

Systematic notes on Asian birds. 36. A preliminary review of the Chloropseidae and Irenidae

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Hypotheses of family phylogeny are summarized up to date, and amendments made to the treatment by Delacour (1960) of *Chloropsis* and *Irena* in Peters's Check-list of Birds of the World (Mayr & Greenway, 1960), at and below species level. Revision of species-limits within *C. cochinchinensis* (Gmelin, 1789) and *C. aurifrons* (Temminck, 1829) as defined in Delacour (1960) restores three ultra-taxa to species rank, boosting the global list of leafbird species to 11. Certain range and nomenclatural issues are resolved, including re-designation of the type locality of *Turdus cochinchinensis*, type species of *Chloropsis*. A new subspecies name is introduced as an outcome.

Introduction

In preparing the way for a planned 'Synopsis of the Birds of Asia' (see Introduction to 'Systematic notes on Asian birds': Dickinson & Dekker, 2000) we compare Peters's Check-list of Birds of the World (Mayr & Greenway, 1960) with later treatments, comment on points arising from the Check-list itself, and propose amendments suggested by recent research. As elsewhere in this review series, it is intended that all new recommendations for the Synopsis be founded on published arguments for change.

Though summarized in general form for dictionary purposes (Delacour, 1964; Wells, 1985a, 1985b), neither of the two families has been monographed since Delacour's treatment in Peters's Check-list (Delacour, 1960), although, recently, one of us (DRW) drafted the text on Chloropseidae for an up-coming volume of the Handbook of the Birds of the World. This highlighted several anomalies. Application of conventional grades of evidence for identifying biological species-limits resulted in some dismantling of two polymorphic species, *C. cochinchinensis* (Gmelin, 1789) and *C. aurifrons* (Temminck, 1829), and promotion of three of their subspecies, *kinabaluensis* Sharpe, 1887, *jerdoni* Blyth, 1844, and *media* Bonaparte, 1850, to species rank. One of these, *kinabaluensis* (formerly known as *flavocincta* Sharpe, 1887), Delacour had actually omitted from the Check-list, presumably by accident as neither name appears even in synonymy. It is also evident that in treating *C. cochinchinensis* Delacour found reason to break with the Check-list convention of excluding synonyms already disposed of as such by Sharpe and co-authors in the Catalogue of the Birds in the British Museum

(1874-1895). A re-investigation of historical materials revealed that the type of *Turdus cochinchinensis* had been assigned an incorrect geographical origin - unfortunate for nomenclature but an error well known to taxonomists of the early 19th century. Sharpe's motive for synonymizing *cochinchinensis* is clear but on evidence supplied this action should not have been taken then, and cannot now be supported. Here, we rectify the situation by introducing a new subspecies name.

The accompanying paper on types in Chloropseidae and Irenidae (Dickinson et al., 2003) mentions one taxon described since publication of the Check-list: *Irena puella andamanica* Abdulali, 1964, which we re-assess here. It also includes an appendix clarifying more of the complex and confusing nomenclature that will be met by any researcher needing to work with literature on Chloropseidae dated prior to 1926 (the year of resurrection of the senior name of the type species by Kloss).

Background phylogeny

In his Règne Animal, Cuvier (1817) used the brush-tipped form of the leafbird tongue to align Buffon's 'Verdin de la Cochinchine' (basis of Gmelin's *Turdus cochinchinensis*) with philemons (meliphagid honey-eaters). Jardine & Selby (1826), authors of the entity *Chloropsis*, also knew of this tongue character and accurately guessed at a function, but took no stand beyond extending structural analogy to sunbirds and referring to an alternative suggestion by Stephens (1825) of a link with Swainson's *Brachypus* (the so-named 'short-legged thrushes'; bulbuls in modern parlance). Museum-based taxonomists of the period, including Gray (1840), Cabanis (1847) and Bonaparte (1850), opted for Cuvier's hypothesis. Contemporaneously in India, Blyth (1852) and, after him, Jerdon (1863) chose the bulbul alliance (Jerdon and others called leafbirds 'green bulbuls'). Blyth seems also to have been the first to associate leafbirds with *Irena* (fairy-bluebirds), plus a third small Indomalayan genus, *Iora* (= *Aegithina*) (ioras), grouping them in a special sub-family Phyllorninae of the Pycnonotidae. In doing so he dissented from a then widely held view of fairy-bluebirds as drongos (cf. Horsfield, 1821, 1824, and Temminck, 1821, 1823, who assigned *puella* to the dicrurine genus *Edolius* in preference to accepting Horsfield's separate *Irena*). A further 36 years were to pass before the fairy-bluebird/bulbul connection re-surfaced (Tweeddale, 1878a), and Sharpe (1882) revised his Catalogue accordingly. Gray (1869) had since retreated from supporting a leafbird/honey-eater link, but by then pycnonotids were being viewed as timalioid and the family expanded to include various genera of what were later to be treated as babblers; indeed, Gray placed *Phyllornis* (see below) directly next to one (*Myzornis*, a monotypic babbler combining similar brush-tipped tongue and green colours).

