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A REVISION OF THE RUDDY KINGFISHER, *HALCYON COROMANDA* (LATHAM)

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INTRODUCTION

The Ruddy Kingfisher, *Halcyon coromanda* (Latham), breeds from India and Japan southward to Sumatra, Java, and the Celebes, with northern populations at least partially wintering in more southern areas. The first reviser of the species was Oberholser (1915), who recognized the races *coromanda*, *major* (Temminck and Schlegel), *minor* (Temminck and Schlegel), and *rufa* Wallace, as well as describing as new *bangsi*, *ochrothorectis*, *neophora*, *pagana*, and *mizorhina*. Peters (1945) synonymized *neophora* and *pagana* with *minor* but otherwise accepted Oberholser's treatment, plus Neumann's (1939) new race, *pelingensis*. Mees (1970), in the latest review of the species, described as new the race *sulana* and accepted all the pre-1915 races, plus *bangsi* among more recently described forms. Mees' limited review was based entirely on material in the Leiden Museum, although this does include several of the types. Our revision is based on all the material we could find in the United States, plus the type series of *mizorhina* from the Royal Ontario Museum. Our series totaled 248 specimens, of which 137 were presumably from their breeding grounds.

As the result of our study, we accept as valid eight of the previously described races of this species, and we name two additional ones. The adults of all of these are illustrated in Figures 1 and 2, along with the immatures of two of the forms; ranges are shown in Map 1. As we will be referring to various of the subspecies by name and/or range before we discuss each in detail, the following list is presented in order to facilitate the reader's understanding of our discussion. We should add that we are generally following the *Times of London* (1967) for names and spellings of localities. Where we list specimens examined by us, we give usu-

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ally only the revised place names, but in quoting we give both the original and the revision. The races that we recognize and their general ranges are:

coromanda (Indian region and Burma; migrates south at least to Sumatra)

major (Japan, Korea, and China[?]; migrates south to Celebes)

bangsi (Ryukyu Islands; migrates south to Philippines and vicinity)

mizorhina (Andaman and Nicobar[?] Islands; resident)

minor (Sumatra, Borneo, Java, and Malaya; resident)

rufa (Celebes and vicinity; resident)

pelingensis (Peleng Island—east of Celebes; resident)

sulana (Sula Islands—east of Celebes; resident)

claudiae (Tawi Tawi Islands in Sulu Archipelago; resident)

linae (Palawan; resident)

Several other names have been applied to this species, including emendations and several synonyms. These are given in Oberholser (1915), but for completeness we list them here. Under the nominate race are *coromandelicus* Vigors, *lilacina* Swainson, *calipyga* (Hodgson), *coromandra* Gray, *coromandeliana* ("Scopoli") Gray, *coramander* Blyth, and *callipyga* Sharpe. Under *major*, Oberholser lists *schlegeli* Bonaparte. Except for these and those listed above, we know of no other names applied to *Halcyon coromanda*.

RANGE

Although the general distribution of this species is satisfactorily known, the breeding and migrational ranges are not well elucidated. The breeding distribution is especially poorly known, apparently because of the inconspicuousness of the species, its predilection for wooded areas, and, at least in some areas, its rarity. Eggs have been recorded from Japan and apparently the Ryukyu Islands (Austin and Kuroda, 1953:482), and Indian region (Ali and Ripley, 1970:88), and Labuan Island, Borneo (Smythies, 1960:303–304). The Labuan Island record, in May, is questioned by Smythies, as the nest was described as a pendulous structure also containing bees (possibly a hole in a wasp nest?). The Japanese breeding records are mainly from June and July, and the nests are in holes in trees. In the Indian region the dates of breeding are given mainly as March–April, with nests in burrows and sometimes holes in trees. In addition, we have seen nestlings from Assam, taken on 16 June; Borneo (no date); and Butung Island (southeast of Celebes), 16 July. Mees (1970) also reports a "juv." taken at Bangka Island (south-



Map 1: Distribution of *Halcyon coromanda*: hatched areas show breeding range, with local subspecies in light circles; migrants are in dark circles (C = *coromanda*, Mz = *mizorhina*, m = *minor*, R = *rufa*, P = *pelingensis*, S = *sulana*, Cl = *claudiae*, L = *linae*, B = *bangsi*, M = *major*). Arrows show directions of migration, while question marks (?) indicate that local status is unknown (there are summer records from southern Burma, but we have not seen the specimens to identify them to race).

east of Sumatra) on 11 July. Thus, actual proof of breeding comes only from the Indian region, Japan, Ryukyus, Sumatra region, Celebes region, and Borneo region.

From the preceding data, it appears that these kingfishers breed in both the temperate and the tropical parts of their range in the spring and summer. Additional evidence of this is that immatures first appear in the two areas about the same time, i.e., August and September. Conservatively, most birds taken in June and July should be on or near their breeding grounds. On this basis additional, probable breeding areas (based on specimens seen by us) would be Korea, Burma (northern part), Palawan, and the Siau and Peleng Islands near Celebes. Additional June–July specimens are listed by Oberholser (1915) from the Celebes proper, by Mees (1970) from the nearby Sula Islands and from Java, and by Sharpe (1892) from southern Burma, Malaya, and Manchuria (one specimen). La Touche (1931:82) also lists summer specimens from Shaweishan Island, at the mouth of the Yangtze River in China, but he specifically noted that these were migrants—an assessment that we cannot refute. Based on our studies of geographic variation, we are relatively certain that the species breeds in the southern Malay Peninsula, on the Andaman Islands, and in the southernmost Sulu Archipelago (Tawi Tawi Islands).

In sum, the breeding range of this species appears to be the northern Indian region, Burma, the Andaman Islands, the Malay Peninsula, Sumatra and vicinity, Borneo area, Java, Celebes and vicinity, the Tawi Tawi and Palawan Islands, the Ryukyus, Japan, and Korea. The species may also breed in Manchuria and eastern China, but less likely elsewhere (in such areas as Taiwan, the remainder of the Philippines, and Vietnam).

The Ruddy Kingfisher is apparently almost totally migratory in Japan, Korea, and the Ryukyus and at least partially so in the Indian region. This fact has been apparent to some workers, but not to others. For example, in his major revision of the species, Oberholser (1915) regarded all populations as resident—not just those of tropical areas. As a result, his descriptions of new races from the Philippines and from Sumatra included northern birds. Japanese-Ryukyu birds (two races) occur southward to the Celebes, and those from the Indian region (nominate race) occur south at least to Sumatra. Details of migration, as well as more specific information on other parts of the distribution of this species, are discussed under individual subspecies.

MOLTS

Although we did not make a detailed study of the molts of this species, we did make general observations on their extent and timing.

The youngest birds that we examined were nestlings in juvenal plumage; all three individuals (one each from Assam, Borneo, and Butung Island—the latter near Celebes) were already fully feathered. The juvenal plumage is distinguishable from that of adults by the dark barring on the underparts (and sometimes upperparts), and often by the lack of reduction of purple above, the different color of the rump, and other features. The plumage is worn for several months, and northern birds migrate southward in it. For example, we have seen such migrants (at least partially in juvenal plumage) as follows: *major* from the Ryukyus, China (Fukien), the Philippines (Luzon, Guimaras, Sibuyan), and Lembeh Island (near Celebes); *bangsi* from the Philippines (Luzon, Calayan, Siquijor); and *coromanda* from Thailand and Singapore.

