowly fringed with olive, and the outer two or three pairs tipped whitish, most so on the outermost feather. Sides of head and neck like the back; chin to breast, yellowish green, streaked indistinctly with dusky; remaining under parts, dull yellow with a tinge of green. A tuft of bright orange-yellow feathers on each side of the breast. Under wing coverts, mixed blackish and white and washed with yellow.

Adult female.—Without the orange-yellow pectoral tufts. Otherwise like the male.

Immature.—Duller on the upper parts than adults; also paler below and without the streaks on the throat and breast.

Note.—Old skins and birds in worn plumage are not so green as others. The upper parts are tinged with brown, and the throat and breast are greyish.

Soft Parts.—Iris, brown; bill and feet, black, the feet sometimes tinged with green.

Dimensions.—Total length, 8.6 to 9.1 in.; wing, 3.1 to 3.6 in.; tail, 2.15 to 2.3 in.; tarsus, 0.7 in.; bill from gape, 2.15 to 2.55 in. Small birds are usually females.

Range in the Malay Peninsula.—From Trang, in Peninsular Siam, south to Malacca. Not recorded from any of the islands.

Extralimital Range.—Sumatra and Borneo.

Nidification.—There seems to be no record from the Malay Peninsula, but a Bornean nest of interwoven fibres, leaves, grass and bark has been described by Salvadori as approximately bottle-shaped, about thirteen inches

long, and attached to the under side of a sheltering leaf. The entrance to the nest cavity was by a passage opening at the junction of the leaf and nest. The nest was sewn to the leaf with silk-like fibres in a wonderful manner. Shelley describes the two eggs as "white, finely streaked with black, and with spots and blotches of that colour towards the obtuse end; length, 0.8 in. by 0.6 in."

Habits.—Specimens collected by Messrs Robinson and Kloss at Chong, in the state of Trang, Peninsular Siam, are the most northerly on record, and although in this locality the species is recorded as quite common, it is either the rarest, or most difficult to obtain, of the genus in the Malay States, from which specimens are known only from a few localities in South Perak (Kulu, Bidor, Teluk Anson); Selangor (Ulu Gombak; Ginting Bidei; Dusun Tua); Negri Sembilan (Bukit Lantai; Bukit Tangga); Pahang (foothills of Gunong Tahan) and Malacca. The only occasion on which I have met with the species in the Peninsula was at Christmas 1936, on Fraser's Hill, when it was not uncommon at about 4000 ft. on the heavily forested slopes below "Wray" bungalow, in close association with *A. magna*, from which it could be readily distinguished by its longer bill, less-streaked under parts and white-tipped tail. The birds were usually seen sitting in a very upright position at the tops of very tall trees, or darting over the valleys from tree-top to tree-top, their torpedo-shaped bodies outlined against the sky. They were particularly attracted by the long, bell-like flowers of *Macrosolen* (*Loranthaceæ*), a bushy scrub parasitic on high trees in submontane localities. The note of this spider-hunter sounds like *chit-chit, chit-chit*. This must be one of the very few birds occurring in the mountains of the Peninsula, and not mentioned by Robinson in his remarkably complete and accurate second volume of the present work.

The bird figured in the plate is a male from the Krau river, Western Pahang.

Arachnothera crassirostris

The Lesser Thick-billed Spider-hunter

Vol. II., p. 297.

Adult: upper parts, dark olive washed with brown; wing and tail quills almost blackish and edged with yellowish olive; the outer tail feathers with large whitish spots on the inner webs at the tips. Chin to breast, olive with a greyish bloom. Remaining under parts, greenish yellow, brightest on the under tail coverts. Males have a tuft of orange feathers on each side of the breast.

Total length, about 6.5 in.; wing, 3 in.

Although this species has been taken at various places in the lowlands of the Peninsula from north to south, it is a rare bird and very little is known of its habits. It seems to be attracted by wild bananas in thick forest. The nest and eggs are unknown.