Sharpe (1882) pushed this latter position to an extreme by treating leafbirds and fairy-bluebirds, with ioras and bulbuls, all as actual timaliids together in a sub-family Brachypodinae. Thereafter, most taxonomists associated leafbirds and fairy-bluebirds with bulbuls (timalioid or otherwise), locating them directly within the Pycnonotidae or from anatomy of the jaw musculature (Beecher, 1953), without *Aegithina*, in a sub-family Pycnonotinae of a greatly expanded Sylviidae. Alternatively, as early proposed by Robinson (1927), they were hived off to a separate, dedicated family next to Pycnonotidae ('for ... practical convenience' in Robinson's case as he still believed them to be intermediate between bulbuls and babblers).

Delacour's Check-list treatment maintained the connection with *Aegithina* in a family Irenidae, again next to bulbuls though he may not have considered osteological characters, including of the internarial septum, skull floor, palate and quadrate, that Wetmore (1960) believed preserved a leafbird/iora connection but distanced these groups from bulbuls; still further from *Irena*. The latter Wetmore placed in the Oriolidae, citing non-operculate nares, morphology of the orbit, sternum and pelvis, and a possible plumage affinity with E Asian Maroon and Silver Orioles. Regardless, these (rather than Beecher's) proposals shared the field until the arrival of molecular taxonomy.

DNA-DNA hybridization findings prompted Sibley & Ahlquist (1990) to overturn arrangements by severing the leafbird/iora connection and re-associating *Chloropsis* with *Irena* somewhere near the base of their oscine parvorder Corvida, well-separated from *Aegithina* in this assemblage. A trial of that finding by nuclear DNA nucleotide sequencing (Barker et al., 2001; Cracraft et al., 2003) affirmed the derived position of *Aegithina* and isolated it decisively by shifting *Chloropsis* and *Irena* out of Corvida into parvorder Passerida. There, *Chloropsis* emerged as the sister-group of an enlarged family Passeridae, subtended by *Irena* and ultimately by nectariniids. A further modification of findings (F.K. Barker, pers. comm.) now places *Chloropsis* and *Irena* as one another's closest relative, but time from divergence implies no firm decision on the number of families to be recognized. Our provisional choice of two in this series and elsewhere (Wells, in press) follows Cracraft et al. (2003).

Nomenclature

Generic names

Temminck (1829, his text on Genre Verdier with Planches Coloriées, livraison 81) posited the name *Phyllornis* for leafbirds (modified presumably by accident to *Phylloris* in the body of the work), claiming that Boie had erected this genus with the entity hitherto known as *Turdus cochinchinensis* Gmelin, 1789, as its type species. This he referred to as '*Phyllornis cochinchinensis* Temm.' since the convention of the day allowed authors to take credit for a new nomenclatural combination. Lesson (1840), Blyth (1843), Swinhoe (1870), Walden (1871b), Hume & Davison (1878) and others of the period believed that to be so and made general use of *Phyllornis*. On the other hand, Sharpe (1882) awarded priority to *Chloropsis* Jardine & Selby, 1826, stating that he had found no trace of a publication in Boie's name, and concluding that Temminck must be presumed to have used a manuscript rather than a published name by Boie. *Chloropsis* was accepted more or less universally thereafter.

Taxonomy at and below species-level

Chloropsis sonnerati Jardine & Selby, 1826

As pointed out by Finsch (1905) and confirmed by Mees (1986) from more material than would have been available to the describer, male bill size (length) in the Nias island population merges too well with that of neighbouring mainland Sumatran *C. s.*

zosterops Vigors, 1830, to warrant maintaining a separate, small-island subspecies, *parvirostris* Hartert, 1898. Comparison with a set of 28 adult male *zosterops* from the Thai-Malay Peninsula (BMNH) affirms this view.

Chloropsis cyanopogon (Temminck, 1830)

Mees (1986) removed *C. cyanopogon* (Temminck, 1830) from the Bangka island fauna list by re-identifying the one claimed specimen (Finsch, 1905) as juvenile *C. sonnerati*. Wing 97 mm, tail 63.5 mm, tarsus 19 mm, and culmen from skull 24.5 mm (Mees's measurements) amply justify this decision (in the southern Thai-Malay Peninsula, adult male and female nominate *cyanopogon* wings do not range above 88 and 82 mm). The individual concerned proves to be an immature female (non-moulting), and regarding size it is worth pointing out that within the population of the SW coastal plain of Peninsular Malaysia there exist even fully adult *males* of wing as short as 96 mm (Wells, in press). The mainland Sumatran situation has yet to be investigated, but no such birds have been found anywhere else.