The postjuvenal (first prebasic) molt involves most or all of the body plumage, but the wing—apparently including most of the coverts—and tail feathers are retained from the juvenal plumage. There may be average differences in color or texture in these flight feathers that would allow first-year birds to be separated from adults, but we could not verify this in our sample. The molt seems to begin first on the breast, then on the throat and on the hind crown to upper back, and finally on the abdomen and remainder of the upperparts. In *major*, specimens in full juvenal plumage or just beginning breast molt were prevalent in July–October (12 specimens), with a 30 September specimen also showing some new feathers on the crown and back. Single November and December (no specific dates given) specimens are in a similar plumage stage to the latter bird, whereas a 30 December specimen has largely assumed adult plumage—with juvenal barred feathers still present only on the throat, abdomen, and sides. Also generally similar to the last specimen are ones taken on 1 March, 18 April, and 23 May; one dated 9 May from Luzon (FMNH) is mainly in juvenal plumage. Possibly the last specimen is misdated, as its stage of molt is more appropriate for an autumn bird.

Bangsi shows a similar timing in this molt, with most August–October specimens (9) in full juvenal plumage or with new feathers only in the breast region. One October specimen (no specific date) is more advanced, with both the under- and upperparts showing new feathers, including on the rump. A 3 November specimen shows only slight feather replacement; single 24 December and 7 January birds are mainly in adult plumage—with juvenal feathers still evident only on the lower breast, throat, forecrown, lower back, and especially the abdomen.

Of the other races we have seen far fewer specimens, but it appears that the timing of the postjuvenal molt of some is advanced over that of *major* and *bangsi*. Single *coromanda* specimens taken on 1 and 22 October are largely in adult plumage, with juvenal feathers evident main-

ly on the abdomen; a *rufa* (Celebes) taken in September (no exact date given) is at a similar stage. An immature specimen of *minor* (Borneo region) taken on 19 May already shows some new feathers on the breast and hind crown, and an immature taken on 13 August is somewhat further along in replacement. On the other hand, an immature specimen of *claudiae* (Sulu Archipelago), taken on 1 December, shows a similar timing of molt to *major* and *bangsi*; it has new feathers appearing on the breast, throat, and upperparts.

Adult *H. coromanda* appear to undergo only one molt per year, that being a complete postnuptial (second, etc., prebasic) molt. In general, the replacement of flight feathers is well underway before the body plumage is molted. Replacement of the remiges begins with the innermost pair and progresses outward—a pair or two at a time. In the single case of tail replacement we have seen, the outer feathers are old and the inner ones are missing or in pin stage. In the tropical races *claudiae*, *rufa*, *pelingensis*, and *minor*, we detected body molt as early as the replacement of primaries 7 to 5 (counting from the *outside*), whereas in *major* and *bangsi* this did not begin at least until pair 4 was molted. Body molt was found to begin on the breast and the nape to rump regions (including the scapulars), closely followed by the crown, throat, and abdomen.

We saw no postnuptial molt in specimens of northern races (i.e., *coromanda*, *major*, *bangsi*) taken on their breeding grounds. At least the last two appear to migrate to the tropics before molting. Some specimens (2 of 12) of those two forms show wing molt in September, and more (9 of 24) in October, but body molt was detected only in specimens (4 of 5) taken in November–January. Of the other forms we had far fewer autumn–winter specimens, but where detected, body molt was generally earlier than in *major* and *bangsi*. For example, specimens of the Borneo–Sumatra race *minor* and the Celebes-area races *rufa* and *pelingensis* were in molt in August–September, with later-taken birds in fresh plumage. On the other hand, in two of three specimens of the Sulu Archipelago race *claudiae*, molt was not seen until September–October, while three Palawan birds (*linae*) were in worn plumage in September, as were four Sula Island birds (*sulana*) in October.

CHARACTERS USED IN ANALYSIS OF GEOGRAPHIC VARIATION

As in previous studies, our analysis of geographic variation in this species included both mensural and plumage characters. Some of these proved of little value in segregating populations at the subspecies level, and we endeavor to discuss them in this section rather than under individual taxa. Mensural characters include several involving the wing

(i.e., shape, formula, length of primary 3 versus 2, tip length, and overall length), as well as tail length, culmen size (length and width), and body weight. These will be discussed later and are summarized in Tables 1, 2, and 3. Because we found males and females to be quite similar in measurements, we have combined the values throughout the study. Immatures average smaller in linear measurements than adults and are treated separately in the subspecies accounts.

Plumage characters are almost entirely ones involving differences in hue of coloration, although the extent of the rump patch is also a useful feature. Basically, adults of *H. coromanda* are brown above and paler below, with the upperparts and breast overlaid to various degrees with purplish tones. The rump is marked by a paler patch of variable size, ranging in coloration from blue to white—depending on subspecies and age. Immatures resemble adults but are barred and often lack purple in the plumage, as mentioned under MOLTS; in addition, their rumps are typically bluer than those of the adults. As with measurements, we found that adults did not differ sexually in plumage, thus we have combined them in our comparisons and descriptions (see SUBSPECIES ACCOUNTS). Nongeographic variation in plumage includes that resulting from the time of year that the specimens were collected (seasonal variation) and the length of time the specimens have been in collections (postmortem variation). These aspects are discussed under NONGEOGRAPHIC VARIATION IN PLUMAGE.

MEASUREMENTS

Wing: Although many workers have used wing length in studies of this species, Mees (1970) appears to be the first to treat geographic differences in wing shape. He reported that in *major* primary 3 (counting from the outermost) was the longest, exceeding primary 2 by 2–4 mm. In *coromanda* he found that primary 3 equaled 4 and was about 4 mm longer than 2. In *minor* and *rufa* he found that primary 3 also equaled 4, but was 5–7 mm longer than primary 2. Finally, in *sulana*, he reported that primary 4 was the longest and that 3 was 6–10 mm longer than 2. We have extended his analysis of primary formula and comparison of primaries 3 to 2, and we have added another measurement, i.e., wingtip. The last is the (arc) distance between the tip of the longest primary and the tip of the *outermost* secondary.

Wing Formula: In 102 specimens of adults from the breeding grounds (Table 1), we found that wing formulas in most races varied to some degree, especially where samples were larger. Most variable were *minor* and *rufa*; *coromanda* was among the least variable (as were *sulana*, *pelingensis*, and *claudiae*—all represented by very small series). In general, the three migratory races (i.e., *coromanda*, *major*, and *bangsi*) had

primary 3 the longest, followed by 2 or 4, 4 or 2, and then 5. One *bangsi* had the formula $4>5>3>2$, which is exceptional and more like that of tropical populations. Overall, our findings agree with those of Mees (1970) in this character for *major*, but not for *coromanda*.

In the remaining (southern) races, primary 4 was generally longest, followed in most specimens by 3, 5, and either 2 or 6. An alternate type is where 5 precedes 3, while two specimens each of *minor* and *rufa* had the formula $3>4>5>2$. We did not find the condition $3=4$, which Mees (1970) claimed to be the formula of *minor* and *rufa*. On the other hand, our data do agree with his for *sulana*, which has primary 4 the longest (as is true of other southern races): In a broad sense, we find that specimens can be separated into two groups on the basis of wing formula: the migratory races with primary 3 longest and the resident races with primary 4 longest.