*Arachnothera flavigaster***The Greater Yellow-eared Spider-hunter**

Anthreptes flavigaster Eyton, *Proc. Zool. Soc.*, 1839, p. 105 (Malacca).

Arachnothera flaviventris, Gadow, *Cat. Birds, Brit. Mus.*, ix., 1884, p. 109.

Arachnothera flavigaster, Robinson and Kloss, *Journ. Nat. Hist. Soc. Siam*, v., 1924, p. 386.

Malay Name.—Uncertain; probably kēlichap jantong.

Description.—A large spider-hunter with the general plumage olive-green; cheeks and a broad ring round the eyes, yellow. Bill, long and curved, the culmen rounded and not ridged.

Adult.—Sexes alike. Top of the head, hind neck, mantle, back and scapulars, olive-green, the crown often slightly spotted owing to dusky centres of the feathers showing through; rump rather purer green; lesser wing coverts like the back; other wing coverts, wing quills, tail quills and upper tail coverts, golden olive on the exposed portions, the hidden parts of the feathers dull smoky brown or blackish. Shafts of wing quills black above. Lores, dusky; a broad ring round the eye continuous with the ear coverts, greenish yellow; a short, indistinct, dusky green malar stripe. Under parts, olive-green, paler and yellower than the upper parts, becoming greenish yellow on the abdomen and almost golden on the under tail coverts.

Immature.—Very like the adult, but not quite so bright.

Note.—Newly moulted birds are much greener and brighter than those in old feather, which are duller and greyish on the mantle and under parts, and have the golden-olive edgings to the quills replaced by dull brownish green. In old skins the green is often less pronounced on the under surface and the yellowish abdomen shows up in greater contrast to the breast.

Soft Parts.—Iris, brown; bill, black or blackish brown; the under mandible sometimes fleshy brown; feet, yellowish brown or deep bright ochreous.

Dimensions.—*Male*: total length, 8.4 to 8.7 in.; wing, 4.2 to 4.3 in.; tail, 1.8 to 1.9 in.; tarsus, 0.9 in.; bill from gape, 1.7 to 1.85 in. *Female*: total length, 7.95 in.; wing, 3.8 to 4.2 in.; tail, 1.75 to 1.9 in.; tarsus, 0.9 in.; bill from gape, 1.7 to 1.75 in. The series examined from the Malay Peninsula is poor and contains few females: on it a sexual difference in size cannot be demonstrated conclusively, but in other parts of its range females of this species run decidedly smaller than males.

Range in the Malay Peninsula.—From Chong in Trang, and the island of Junk Zeylon, down both sides of the Peninsula in the lowlands to South Johore, and the islet of Pulau Ubin in the Johore Strait. No record from Singapore. No formal record from the eastern side of Peninsular Siam or from the states of Kelantan and Trengganu.

Extralimital Range.—Sumatra and Borneo. It was recorded from Cochin-China by Tirant, but later workers in French Indo-China have not met with the species.

Nidification.—The only note I have is of a bird shot off a nest, without

eggs, by Mr V. W. Ryves, in Negri Sembilan. The nest was placed in the cavity formed by sewing together three large leaves growing near the top of a rubber-tree.

Habits.—A fairly common species wherever it is found in the Peninsula. Robinson and Kloss record it as common along with other members of the genus in the park-like country at Chong in Peninsular Siam, and it is numerous in forest clearings in the south of Johore. On the tiny island of Pulau Ubin in the Johore Strait it frequents secondary jungle where there are tall flowering trees, at the tops of which it occurs in small parties. Hume and Davison note that whereas it perches on the inflorescence of the coconut, in the case of other flowers it often poises itself in front of the blossoms on rapidly fluttering wings. The species is, of course, a heavy one.

On the Winter, or Eclipse, Plumage in Sunbirds

It is a well-established, but in most territories a little-known and imperfectly understood fact, that the males of some sunbirds, although only a very small minority of the known species, in Africa, India, French Indo-China, Malaysia and, judging from a few specimens in my possession, from the archipelagos east of Malaysia also, have a post-nuptial moult, in which they assume a "winter," or off-season, dress, also known as the eclipse plumage, which is more like that of the adult female than their own resplendent breeding plumage.