Chloropsis kinabaluensis Sharpe, 1887

For an explanation of prior use of the name *C. kinabaluensis* over *C. flavocincta*, see Dickinson et al. (2003). Treated as a subspecies of otherwise lowland SE Asian *C. cochinchinensis* since Chasen (1935), but overlooked by Delacour (1960), this leafbird is endemic in upland forests of Borneo: recorded on Kinabalu and Trus Madi peaks in the north, and the spinal mountain system east to Kayan Mentarang and south to Mount Dulit and the Usun Apau plateau (Sheldon et al., 2001; Smythies, 2000; van Balen, 1997).

Exclusive of *kinabaluensis*, *C. cochinchinensis* - including lowland Bornean *C. c. viridinucha* (Sharpe, 1877) - conforms to the leafbird norm of sexual dimorphism of the adult face-pattern. From lores to mid eye level, including face, chin and throat, males show a sharply delineated, jet black mask highlighted at the edge mainly by clear yellows, and enclosing a partly erectile, quadrangular patch (or flash) of intense violet-blue back from the base of the lower mandible. Females lack a mask. Their face is green, along with the rest of the head, and their jaw-line flash which is smaller, lighter-toned, more cobalt blue than in males, melds with turquoise-tinted chin and throat.

Mask and jaw flash have no juvenile precursors in any leafbird (though *C. aurifrons* and *C. media* show some blue feathering at an early stage of post-juvenile moult) and in nature both should signal sexual maturity. Whatever their main social behavioural role, these characters are guessed to function in mate selection. Non-masked cohorts of *kinabaluensis*, on the other hand, are exclusively juvenile. The faces of its adults differ only in the colour of their mask-surround: yellow in males, viridian green in females, although female *kinabaluensis* lacks a jaw-line flash (among adults, true of only one other member of the family). If we are correct, behavioural signals that might promote matings between *kinabaluensis* and neighbouring *C. c. viridinucha* have at least been damaged. Other morphological differences that imply isolation include: size (male *kinabaluensis* wing 95-100 mm, n = 9, versus 83-87 mm, n = 5, in *C. c. viridinucha*, the latter consistent with *C. cochinchinensis* populations elsewhere in SE Asia); size dimorphism in favour of males (on wing-length, males average three percent larger in *kinabaluensis* against eight percent in *C. c. viridinucha*, the latter again

typical of *C. cochinchinensis* elsewhere in the region); strength of male jaw-line flash (much larger and bluer in *kinabaluensis* than in any *C. cochinchinensis* subspecies); tone of blue on the wing (bright aquamarine in both sexes of *kinabaluensis* versus darker cobalt blue, rich especially on the carpus, alula, primary-coverts and outer primary tract in males of all equatorial populations of *C. cochinchinensis*, including *viridinucha*). Among other distinguishing characters, *C. cochinchinensis* subspecies accepted here, i.e., including *viridinucha*, show only weak development of an upper mandibular notch and nail whereas by any leafbird standard *kinabaluensis* has a heavy bill, prominently notched and nailed, implying some difference at least of foraging emphasis.

No intergradation has been reported in these or any other characters even though, locally, *kinabaluensis* and *C. c. viridinucha* meet in continuous forest cover (Smythies, 1957), or their ranges are separated by no more than a few hundred metres of altitude. We conclude they behave as a classical parapatric species pair (Haffer, 2003), effectively isolated genetically yet excluding one another ecologically. On Mount Kinabalu, north of the range of *C. c. viridinucha* and in the absence of any other lowland representative of *C. cochinchinensis*, *C. kinabaluensis* extends down the sub-montane slope to about 550 m elevation (Smythies, 2000). On current evidence, elsewhere it lives entirely within montane forest.

We propose the vernacular name Bornean Leafbird for this taxon (see colour plate 1).

Chloropsis jerdoni (Blyth, 1844)

Application of the criterion of a broadly equivalent amount of morphological divergence elsewhere in Delacour's *C. cochinchinensis* complex also easily splits off subspecies *jerdoni* Blyth, 1844, isolated in the Indian subcontinent and Sri Lanka. Female *jerdoni* are maskless and their viridian-turquoise chin and throat suffuse into an only slightly brighter jaw-line flash, but rather than merging into other surroundings as in accepted *C. cochinchinensis* subspecies this colour forms a contrasting, clean-cut bib. The male *jerdoni* mask is typical but with violet-blue jaw-line flash large and lanceolate, even less like the short, truncated patch of *C. cochinchinensis* subspecies than that of male *C. kinabaluensis*. More impressively, other than their turquoise lesser wing-covert patch (widespread in the family), both sexes lack blue on wings and tail, and unless remote Philippine *C. flavipennis* (Tweeddale, 1878b) belongs here (see below), *jerdoni* is the only presumed member of the complex of which this is true. Bill morphologies are also more at variance than expected in a subspecies relationship: proportionately longer and more slender in *jerdoni* than in *C. cochinchinensis* subspecies (see below), slightly decurved rather than straight, entirely lacking a notch or nail (so that upper and lower mandibles close precisely tip to tip), and with a channelled lower mandibular tip allowing protrusion of the brush tongue while the bill is closed (a presumed nectar-feeding specialization noted also in *C. hardwickii* and *C. aurifrons*). Geographical ranges of *C. cochinchinensis chlorocephala* (Walden, 1871a) and *C. jerdoni* in the NE Indian subcontinent are well separated, but habitat ranges are stated to be different and our preference is to return *jerdoni* to species rank - a decision already taken independently by Rasmussen & Anderton (in press).