Length of Primary 3 Versus 2: The values for this are given in Table 2 as “ $P3>2$ by. . . .” Invariably we found that primary 3 exceeded 2 in length, by amounts ranging from 1.5 to 7.5 mm. The mean difference is smallest in *major* and *bangsi*; largest in *sulana*, *rufa*, and *pelingensis*; and intermediate in other races. Although the trend is clear, i.e., least difference in Japanese-Ryukyu birds and greatest in Celebes-area ones, a great deal of overlap exists—both between individuals and between races. Consequently, we do not regard this character as one of great taxonomic value nor as satisfactorily reflecting such features as roundness of wing.

Table 1: Wing Formulas of Adult *Halcyon coromanda* from Breeding Grounds

Wing formulas* and percent of specimens with each					
	Sample Size	$3>2>4>5$	$3>4>2>5$ $3=4>2>5†$	$3>4>5>2$ $3=4>5>2†$	$4>3>5>2$ $4>3>5>6†$ $4>5>3>2$ $4>5>3>6†$
<i>major</i>	16	62.5	37.5		
<i>bangsi</i>	22	9.1	86.4		4.5
<i>coromanda</i>	9	100.0			
<i>mizorhina</i>	1				100.0
<i>sulana</i>	4				100.0
<i>rufa</i>	9			22.2	66.7
<i>pelingensis</i>	5				100.0
<i>claudiae</i>	3				100.0
<i>linae</i>	13				84.6
<i>minor‡</i>	20			10.0	65.0

* Formulas are in the order of decreasing primary length, with the outer primary numbered as 1.
† Rarer than above formula.
‡ Borneo area, Sumatra, Mentawai Ids.

Wingtip (and Wing) Length: We used the wingtip measurement in our study in an attempt to evaluate the degree of roundness in the wings of different populations. While Mees (1970) raised the point about relative wing shape in races, his use of neither wing formulas nor measurements of primary 3 versus 2 really allows its assessment. In Table 2 one can see that measurements of wingtip (arc) are absolutely greater in longer-winged (arc) populations than in shorter-winged ones. Thus, *major* and *bangsi* are longest in wingtip and *linae* and *minor* smallest. Interesting is the fact that the three migratory races all average longer in wingtip than do resident races, even though several of the latter overlap

Table 2: Wing Measurements of Adult *Halcyon coromanda
from Breeding Grounds**

	Length (mm)			Wingtip (mm)			Wingtip	P3>2		
	$\bar{x}$	s.d.	range	$\bar{x}$	s.d.	range	Ratio† (%)	$\bar{x}$	s.d.	range
<i>major</i> (n=16)	121.8	2.6	117.0-126.0	32.6	1.2	30.5-35.0	26.8	2.8	0.9	1.5-5.0
<i>bangsi</i> (n=23)	120.4	2.6	115.5-125.5	30.6	1.6	27.5-34.0	25.4	3.8	1.1	2.0-6.5
<i>coromanda</i> (n=13)	112.9	2.9	108.0-118.0	28.0	3.3	21.0-31.0	24.8	4.4	1.0	3.0-6.5
<i>mizorhina</i> (n=1)	115.0	—	—	26.5	—	—	23.0	5.5	—	—
<i>sulana</i> (n=4)	119.4	1.7	117.0-121.0	26.6	2.5	24.5-30.0	22.3	6.2	0.2	6.0-6.5
<i>rufa</i> (n=13)	113.4	2.2	110.0-116.0	24.2	2.6	20.0-29.0	21.3	6.1	0.9	4.5-7.0
<i>pelingensis</i> (n=4)	110.4	1.4	108.5-112.0	23.0	1.6	21.5-25.0	20.8	6.5	1.2	5.0-7.5
<i>claudiae</i> (n=4)	107.2	2.1	105.0-109.5	20.0	1.8	18.0-22.0	18.7	4.5	0.6	4.0-5.0
<i>linae</i> (n=15)	102.2	2.3	97.0-106.0	19.9	1.8	17.0-23.0	19.5	5.1	0.7	4.0-6.0
<i>minor</i>										
Borneo (n=19)	99.9	2.4	94.5-103.0	20.2	1.7	17.5-23.5	20.2	4.9	1.1	3.5-7.5
Sumatra (n=4)	101.2	1.3	100.0-103.0	20.9	1.7	19.5-23.0	20.6	5.1	0.2	5.0-5.5
Mentawai Ids. (n=7)	105.4	2.7	100.5-108.0	21.4	2.4	18.5-24.5	20.3	5.2	1.2	3.5-6.5

* Sexes lumped.

† Mean wingtip length over mean wing length.

in mean wing length with *coromanda*. To assess this relationship, we calculated the ratio of mean wingtip to mean wing length in each population (Table 2). This showed that northern races had wingtips averaging 24.8 to 26.8 percent of wing length, while southern ones had them 18.7 to 22.3 percent (the one *mizorhina* was 23.0 percent). This indicates, as Mees (1970) suggested, that the wing is more pointed in migratory races. We should add that we have not computed means and variances for this ratio, as Corner Tests (Steel and Torrie, 1960) reveal that wingtip and wing length are not correlated. Thus one is not justified in using ratios other than for the very general purpose of pointing out trends. The lack of correlation means that measurements should be treated separately, which we do in this study. In that wing length is an easier measurement to make accurately than wingtip, we emphasize the former in our revision.

In conclusion, there is geographic variation in wing shape (and length) in *Halcyon coromanda*. Northern, migratory races tend to have primary 3 the longest, to have less difference in length between primaries 3 and 2, and to have more pointed wings. Southern resident races tend to have primary 4 the longest, to have a greater difference between 3 and 2, and to have more rounded wings.

Tail Length: Although tail length correlates with wing length *within* populations (in Corner Tests), from area to area it does not. For example, the longest-tailed birds are *sulana*, although these are the third longest-winged (Table 3). In spite of overlap, tail length is a useful measurement in segregating populations, particularly those with the longest and the shortest values.

Culmen: We measured both culmen length (from the anterior part of the nostril) and width (at base of the mandible, between the rami). Our figures (Table 3) do not reveal any major differences in means of either measurement, although there are several significant geographic trends. In length, the largest race is *mizorhina* (one specimen), followed by *sulana* and *claudiae*; all other races average shorter billed and in the same general range of values. In width, *sulana* has the largest bill, with *linae*, *minor*, and *coromanda* the smallest and the remaining races in between.

Based on our analysis, we find the bill measurements do not provide generally useful means of segregating populations of these kingfishers, although at least in culmen length some sorting is possible (e.g., larger-billed races). It should also be kept in mind that inherent difficulties exist in measuring culmen length; these include both the tendency for blunting and for overgrowth to occur in the bills of different individuals. Also, there may be a differential growth factor involved, in that full size in bill may not be obtained even after adult plumage is acquired; cer-

tainly immatures show smaller bill size for some months after they fledge. Examination of the bills of adults in different populations suggests that geographic differences do exist in this character, particularly in the degree of inflation. Although we are not able to quantify (and hence accurately convey) the extent of these differences, we would point them out by ranking races as follows (in order of increasing inflation): *major*, *bangsi*, *coromanda*, *mizorhina*, *minor*, *linae*, *claudiae*, *pelingensis*, *rufa*, and *sulana*.