This post-nuptial moult has been examined in a few species and has been determined as of the body feathers only; the complete moult takes place in the "spring," when the ornate full plumage is reassumed.

In the sunbirds occurring in the Malay Peninsula only the two forms of *Leptocoma jugularis* are known with certainty to be subject to such a marked seasonal change, but, as shown below, there is a small amount of evidence to suggest that the change takes place, at least sporadically, in other species. Another Malayan species of *Leptocoma*, Van Hasselt's sunbird, does not change, as the fine series of skins before me indicates. This is curious, but a parallel situation exists in Ceylon, where the males of *L. asiaticus* have an "eclipse" plumage and those of *L. zeylonica* have not.

Locally the subject is not easy to study in detail and the change is by no means so obvious as it appears to be in Sind, for instance. In the first place, males in winter plumage are always in a small minority in Malayan collections, and in my experience they are also not met with frequently in the field. Possible explanations of this are that birds in "eclipse" are more recessive and less bold in their habits than when in full breeding plumage, or that only a minority of males assume the "off" plumage. This latter suggestion deserves a very detailed investigation, which will, however, be difficult to carry out, as the breeding season of the species, if not of the individual, is so extended in the Malay States that full-plumaged males can be seen throughout the year. I find it difficult to believe that the more or less resident sunbirds in my Singapore garden at the southern extremity of the Malay Peninsula undergo a seasonal change of plumage. Blanford emphatically

denied that any Indian sunbird had distinct summer and winter plumages, and considered that young males found throughout their first year in an incomplete plumage explained the observed facts, but Indian ornithologists now accept the eclipse plumage as an established fact.

Turning to the only local species that is known definitely to change, *Leptocoma jugularis*, and dealing with the northern form (*L. f. flammavillaris*) first, I find that the collections before me from Peninsular Siam produce winter plumage, or birds changing from it back into full plumage, in April and May (rather later, June and July, farther north in Bangkok), and summer plumage from October to May. I cannot actually correlate these dates with a breeding season, as nests have been found in every month in Siam, and on the available information I cannot even distinguish a "peak."

Information with regard to the southern race (*L. j. microleuca*) is even less precise. Males certainly change into a winter plumage both on the main island masses of Malaysia and on the smaller islands and coastal islets, but at the moment I can do little but record that from the Peninsula I have seen eclipse males in December and full-plumaged birds in all months except June, October and November, and it should be noted that even these gaps may be due purely to the luck of collecting.

According to Hume and Davison, specimens killed in August, and several of those killed in September, are in eclipse or passing out of it; but almost all the specimens killed at the end of October were in full or nearly full breeding dress (*Singapore*). In the south of the Peninsula it seems to me that the bulk of this race breeds during the first five months of the year. There is, therefore, ample room for further research on the subject, and at the moment I should not care to even indicate the process and extent of the moult in Malayan birds.

Turning now to some purely circumstantial evidence provided by a few skins of the crimson sunbirds (*Ethopyga*), there is here a bare suggestion of an "off" season plumage. I have never seen this plumage complete, but have examined male specimens of *A. s. siparaja* and *A. m. temmincki* which are moulting from a worn, faded, olive plumage, certainly at least mostly like that of the adult female, into the bright red dress of the adult male. I am convinced that these birds are not young, as they are assuming the red plumage in a sequence not followed by changing immature birds. They have, for instance, no well-defined red area on the throat, whereas young males of *siparaja* show a rufous flush on the throat at a very early age and, in some cases at least, even when their first feathers open. Irregularities of moult have to be considered, and perhaps in the specimens mentioned above the assumption of the adult plumage has been retarded. Finally, I have seen males of *Anthreptes malacensis* moulting from a plumage like that of the female, but apparently not the first juvenile plumage, into the metallic dress normal in adult males.