We agree that the vernacular name Jerdon's Leafbird is appropriate for this taxon (see colour plate 1).

Chloropsis cochinchinensis (Gmelin, 1789)

These excisions from Delacour's *C. cochinchinensis* leave a still polymorphic but morphologically better-integrated species occupying the SE Asian lowland heartland of the family (Dunn, 1974), from Assam south to Java. *C. cochinchinensis* is now taken to comprise subspecies: *chlorocephala* Walden, 1871a, of western continental SE Asia northwest to Assam; *kinneari* Hall & Deignan, 1956, of northeastern continental SE Asia; *serithai* Deignan, 1946, of the northern Thai-Malay Peninsula; *moluccensis* J.E. Gray, 1831, of the southern Thai-Malay Peninsula, Sumatra and S China sea archipelagos; *viridinucha* Sharpe, 1877, of Borneo; and *cochinchinensis* Gmelin, 1789, of Java (see on), plus the form re-named below.

Mees (1986) compared material from Bangka and the type of *C. c. billitonis* Chasen, 1937, from neighbouring Belitung island with a mainland Sumatran series, found they agreed perfectly, and synonymized *billitonis* with *icterocephala* Lesson, 1840 (type locality Palembang). Contra Deignan (1946), we have been unable to find any meaningful plumage or mensural difference between southern Thai-Malay Peninsular and mainland Sumatran populations, and consider Delacour correct to have applied the older name *moluccensis* (type locality Malacca) to them both, synonymizing *icterocephala*. We are less certain about the status of a second S China Sea subspecies, *natunensis*, erected by Chasen (1938) for the population of Bunguran island, Natuna archipelago. Smythies (1957) assigned this to *icterocephala*, whereas Delacour accepted it for Peters's Checklist, either overlooking Smythies' opinion or having disagreed with it. On overall size and plumage characters the few specimens we have seen support the Smythies view. Unfortunately, we have no independent culmen measurements of Bunguran material hence are unable to comment on Chasen's claim that *natunensis* is long-billed: from skull in seven males 22-25 mm, versus none of his Sumatran sample above 23.5 mm. These figures certainly are large compared with data from the Thai-Malay Peninsula (in an extensive sample, no male above 21.3 mm: Wells, in press), but the need for equivalence of tools and technique applies especially to the measuring of bills.

A new name is introduced for the population of SE Thailand, Cambodia and southern Vietnam (see below).

Type locality of *Turdus cochinchinensis* Gmelin, 1789

Jardine & Selby (1826) adopted *Turdus cochinchinensis* Gmelin, 1789, as the type species of their new genus *Chloropsis*, stating that Gmelin had based his description on plate 643 of *Planches Enluménées* (Daubenton 1765-80), and works of Latham. Gmelin's wording recognizably describes a blue-winged leafbird but not in the detail that permits connection with a particular ultra-taxon. He made no mention of Latham but did list *Planches Enluménées*, plate 643, figure 3. Identifying the geographical origin of *T. cochinchinensis* therefore rests on what information is independently extractable from artist F.N. Martinet's depiction and the description of material in the special edition of Buffon's (1771-1786) *Histoire Naturelle des Oiseaux* that incorporated the plates. Both have been re-examined. The text (perhaps by Buffon's editor, Montbeillard) tallies with figure 3 in all essential details, and the writer goes on to claim, "Ce petit merle vient certainement de la Cochinchine, car il s'est trouvé dans la même caisse que d'animal porte musc envoyé en droiture de se pays".