Weight: Body weight would probably be the best index of size in this species, but unfortunately too few data are available for any meaningful comparisons. The only race for which we have more than one weight is *major*: two breeding ground adults weighed 93.5 and 100.0 g,

Table 3: Tail and Culmen Measurements of Adult *Halcyon coromanda from Breeding Grounds**

	Tail length			Culmen length (from nostril)			Mandible width (at base)		
	$\bar{x}$	s.d.	range	$\bar{x}$	s.d.	range	$\bar{x}$	s.d.	range
<i>major</i> n=16	67.9	1.8	65.0-71.0	45.2	1.8	42.0-47.9	16.9	0.6	16.1-18.0
<i>bangsi</i> n=23	72.9	2.0	68.5-76.5	44.8	1.9	41.0-47.6	16.8	0.6	15.7-17.6
<i>coromanda</i> n=13	62.3	2.0	60.5-67.5	46.3	1.9	43.8-48.8	16.5	0.7	15.0-17.5
<i>mizorhina</i> n=1	67.0	—	—	51.6	—	—	17.4	—	—
<i>sulana</i> n=4	82.4	2.0	79.5-84.0	49.7	1.0	48.9-50.8	18.2	0.9	16.9-18.9
<i>rufa</i> n=13	66.9	1.8	65.5-69.5	47.8	1.8	44.8-51.5	17.4	0.5	16.5-18.2
<i>pelingensis</i> n=4	66.0	—	64.5-67.5	46.3	2.4	42.8-48.5	17.2	0.7	16.7-18.1
<i>claudiae</i> n=4	64.5	0.8	63.5-65.5	49.0	—	47.8-50.2	17.3	0.7	16.5-18.1
<i>linae</i> n=15	59.5	1.6	56.5-61.5	45.1	1.0	43.3-47.3	16.3	0.5	15.3-16.8
<i>minor</i> Borneo n=19	58.2	1.2	55.5-60.0	45.9	1.2	41.3-49.2	16.5	2.1	14.8-17.7
Sumatra n=4	57.9	0.7	57.5-59.0	46.0	1.2	44.4-47.2	16.5	0.4	16.0-16.8
Mentawai Ids. n=7	60.1	2.8	57.5-63.5	45.7	1.4	43.8-47.5	16.5	0.5	15.9-17.2

* Sexes lumped.



Figure 1: Subspecies of *Halcyon coromanda* (part). Top (left to right) = *major*, *coromanda*. Middle = *sulana*, *bangsi*. Bottom = *bangsi* (immature), *mizorhina*.



Figure 2: Subspecies of *Halcyon coromanda* (part). Top (left to right) = *pelin-gensis*, *rufa*. Middle = *minor*, *claudiae* (immature). Bottom = *claudiae*, *linae*.

whereas six migrants averaged 99.6 ± 12.5 g (range 81.3 to 112.3 g). Other weights, all of adults on the breeding grounds, are *coromanda*, 70.0 g; *claudiae*, 98.0 g; and *linae*, 73.5 g. Obviously more data are needed, but from these it appears that linear measurements and body weight are not absolutely correlated in this species. At least, birds with shorter wings and tails overlap or approach in weight those with longer wings and tails.

NONGEOGRAPHIC VARIATION IN PLUMAGE

Seasonal Variation: With wear through the year, adults of *H. coromanda* show a progressive diminution of purple coloration and an increase in browns, as the feather edgings wear off to expose underlying coloration. Wear may be especially prominent on the head and abdomen—probably because of the plumage rubbing against the nest cavity in the breeding season. The plumage also tends to become paler with wear, and summer and early autumn specimens can be quite washed out in coloration. We have too few immatures to discern their seasonal color changes.

Postmortem Variation: Recently taken birds tend to be slightly darker and richer colored than older birds, *in series*. The differences within older or recent series are great, however, and some specimens within them may approach or equal those in the other in coloration. Thus one finds considerable individual variation in specimens, which in part offsets that reflecting length of time in collections. On the whole, well-cared-for specimens taken even as long ago as the late 1800s still show populational characteristics of more recent material.

SOFT-PART COLORATION

Color data recorded on labels suggest that the reddish bill and feet of adults are somewhat different in color, the latter being slightly duller. The bill color is given as various shades of orange-red, the feet similar but less reddish, and the nails as pale to blackish brown (same in young). The eyelid is given as red in *coromanda* and *minor*, this color presumably applying also in other races. Eye color is given as various shades of brown. Young birds appear to have blackish, dusky, or brownish bills and dull feet, these becoming like those of adults in autumn or winter. Foot color in juveniles and immatures was given as “fleshy purple” (*coromanda*), “pale brownish vermilion” (*rufa*), and blackish brown with orange posteriorly and on the toes (*bangsi*). The bill appears to change to orange beginning at the tip; the eyes are dark or gray-brown.

Colors of the bill, legs, and feet of adults fade after death, although this may require years. As a rule, the bills of specimens become dull yellow after 25 years, although some areas of orange—especially along

the culmen ridge—were detected in specimens taken as long ago as 1916. Birds taken in 1945-1949 showed mostly yellow bills, whereas those from 1960-1963 were mainly light orange, and those from 1969-1972 were dark reddish orange. Feet change more rapidly, and those of birds collected as recently as 1969 are dull yellow or only slightly orangish.

SUBSPECIES ACCOUNTS*

Halcyon coromanda coromanda (Latham, 1790)

[*Alcedo*] *coromanda* Latham, Index Ornith., Vol. 1, 1790:252 (not seen). "Coromandela" [India] (*contra* Oberholser, 1915:643; see Whistler and Kinnear, 1935:763, and Peters, 1945:194). Location of type specimen, if extant, not known.

Description: A rather pale race, with a moderately long wing and wingtip and rather short tail.

ADULT—Upperparts Chestnut† with rufous tone, paler on cheeks and overlaid with a light Phlox to dark Rose Purple on the back, nape, lower tail coverts, sides of neck, lesser wing coverts, and (in some birds) hind crown. Wings and tail more Chocolate Brown, with purple wash on the latter and on some secondaries and other wing feathers. Rump with a moderate-sized silvery white patch; some feathers (especially posteriorly) often tipped, barred, or washed with blue (Turquoise to Azure) or purplish. Underparts Raw Sienna to Tawny (darkest anteriorly), with throat often buff. Within the series there exists some variability in color, with the palest birds being from Sikkim.

IMMATURE—Color similar to adult, but darker brown above and with little or no purplish; below, barred faintly to moderately with dusky on the feather tips of the side of the throat, breast, and posterior abdomen. Rump patch tends to be smaller and with more blue or purplish. Measurements: one specimen = wing length 110.5, wingtip 28.0, culmen length 39.2, mandible width 15.2.

Specimens examined: Nepal 3; Sikkim 3; India—Assam 5, Darjeeling 2, Bengal 1, no other locality 1; Burma 3; Thailand 3; Malaya 2; Singapore 1; Sumatra 6.

Range: The breeding distribution includes Nepal, Sikkim, northern Burma (Myitkyina), and northeastern India in Darjeeling, Assam, and (according to Ali and Ripley [1970:88]) Nagaland, Manipur, and West Bengal, plus Bhutan and East Pakistan (= Bangladesh). In addition, Sharpe (1892:220) lists summer specimens from southern Burma (Amherst), but we have not seen them to be able to assign them to a race. Migrant *coromanda* occur south to Sumatra, including southern Burma,

* For measurements of adults, see Tables 2 and 3.