Between the Daubenton and Buffon editions of *Planches Enluménées* there are printing variations, including in the positioning of the blue jaw-flash, shown correctly behind the lower mandible in one versus in line with the upper mandible in the other, and variation in the amount of coppery tinting applied to green plumage parts, from slight to quite strong. None of this detracts from the realistic depiction of a black-masked adult male blue-winged leafbird showing slight yellow at the immediate rear rim of the eye and a bold, clear yellow lateral border to the bib part of the mask, beginning below the jaw-flash and broadening into a breast-patch under the bib. Tinting on green has no bearing on the extent and distribution of this yellow, which is shown the same in both editions. All continental SE Asian populations of *C. cochinchinensis* north of the Sunda region, including of far-S Vietnam (Cochinchina), have the yellow border of the male mask broaden posteriorly into a patch under the bib, as indicated in Martinet's figure 3 (see colour plate 2); and this patch is clearest in those of the SE corner of the region, again including far-S Vietnam. All of these populations, and those of the Sunda region, however, feature clear yellow running dorsally around the eye and broadly along the upper border of the mask to converge over the bill and, in varying amounts, on the anterior cap. In only one part of the species range does the yellow border expand onto the breast, as shown, yet terminate at the eye, leaving the whole cap down to mask level and forward to the bill green. This is Java, and a claim that Buffon's specimen had been both moulting and in poor condition (Temminck, 1829) in no way compromises the detailed likeness of figure 3 to a Javan male (see colour plate 1).

Source of the consignment of musk (or a musk deer?) is the only demonstration of origin offered by Buffon, who seems not to have considered wildlife and specimen trade along the Asian shipping lanes of the day. In any event, none of this stands in the way of clear internal evidence supplied by the artwork that *cochinchinensis* was founded on a bird not from Cochinchina but from Java. This is no recent discovery. Temminck (1829) figured a male blue-winged leafbird that he stated was from Java and which (see above) he named *Phyllornis cochinchinensis* (see colour plate 2). With it, he described a female (expressly because Buffon had not). That the type locality of *cochinchinensis* was actually Java seems then to have become general knowledge over several decades. Thus, Walden (1871b) considered Temminck's figure "the most exact resemblance of the [Javan] species until then published", noting that it matched Javan material in his own collection and, critically, agreed well with Montbeillard's (= Buffon's) text. In direct comparison, nothing important distinguishes it from Martinet's figure.

The shift of ground dates from Nicholson (1881) publishing on Javan leafbird and other material he had acquired from the H.O. Forbes collection, and where he reports correspondence with R.B. Sharpe: "Mr Sharpe, who has recently worked out the bulbuls, informs me that the Javan species is really the *Turdus cochinchinensis* of Gmelin; but that he considers that that name should be suppressed on account of its misleading tendency, and *C. nigricollis* of Vieillot is the next in order of date". Nicholson took this advice, Sharpe himself synonymized *cochinchinensis* in volume 6 of his Catalogue (1882), and *nigricollis* Vieillot, 1818, became the name by which the Javan population has been known ever since. The source is 'Le Polochion verdin' *Philemon nigricollis*, but Vieillot attached no type material to this name and made no mention of Java. His descriptions are of a masked male and vert-de-gris throated female, with olive green cap, blue shoulder-patch in both sexes, but no mention of other blue on wings or tail, and no mention of any yellow, features together hinting at a taxon that we no longer

consider to be part of species *C. cochinchinensis*. The only illustrations linked to Vieillot's name that we have seen are plates 77 and 78 of Audebert & Vieillot (1802), and these we identify as a pair of *C. jerdoni*, the male associated with Gmelin's name *cochinchinensis*. As '*nigricollis* Vieillot' lacks standing, no name previously valid for Java is displaced by restoration of *cochinchinensis*, but a new one is needed for the now-dispossessed birds of SE Thailand, Cambodia and S Vietnam. In the absence of any already-available alternative, we propose:

Chloropsis cochinchinensis auropectus subsp. nov.

Material.— Holotype: adult male, collected on 8 January 1928 by J. Delacour and W.P. Lowe. Type locality: Tay-Ninh, S Vietnam, co-ordinates 10°41'N, 106°07'E (BMNH 1928.6.26.992). Paratype: adult female, collected on 13 January 1928 by J. Delacour and W.P. Lowe at Tay-Ninh (BMNH 1928.6.26.924).

Etymology.— Name compounded of nouns in apposition, denoting the brassy-orange tint to the yellow of the breast patch below the black bib of the adult male.

Description of holotype.— Lores from nostril to eye, anterior face incorporating anterior lower eyelid, and chin and throat, black, enclosing a truncated patch (flash) of glossy dark violet-blue on the jaw from the base of the lower mandible. Forehead, band above lores, narrow (interconnected) eyelid-rim, and broad band from bottom of eye around the whole edge of the black bib, clear primrose yellow, merging on the upper breast into a patch of brassy yellow. Rest of head, including ear-coverts, pea green, crown from mid level of eyes to nape, top and sides of neck, and rear ear-coverts washed coppery yellow. Mantle to upper tail-coverts bright grass green. Lesser wing-coverts bright, glossy cobalt blue; carpus-edge, alula and primary-coverts darker, richer blue shading distally to turquoise, and outer-webs of these coverts edged turquoise; and median- and secondary-coverts grass green, the latter tinged blue on the inner part of the outer-web. Tertiaries and inner secondaries grass green, blueness of the interior of the outer-web strengthening distally on remaining secondaries, and S1 only fringed green. P1-3 like S1, then green retreats to the tip of P4-5; primary outer-webs otherwise cobalt blue edged with turquoise; all inner-webs dark grey. Central rectrices grass green, slightly darker than upper body, other tail-feathers dull blue, except on R6, with touch of green at the extreme outer-web fringe and extreme tip. Below, all remaining underparts, well-delineated from breast patch, grass green, lighter than on upperparts; lower wing-coverts viridian green with blue carpus-edge; thighs as belly, and underside of tail dull grey-blue. Bare-parts: iris brown; bill black; feet grey-blue. Measurements (mm): wing 85, tail 68.7, tarsus 17.3, culmen from skull 18.3.

The female paratype differs as follows: Green of cap extends to bill-base and lores, and coppery wash of posterior head fainter. Exclusive of lores, anterior face, chin and throat viridian green, and jaw-flash turquoise. Blue on wing-coverts restricted to carpus and leading edge of lesser-coverts, and primary-coverts are duller, their outer-webs more broadly edged aquamarine blue. Primaries are more aquamarine blue, with definite green tinge to outer-web edging; and the tail is duller. Below, lacks all yellow, and green breast shows no more than a brassy tinge. Bare-parts as male. Measurements (mm): wing 77, tail 63.9, tarsus 16.3, culmen from skull 17.8.

Identification.— see colour plate 1. Adult males of all populations north of the Sunda region show a clear green patch on the centre-mid crown, immediately behind the yellow of the forecrown, bright pea green in *C. c. auropectus* and northwestern and western *C. c. chlorocephala*, duller, more bronzy in northeastern *C. c. kinneari*. From *chlorocephala*, subspecies *auropectus* is told by its brighter, clearer yellow breast patch, well-delineated from remaining underparts (more bronze-tinted, merging with surrounding green in *C. c. chlorocephala*). The greens of *C. c. kinneari* are slightly darker, its breast patch still duller, less clear-cut than that of *C. c. chlorocephala*, and its yellow bib-surround distinctly narrower than in the other subspecies. No other age/sex class of *C. c. auropectus* is safely separable.

Range.— E-central and SE Thailand, Cambodia and S Vietnam.

Before leaving the issue of the species type locality, one historical counter-claim must be disposed of. In rescuing the species name *cochinchinensis* from synonymy (see Dickinson et al., 2003), Kloss (1926) challenged Sharpe's action with an assertion that Martinet's Planches Enluminées figure and the accompanying Buffon/Montbeillard text, together, did after all support an Indochinese rather than a Javan source for Gmelin's type. From stated sight of original works, Kloss found 'the yellow forehead of the northern [distinguishing it from the Javan] bird' to have been both illustrated and, so he claimed, described in Montbelliard's [sic] text - a section of which he translated as 'the black of the throat is surrounded by a kind of yellow gorget that diminishes on the breast'.

The copy or copies consulted by Kloss have not been identified hence cannot be checked (indeed, if held in SE Asia at that time they may no longer exist), but no yellow forehead appears on Martinet's figure 3 of plate 643 of either of the Rothschild library (BMNH) sets of Planches Enluminées examined by us. Kloss's descriptive point is rendered understandable only by assuming he meant 'black throat' to be read as 'black mask', i.e., incorporating the bird's face, above which he claimed to have found yellow. Key original text (script modernized) then effectively undoes him: '... le noir de la gorge s'étend derriere les coins de la bouche, & remonte sur le bec superieur ou il occupe l'espace qui est entre la base & l'oeil, & par en bas il est environné d'une espèce de hausse-col jaune qui tombe sur la poitrine; ...'. From this, we understand the yellow gorget to surround the black *below* [the wording implies the eye or that part of the mask between the upper mandible and the eye, i.e., lores or face] and merely to descend onto the breast - exactly as shown in the plates we have examined. No extension of yellow onto the cap is specified or implied, and no dwindling of yellow below the bib. Independent of his faulty translation, by that date, Kloss ought in any case to have been aware that no Indochinese (as distinct from Sunda) regional population of Blue-winged Leafbird shows a gorget narrowing onto the breast; indeed, that quite the opposite holds true.

Chloropsis flavipennis (Tweeddale, 1878b)

We have seen too little material for independent comment, but follow Parkes's (1973) placement of *C. f. mindanensis* Salomonsen, 1953, in synonymy and his treatment of *C. flavipennis* (Tweeddale, 1878b) as monotypic. The relationship of this remote and unusual species is uncertain. Kennedy et al. (2000) described its few

known vocalizations (apparent contact calls rather than song) and pointed to a similarity with at least one common call of *C. palawanensis* (Sharpe, 1877) of the Palawan archipelago. One of us (DRW) has extended this similarity to a common call of mainland *C. cochinchinensis*.