† Throughout the text, capitalized colors are from Ridgway, 1886.

Thailand, Malaya, and Singapore; they have also been reported on Berhala Island (east of Sumatra) by Mees (1970), once in Borneo (Smythies, 1960:304), and at Amoy, China (Oberholser, 1915). We have examined the Amoy specimen (USNM) and find it to be *H. c. major*; consequently, this would seem to remove the basis for statements reporting the occurrence of *coromanda* in southeastern China (e.g., Peters, 1945:194).

Reports of *H. coromanda* from southern Vietnam (Wildash, 1968:130) could possibly refer to the nominate form, although we know of no specimen records east of Thailand. It is also possible that the species breeds more widely in southeastern Asia than now believed, although definite evidence of such is unknown to us. Several specimens from the Malay Peninsula—albeit taken outside the expected spring-summer breeding season—show intergradation of a type that one would expect if the larger, paler *coromanda* were intergrading through a series of breeding populations with the smaller, darker *minor* to the south. The situation will be discussed under the latter race.

Although the inference of Ali and Ripley (1970:88) is that *H. c. coromanda* is resident in the breeding area, we have seen specimens taken there only in the period from 22 April to 10 July. Outside the breeding area, we have seen specimens typical of this race taken between 22 October (Singapore) and 24 April (Burma and Thailand). The only winter specimen from India that we have seen was one (ANSP) taken at the delta of the Ganges, Bengal, on 12 February, while a November specimen was reported from Madras, in the far south (Whistler and Kinnear, 1935). We do not doubt that some birds winter in their breeding areas, but others, perhaps many, migrate southward for that period.

***Halcyon coromanda major* (Temminck and Schlegel, 1842)**

Alcedo (Halcyon) coromanda major Temminck and Schlegel, in Siebold's Fauna Japonica, Aves, 1848:75, pl. 39. Japan. Holotype (not examined) in Rijksmuseum van Natuurlijke Historie, Leiden.

Entomothera coromanda ochrothorectis Oberholser, Proc. U.S. Nat. Mus., 48:652, 1915. Palanoc, Masbate Island, Philippine Islands. Holotype (No. 233,081—examined) in U.S. National Museum.

Description: ADULT—Typically paler than *coromanda*, especially on the underparts, with the longest wing and wingtip of the species and a moderately long tail; the rump patch is reduced to a stripe, often broken, with the color Pale Blue to darker, more greenish blue. Dorsally largely rufous, with the wash palest Lilac to Rose Purple—much paler than *coromanda*. Breast Tawny to Ochraceous, becoming paler, even buff, on the throat and posteriorly. In two July specimens from Korea (FMNH, KU) and an undated one from Japan (FMNH), the breast is darker (Tawny Ochraceous) and the throat and abdomen are slightly

darker than typical *major*. Dorsally these birds are also slightly darker. We regard these as variants of *major*, particularly as Korean breeding birds consist of both paler and darker types.

IMMATURE—Similar to adult but with sides of throat, breast, and upper abdomen squamate with dusky and usually lacking purplish above; underparts variable, ranging from buff to the rufous of adults; rump deeper blue. Measurements: two specimens = wing length 115.0–117.5, wingtip 31.0–32.5, $P3 > 2$ by 2.0–2.5, tail 63.5–65.5, culmen length 39.5, mandible width 15.5–17.1.

Specimens examined: Korea 6; Japan—Hokkaido 1, Honshu 14, no other locality 1; Ryukyu Islands—Okinawa 3, Iheya 1, Yayeyama 1; China 2; Taiwan 11; Philippines—Luzon 41, Masbate 1, Mindoro 1, Sibuyan 2, Cebu 1, Guimaras 1, Calayan 1, Mindanao 2; Celebes 1; Lembeh Id. 3.

Range: The breeding distribution includes at least southern Korea and central and northern Japan (Hokkaido, Honshu); breeding in central Manchuria has also been reported by some authors, including La Touche (1931:81–32), who also reported migrants on Shaweishan Island at the mouth of the Yangtze River in June. Although we know of no evidence of *H. coromanda* breeding in China, this is a likely possibility. The only definite Manchurian record that we know of is a 20 June specimen listed in the British Museum (Sharpe, 1892:220). Vaurie (1965:666) also reports occurrences of *H. c. major* elsewhere in Japan (Kyushu, Shikoku, Sado, Tsushima) and on Quelpart (= Cheju Do) Island, but the status of these birds is not known. Suggestions that the species breeds on Taiwan and in the main Philippine Islands (race "*ochrotho-rectis*") are of doubtful validity, as will be discussed later. Migrants of *major* occur southward to the Celebes, including on nearby Lembeh Island, in the main Philippine Archipelago (but not so far as known on Palawan or the Sulu Archipelago), on Taiwan, in the Ryukyus, and in eastern China. Vaurie (1965:666) also reports a straggler on Sakhalin Island.

Although Austin and Kuroda (1953:482) regarded the species as breeding southward only to central Honshu in Japan, we have seen three August–September specimens from the Kyoto area that suggest the presence of a breeding population there. These specimens are darker and have larger, whiter rump patches than any more northern Japanese birds that we have seen; in fact, they can be regarded as intergrades between *major* and the Ryukyu race, *bangsi*. While we do not suggest that this intergradation results from birds breeding throughout southern Japan, this is certainly a possibility. At any rate, the distinctive intergrades suggest that breeding occurs farther south than central Honshu.

Statements that *H. coromanda* breeds on Taiwan and in the main Philippine Archipelago were not substantiated by our study, and it ap-

pears that all of the birds occurring in these two areas are migrants of *major* (or of the Ryukyu race, *bangsi*). We have seen specimens of *major* taken in Taiwan from 21 April to 24 May, and in the Philippines from 30 September to 17 May. This fits well with the known occurrence of *major* on its breeding grounds, i.e., 16 May to October in Japan (Austin and Kuroda, 1953:482) and May to September in Korea (Gore and Won, 1971:285).

As previously indicated, Oberholser (1915) described the race *ochrothorectis* from the Philippines—on the erroneous assumption that *H. coromanda* was resident in the main part of the archipelago. Although his type series was actually a mixture of *major* and *bangsi*, the type itself is the darker variant of *major*—which we described earlier in this paper. This variant is more common in Korea (2 of 6 specimens) than in Japan (1 of 14 specimens from Hokkaido and northern Honshu), which may indicate the existence of an east-west cline of increasingly dark coloration in *major*. If there is a breeding population in China (including Manchuria), perhaps it is predominately dark. Whether it would be separable as a distinct race would have to be determined, but the name *ochrothorectis* would probably be applicable. It is also conceivable that the darker form would breed in Taiwan, where it predominates over paler specimens of *major* (7 of 10 specimens); however, as already stated, no evidence of breeding seems to have been reported from the island. At any rate, "*ochrothorectis*" is neither a resident nor a breeder in the Philippines, and at present we synonymize it as the dark variant of *major*. Of the 50 specimens of *major* that we examined from the Philippines, about one third are the darker type.

***Halcyon coromanda bangsi* (Oberholser, 1915)**

Entomothera coromanda bangsi Oberholser, Proc. U.S. Nat. Mus., 48:654, 1915. Ishigaki, Yayeyama Group, Rio Kiu [= Ryukyu] Islands, Japan. Holotype (No. 49,990—examined) in U.S. National Museum.

Description: ADULT—Much darker than either *coromanda* or *major*, with more extensive purplish above than in those races and, unlike them, often with that color on the breast; slightly shorter in wing but longer in tail than *major* and much longer in wing and tail than *coromanda*. The rump patch is large and mainly white, versus small (and broken) and largely bluish in *major* and smaller and with more blue in *coromanda*. Dorsally, light to dark Rose Purple, this overlaying dark rufous-brown; the purplish extensive, extending well onto the crown and the sides of the face. The underparts are dark Tawny Ochraceous or Raw Sienna, with a tendency toward paler posterior underparts in some birds and especially anteriorly in most, with the chin buff; in many birds there is a pale Rose Purple wash over the breast.

IMMATURE—Similar to adult, but generally lacking purplish, and with the sides of throat, breast, and upper abdomen barred with dusky; rump patch resembles that of adults, but somewhat more bluish (less white). Separated from *major* and *coromanda* by darker coloration and larger, whiter rump patch; also larger than *coromanda*. Measurements: six specimens = wing length 119.5 ± 2.0 , 117.0–122.0; wingtip 30.1 ± 1.7 , 28.5–33.0; $P3 > 2$ by 3.2 ± 4.0 , 1.5–4.0; tail 68.4 ± 4.2 , 63.0–74.0; culmen length 42.9 ± 2.2 , 41.2–45.8; mandible width 16.4 ± 0.3 , 16.0–16.7.

Specimens examined: Ryukyu Islands—Amami O 4, Okino Erabu 1, Okinawa 7, Kerama 1, Yayeyama 1, Ishigaki 9, Iriomote 5, Yanakuni 1; Philippine Islands—Luzon 15, Calayan 1, Siquijor 6, Mindano 1; Talaud Islands—Salebabu 1.

Range: The breeding distribution is along the length of the Ryukyu Islands, where we have specimen records from eight of the islands; also reported on Tokuno, Miyako, and Yonaguni Islands (Vaurie, 1965:667). Migrants occur southward to the Philippines (not recorded on Palawan or in the Sulu Archipelago) and nearby Talaud Island. Vaurie (op. cit.) also reports an April specimen from Taiwan, but we have seen none from there and suspect that it was "*ochrothorectis*"—as we have seen the specimens that he examined. We have specimen records from the Ryukyus from 5 April to 13 September, with one specimen (USNM) from Yayeyama dated 2 February. From the worn state of the plumage of the latter, we suspect that the specimen is misdated—probably having been taken in the summer. In the Philippines, *bangsi* specimens have been taken between 26 September and 20 April, and the one (AMNH) from the Talaud Islands was collected on an unspecified date in May.

Halcyon coromanda minor (Temminck and Schlegel)

Alcedo (*Halcyon*) *coromanda minor* Temminck and Schlegel, in Siebold's Fauna Japonica, Aves, 1842:76. Borneo and Sumatra, restricted to Pontianak, Borneo, by Oberholser, 1915:649. Lectotype (not examined) in Rijksmuseum van Natuurlijke Historie, Leiden.

Entomothera coromanda neophora Oberholser, Proc. U.S. Nat. Mus., 48:646, 1915. Tapanuli Bay, northwestern Sumatra. Holotype (No. 179,191—examined) in U.S. National Museum.

Entomothera coromanda pagana Oberholser, Proc. U.S. Nat. Mus., 48:648, 1915. North Pagi [= Pagai] Island, western Sumatra. Holotype (No. 179,762—examined) in U.S. National Museum.

Description: **ADULT**—Borneo-area birds are much darker than *coromanda* and *major* and are somewhat darker than *bangsi*; from all of these, *minor* differs in being much shorter in wing and, from *major* and *bangsi*, tail (slightly shorter than *coromanda*). Above, Borneo-area *minor* are dark brown, near Russet, heavily washed with Wine Purple to Phlox; the purples are extensive, including not only the back but also the fore-

head, sides of the head, and much of the wings. Below, Ochraceous to light Tawny, with a distinct Rose Purple to light Magenta breast band in most specimens. The rump patch is large and white.

Singapore *minor* (2 specimens) are quite similar to those from the Borneo area in color and size, but two of three presumed breeding birds from Sumatra ("*neophora*") are paler; also, the three average slightly larger in wing measurements. As there is overlap in these features between Sumatra and Borneo birds, we follow Peters (1945:195) and include them in *minor*. The seven adult specimens from the Mentawai Islands ("*pagana*"), off western Sumatra, differ from Borneo-area birds in averaging somewhat paler (somewhat darker than Sumatra birds); they also average longer in wing and tail than either Borneo or Sumatra populations. Again there is overlap in the characters, and we follow Peters (op. cit.) in including the Mentawai birds in *minor*. Several specimens from the Malay Peninsula and vicinity we regard either as atypical *minor* or as intergrades between that race and *coromanda*. In particular, two 28 March specimens (USNM) from southern Thailand (Nakhon Si Thammarat) are interesting, because in color and size they are quite similar to Sumatra *minor*—in which race we include them. Two other specimens are the size of *coromanda* but somewhat darker: one taken on 25 May at Koh Kut, extreme southeast of Thailand (USNM), and one without date from Malacca, Malaya (USNM). These two specimens we regard as *coromanda* toward *minor*.

To summarize, *minor* (sensu lato) is darker than *coromanda* and *major* and similar to or darker than *bangsi*; from *major* and *bangsi*, all *minor* populations differ in being much shorter in wing and tail length. From *coromanda*, *minor* differs by being not only darker, but also generally shorter in wing and in wingtip.

IMMATURE—Darker and browner (sootier) than the adult, lacking purple and having dusky squamation on the sides of the throat, auriculars, breast, and upper abdomen. Much darker than immatures of *coromanda* and *major*, and somewhat darker than *bangsi*; shorter in wing than those races and in tail than *major* and *bangsi*. Measurements: one specimen from Sumatra = wing length 101.5; wingtip 22.0; $P3 > 2$ by 4.5; tail 57.5; culmen length 46.5; mandible width 15.4; one specimen from Mentawai Ids. = wing length 101.5; wingtip 19.0; $P3 > 2$ by 3.5; tail not measurable; culmen length 44.8; mandible width 16.2.

Specimens examined: Borneo 11; Labuan Island 9; Singapore 2; Mentawai Islands—Batu 1, Siberut [= North Pora] 1, Pagai Utara 4, Pagai Selatan 2; Thailand 2.

Range: Presumably resident; found in Borneo and Singapore and, in atypical form, in Sumatra, in the Mentawai Islands, and in the Malay Peninsula, north at least to the Isthmus of Kra; also reported in western

Java by Mees (1970) and on Billiton (= Belitung) Island by Peters (1945:195). Records cited by Peters from Palawan and the Sulu Archipelago (Tawi Tawi Islands) refer to other races—discussed later.

As mentioned previously, the small, dark birds typical of the Borneo area and Singapore give way to slightly larger and paler populations in Sumatra (and the Malay Peninsula). This variational distribution has the appearance of a cline, grading from Borneo *minor* to the larger, paler breeding *coromanda* of the Indian region. As already stated, we have no direct evidence that a breeding continuum of populations actually exists between the two regions. In fact, at present the data point to a hiatus in most of southern Burma and Thailand, and even the assumption of breeding in the Malay Peninsula is tenuous—as we have no definite nesting records from there. On the other hand, the existence of intergrade specimens (i.e., *coromanda* $\times$ *minor*), which do not match those of any known breeding population, suggests that there may well be breeding areas in Indochina and vicinity. In addition, summer specimens have been collected in southern Burma (Amherst), in June–July, and in Malaya (Johore), in June (Sharpe, 1892:220).