The only plumage clue offered is the general similarity of the straw yellow pattern on the outer wing of *C. flavipennis* with that of *C. jerdoni* (but with some approach also to *C. sonnerati*, whose heavy, hook-nailed bill it matches much better). Endemic in the southern Philippines where probably anciently isolated from congeners, *C. flavipennis* has taken the well-known evolutionary route of losing sexual dimorphism with reduction of ornamentation (Mayr, 1963), hinting at the relaxation of a possible ancestral fitness cost. Male *C. flavipennis* are totally hen-plumaged, and because this species lacks even a jaw-line flash it could actually be described as neotenic. Similarly isolated, maskless though not so fully monomorphic *C. palawanensis* retains sufficient blue on wings and tail to betray a mainland *C. cochinchinensis* connection but is at an earlier stage, perhaps, of the same evolutionary trend.

Chloropsis media (Bonaparte, 1850)

Arguments advanced for splitting parts of the *C. cochinchinensis* complex (above) apply equally to *C. media* Bonaparte, 1850, a sub-montane endemic of Sumatra since Chasen (1935), and in Peters's Check-list, treated as a long-marooned form of continental *C. aurifrons* (Temminck, 1829). Adult *C. media* agree with other *C. aurifrons* complex subspecies in size and wing and cap patterns - turquoise lesser wing-covert patch and cap from bill-base to mid eye level yellow (orange in *aurifrons*) - but *media* is dimorphic. Males show a typical black mask, females are green-faced, whereas throughout the continental and Sri Lankan range of *C. aurifrons* both sexes are masked and, per subspecies, diverge only slightly. In addition, the long, narrow, violet jaw-line flash of *C. media* is discrete, as per southern S Asian *C. a. frontalis* von Pelzeln, 1856, and *C. a. insularis* Whistler & Kinnear, 1933, whereas in all populations of continental SE Asia (that on an evolutionary timescale may have retreated away from the range of *C. media* only recently) the whole area of chin and throat between flashes is in-filled with the same violet. Since the only green-headed cohorts of continental *C. aurifrons* subspecies are juvenile, exactly as they are in *C. kinabaluensis*, we come to a parallel conclusion on taxonomy, albeit without the parapatry element. Our recommendation is that *C. media* be restored to species rank, and we note that its bill is slightly notched and nailed versus not at all in *C. aurifrons* subspecies. No spirit material has been examined hence the form of the *C. media* lower mandible tip is unchecked.

We propose the vernacular name Sumatran Leafbird for this taxon (see colour plate 1).

Chloropsis aurifrons (Temminck, 1829)

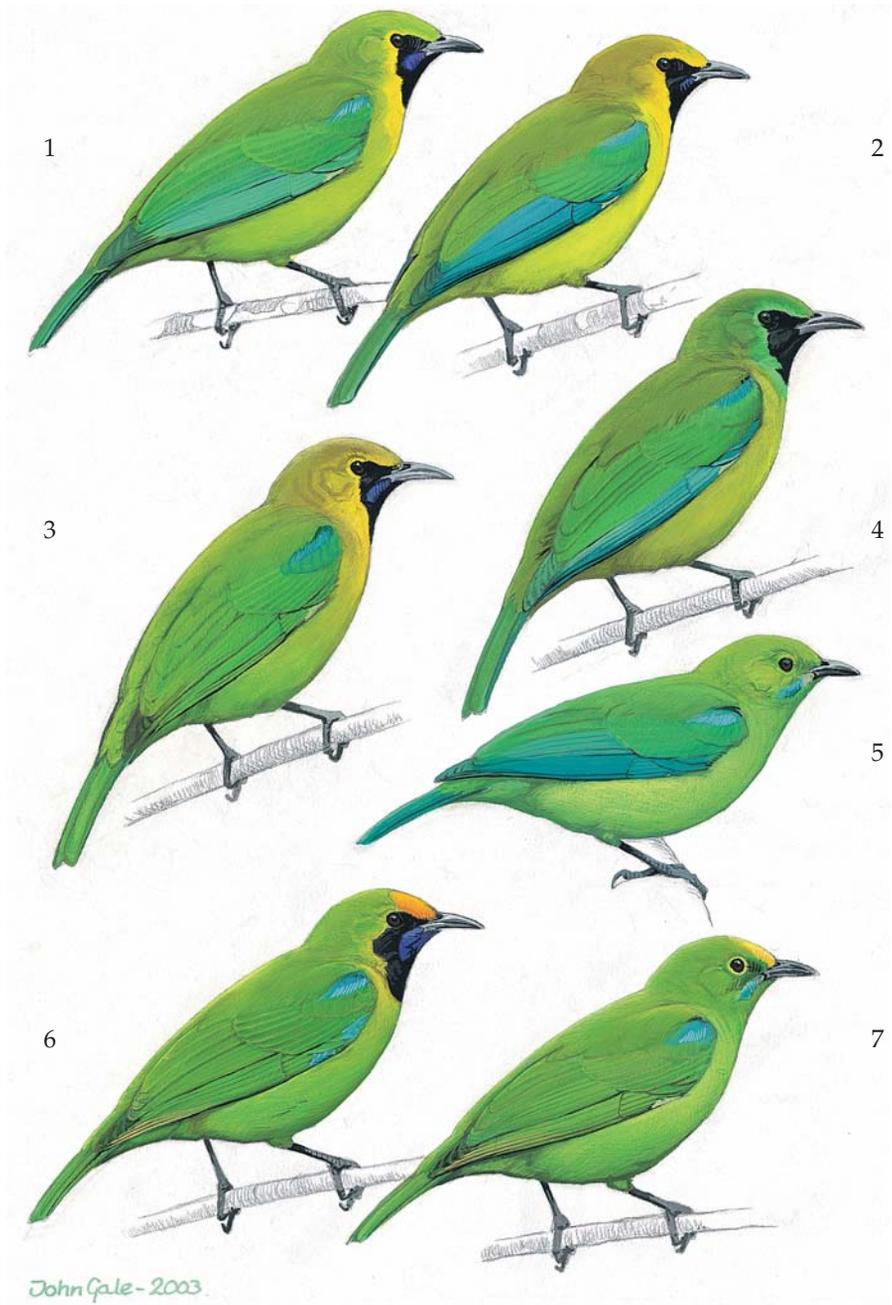
Within *C. aurifrons* as re-defined, the Check-list presents a confusing distributional picture of SE Asian subspecies *C. a. inornata* Kloss, 1918a, type locality Lat Bua Khao, Nakhon Ratchasima province, E-central Thailand, and *C. a. incompta* Deignan,