***Halcyon coromanda mizorhina* (Oberholser, 1915)**

Entomothera coromanda mizorhina Oberholser, Proc. U.S. Nat. Mus., 48:645, 1915. North Andaman Island. Holotype (No. 44,113—examined) in Royal Ontario Museum.

Description: ADULT—The holotype, the only adult seen by us, resembles *coromanda* in size but is darker; *major* and *bangsi* are larger than *mizorhina*, with *major* much paler and *bangsi* somewhat so. *Mizorhina* is larger than *minor*, but varies from paler to somewhat darker than that form, depending on the population compared. Specifically, *mizorhina* is paler than Borneo-Singapore *minor*, with the purple coloration less lilac and the white rump patch tipped with pale blue. *Mizorhina* is somewhat darker than Sumatra *minor* (“*neophora*”), but is similar in color to *minor* from the Mentawai Islands (“*pagana*”). In fact, the latter might be included in *mizorhina* except for the fact that the two populations differ significantly in measurements. For example, the wings of seven Mentawai Island *minor* measure 100.5 to 108.0, compared to 115.0 in the *mizorhina* measured by us and 112.0 to 122.0 in a series measured by Baker (1927:274).

IMMATURE—The one specimen seen is similar in color to the adult but lacks purple and has dusky squamation on the sides of the throat, breast, and abdomen. Paler than typical *minor* and darker than *coromanda*; smaller than *major* and *bangsi*, as well as darker. Measurements: one specimen = wing length 112.0, wingtip 24.0, P3 > 2 by 3.0, tail 68.0, culmen length 52.5, mandible 16.6.

Specimens examined: North Andaman Island 1; South Andaman Island 1.

Range: Resident on the Andaman Islands so far as known; according to Oberholser (1915) and Peters (1945) this is probably the race on the Nicobars (we have seen no Nicobar specimen of *H. coromanda*, but Sharpe [1892:220] lists one from there in the British Museum).

This race can be considered as an intergrade between *coromanda* and *minor*, being the size of the former while rather dark in color. Actually, in the one adult that we have seen, *mizorhina* is quite similar in color to Mentawai Island *minor* ("pagana"), but the size is significantly larger.

✕ ***Halcyon coromanda liniae* ssp. nov.**

Holotype: DMNH 4649, adult ♂, Iwahig (west of Puerto Princesa), Palawan, Philippine Islands; collected in May 1970 by an unspecified collector.

Description: ADULT—A small, dark race suggesting *minor* from the Borneo area, of which it has previously been considered a part. Differs from that race in its consistently darker coloration, especially of the more plum-colored dorsum and the rufous of the underparts; size essentially the same. All other previously mentioned races are distinctly paler and have longer wings, wingtips, and tails. Upperparts dark Russet, extensively overlaid with dark Phlox to Wine Purple, this extending over the forehead, sides of head, and wing surface; below Tawny, generally with a dark Rose Purple to Magenta breast band. Rump patch large and silvery white, often with some bluish tipping.

IMMATURE—None seen, but probably somewhat darker than *minor*.

Etymology: Named for Lina Florendo Rabor, wife and constant field companion of Dioscoro S. Rabor.

Specimens examined: Palawan 15.

Range: Confined to Palawan, so far as known; we have seen specimens from Panacan, Taguso, Aborlan, and Tarabanan, as well as the type locality.

✕ ***Halcyon coromanda claudiae* ssp. nov.**

Holotype: DMNH 27,729, adult ♀, Bulubuk, Sanga Sanga Island, Tawi Tawi Group, Sulu Archipelago, Philippine Islands; collected 20 September 1972 by D. S. Rabor and E. Macatiguib.

Description: ADULT—Dorsally the darkest race of the species, recalling *liniae* of Palawan but dorsum darker, more bluish (less plum) purple; wing and tail average longer than in that race, as does culmen. Darker than all *minor*, with longer wing, tail, and culmen, except for some overlap with Mentawai Island birds ("pagana"). Darker than other races,

with shorter wing and tail (except than *coromanda*) and longer culmen (except than *mizorhina*). Upperparts Hazel to Burnt Sienna, extensively overlaid with Auricula Purple, this extending over the forehead, sides of head, and wings. Underparts similar to those of *linae*, but slightly paler Tawny; breast band prominent and the same color as the upperparts, but slightly paler and not quite as dark as that of *linae*. Rump white with some Nile Blue tipping, as in *linae* and *minor*.

IMMATURE—Similar to *minor*, but darker, especially on breast and auriculars. In *claudiae* the latter area is chestnut-brown with a little darker barring; in *minor* this area is buff and pale rufous, barred with dusky. In *claudiae* the brown of the upperparts is darkest on the crown, with the back paler and less sooty. The rumps in both are blue. Other races are paler and larger than *claudiae*, with the pattern of the auriculars like *minor*. Measurements: two specimens = wing length 101.5–102.0, wingtip 17.5–18.0, $P3 > 2$ by 4.5–5.0, tail 58.0–58.5, culmen length 42.5–47.3, mandible width 16.6–16.8.

Etymology: Named for Claudia Leigh Hubbard, wife of John P. Hubbard and an avid devotee of kingfishers.

Specimens examined: Tawi Tawi Island—Sanga Sanga 2, Tawi Tawi 4.

Range: Confined to Tawi Tawi Islands, Sulu Archipelago, so far as known.

Halcyon coromanda rufa Wallace, 1862

Halcyon rufa Wallace, Proc. Zool. Soc. London, 1862:338. Sula Islands and Celebes, restricted to Makassar, Celebes, by Sharpe, 1870 (*contra* Peters, 1945:195). Lectotype (not examined) in British Museum (Natural History).

Description: **ADULT**—This race recalls *minor* of the Borneo area, but is paler above and on the breast and has the large rump patch consistently blue (thus differing from all races); also the wing, wingtip, and tail are significantly longer, and the bill is somewhat larger than in *minor*. *Rufa* differs from *coromanda* and *major* in being darker, from *major* and *bangsi* in its smaller wing and wingtip (also tail compared to *bangsi*), and from *mizorhina* by its blue rump and smaller bill. *Claudiae* and *linae* are both much darker than *rufa*, with *linae* also having smaller measurements. Upperparts Cinnamon Rufous to light Chestnut overlaid with Rose to Wine Purple—less extensive than in *minor*, *linae*, and *claudiae*. Underparts rufous, resembling those of *minor*, but slightly darker; breast band similar to purple of back, paler and less extensive than in *minor*. Rump patch large and Nile to Turquoise Blue. Birds from Siau Island, north of Celebes, are slightly paler above than typical *rufa*, but otherwise they are similar in plumage and measurements; we include them in *rufa*.

IMMATURE—Similar to the adult but plumage darker above, mainly lacking purple coloration; throat, breast, and anterior abdomen barred dusky. Rump deeper blue. Specimen not measured because it was not full grown.

Specimens examined: Celebes 9; Butung Island 1; Sangihe Islands—Siau Island 3.

Range: So far as known, confined to Celebes and vicinity, including Siau Island in the Sangihe Islands and Butung Island (southeast of Celebes). Also reported by Oberholser (1915) from Talaut (= Talaud), Lembah, Peling (= Peleng), Togian, and Talissi (= Talisei) Islands; however, some of these records require reexamination. For example, the only specimen that we have seen from the Talaud Islands is *H. c. bangsi*; those from Lembah are *H. c. major*, while those from Peleng are *H. c. pelingensis*. Peters (1945:195) included Oberholser's records under *pelingensis*, on the assumption that the name *rufa* was properly applied to the Sula Island race and that birds from Peleng and the Celebes were another race (see *sulana* for clarification).

***Halcyon coromanda pelingensis* Neumann, 1939**

Halcyon coromanda pelingensis Neumann, Bull. Brit. Ornith. Club, 59:117, 1939. Peling (Peleng) Island (east of the Celebes). Holotype (not examined) said to be in the Museum of Comparative Zoology.

Description: ADULT—In describing this race, Neumann (1939) stated that it differed from *rufa* of the Celebes only in having the wing and culmen much shorter. While Peleng birds average smaller than *rufa* in these measurements (as well as in tail length), considerable overlap exists and separation is not possible on this basis. Neumann's measurements for *rufa* are much larger than ours (those for *pelingensis* are similar), e.g., wings of 120–126 mm versus ours of 110.0–116.0. Although he was aware of migrants from farther north occurring in the Celebes, it would appear that he failed to exclude them from his sample (or possibly he misread or miscopied his measurements). Actually, we find *pelingensis* to differ from *rufa* on a consistent basis only in having the rump white rather than blue; its smaller size and slightly paler color are only average characters. The characters separating *pelingensis* from previously treated races are the same as those of *rufa*, except where rump color is concerned.

IMMATURE—None seen but probably similar to that of *rufa*.

Specimens examined: Peleng Island 4.

Range: Peleng Island, east of Celebes; other island records of this race listed by Peters (1945:195) actually refer to *rufa*.

***Halcyon coromanda sulana* (Mees, 1970)**

Halcyon coromanda sulana Mees, Zool. Mededelingen, 40:300, 1970. Soela-Bessi [= Besi Island, Sula Islands, east of Celebes]. Holotype (not examined) in Rijksmuseum van Natuurlijke Historie, Leiden.

Description: ADULT—A pale race, with large measurements; in tail and mandible width it is the largest race, next largest in culmen length, third in wing length, and with a moderate wingtip length. In its pallor, *sulana* recalls *coromanda* and *major*, but those races are somewhat darker and less purplish above and somewhat paler below; lack purplish on the breast; have smaller, less whitish rump patches; and have primary 3 rather than 4 the longest. In tail length alone *sulana* can be usually distinguished from all other races. *Bangsi* is notably darker above, but otherwise generally similar to *sulana*; other dark races also resemble *sulana*, differing in color in being from somewhat to considerably darker and in *rufa* in having the rump blue. Above, mainly Rose Purple, rump patch large and mainly white (some blue tipping); below, pale Tawny, with a Rose Purple wash on the breast.

IMMATURE—None seen.

Specimens examined: Sula Islands—Mangole Id. 4.

Range: So far as known, confined to the Sula Islands, east of Celebes, on Mangole and, according to Mees (1970), Besi Islands.

As indicated under *H. c. rufa*, Peters' (1945:195) treatment of Celebes-area breeding birds differs from that of Oberholser (1915) and various other authors. *Rufa* is the oldest name applied to the resident birds of that area, having been proposed for specimens from the Sula Islands and Celebes by Wallace (1862). Sharpe (1870) listed the type specimen of *rufa* as an adult ♂ collected at Makassar, Celebes, by Wallace in 1856. Neumann (1939) then described *pelingsensis* from Peleng Island, located between the Celebes and the Sula Islands. Later, Peters (op. cit.) cited Neumann "*in litt.*" as having informed him that the type of *rufa* "... in the British Museum was collected by Allen either on Mangole or Besi" in the Sula Islands. Peters, overlooking the fact that no such specimen was listed from these islands by Sharpe (1892) as being in the British Museum collection, then restricted the name *rufa* to Sula Island birds, and, on the assumption that Peleng and Celebes birds were the same, called the rest *pelingsensis*. The shift by Peters of the type locality of *rufa* from the Celebes to the Sula Islands is clearly in error and we accept Sharpe's original listing of Makassar. In this we agree with Mees (1970), whose discovery that Sula Island birds were distinct required that yet another name be proposed, i.e., *sulana*. In summary, the name *rufa* should be applied to birds from the Celebes and vicinity, with *pelingsensis* restricted to the Peleng Island population and *sulana* to that of the Sula Islands.

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KEY TO FORMS

In this key only adults are included and sexes are lumped.

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|-----|--|----|
| 1. | Coloration pale, rump patch large and white, tail > 74 mm (Mees, 1970) | |
| | <i>sulana</i> (Sula Ids.) | |
| 1. | Coloration and rump patch variable, tail < 76.5 mm | 2 |
| 2. | Wing > 115.0, wingtip > 27.5, primary 3 usually longest | 3 |
| 2. | Wing < 118.0, wingtip < 31.0, primary 3 or 4 longest | 4 |
| 3. | Coloration pale, rump patch broken and bluish, tail < 71.0 | |
| | <i>major</i> (Japan, Korea; migratory) | |
| 3. | Coloration dark, rump patch large and white, tail > 68.5 | |
| | <i>bangsi</i> (Ryukyus; migratory) | |
| 4. | Coloration dark, rump patch large and blue, tail > 65.5 | |
| | <i>rufa</i> (Celebes region) | |
| 4. | Coloration variable, rump patch otherwise, tail < 67.5 | 5 |
| 5. | Coloration rather dark, culmen length > 51.0 | |
| | <i>mizorhina</i> (Andaman Ids.) | |
| 5. | Coloration variable, culmen length < 51.0 | 6 |
| 6. | Coloration pale, rump patch smaller and often with more bluish, primary 3 longest | |
| | <i>coromanda</i> (Indian region; migratory) | |
| 6. | Coloration variable, rump patch larger and largely white, primary 4 usually longest | 7 |
| 7. | Coloration rather dark, wing > 108.5, tail > 64.5 | |
| | <i>pelingensis</i> (Peleng Id.) | |
| 7. | Coloration variable, wing < 109.5, tail < 65.5 | 8 |
| 8. | Coloration very dark, wing > 105.0, tail > 63.5, culmen length > 47.8 | |
| | <i>claudiae</i> (Tawi Tawi Ids.) | |
| 8. | Coloration variable; wing, tail, and culmen lengths shorter (if not, coloration paler) | 9 |
| 9. | Coloration very dark, dorsum more plum colored | |
| | <i>linae</i> (Palawan Id.) | |
| 9. | Coloration variable but paler | 10 |
| 10. | Coloration darker, wing averages shorter (94.5-103.0) | |
| | <i>minor</i> (Borneo, Singapore) | |
| 10. | Coloration paler, wing variable | 11 |
| 11. | Coloration pale, wing averages shorter (100-103) | |
| | "neophora" [= <i>minor</i>] (Sumatra, Malay Pen.?) | |
| 11. | Coloration paler, wing averages longer (100.5-108) | |
| | "pagana" [= <i>minor</i>] (Mentawai Ids.) | |
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