1948, type locality southern slope of the Lang Bian massif, S Vietnam - understood to differ in extent of orange on the cap and colour of the border of the black bib. Deignan (1963) defined the Thai range of *C. a. inornata* as the east and southeastern provinces, and northern parts of the central plains, but excluded SW Thailand even though Kloss (1918a; see also Robinson & Kloss, 1924) expressly stated that he collected *C. a. inornata* in Prachuap Khirikhan province. The Thai range of *C. a. incompta* Deignan gave as the west and southwestern provinces only, i.e., remote from its type locality and isolated from this by his claimed southeastern spur of *C. a. inornata* range. The implied presence of two subspecies in Prachuap Khirikhan is a further issue.

Type descriptions of subspecies *inornata* and *incompta* characterize both as lacking yellow interposed between the black bib and green breast, a conundrum that Deignan (1948) had himself already resolved by pointing out that Kloss's designated holotype of *inornata* (Kloss 1918b) was actually subadult, all-green-breasted by virtue of age rather than geography. A Kloss paratype from the same locality (BMNH), re-examined by us, is the same whereas Deignan states that fully adult topotypes show a narrow but consistent border of yellow, i.e., that the description of *inornata* is to be amended. By Kloss's definition, a fully adult male (BMNH) from Koh Lak (= Prachuap Khirikhan) totally lacking yellow around its bib would inevitably have been identified as *inornata*, whereas the above line of argument marks it as *C. a. incompta* (see colour plate 1). Apparently, this resolves the issue of double occurrence in SW Thailand, leaving only the question of whether Deignan (1963) was right to imply two range parts of *incompta* are separated by more than just historical deforestation of the S-central plain of Thailand. We are able to report here only that the BMNH collection possesses two adults from SE Thailand (Chanthaburi province), and that these are *incompta* rather than *inornata*. The expectation must, therefore, be that *incompta* occupies a, probably recently continuous, southernmost zone from SW Thailand as far as Cambodia and S Vietnam, with *inornata* between it and more northerly *C. a. pridii* Deignan, 1946; in other words, that the width of the yellow breast-band declines regularly north to south through continental SE Asia, from nominate *C. a. aurifrons* via *pridii* then *inornata*, to zero in *incompta*.

Chloropsis hardwickii Jardine & Selby, 1830

Peters's Check-list assigns subspecies *malayana* Robinson & Kloss, 1923, exclusively to the uplands of Peninsular Malaysia, whereas Smythies (1953) had extended it to all of upland Burma except the Chin hills and the north, i.e., far into the range of what other, including more recent, authors have recognized as nominate *C. h. hardwickii*. These two subspecies differ only in size and a search of the BMNH series confirms the existence of wide size variation within Burmese limits, including the presence of individuals as small as from Malaysia. Evidently, *C. h. malayana* is not the Peninsular endemic it has widely been assumed to be but extends north to intergrade with nominate *hardwickii* on the continent. This process may start in Karen state but the sharpness of the intergradation zone and its geographical limits (including whether it extends beyond Burma) are undescribed and in need of further exploration.



Colour plate 1: Significant leafbirds: (1) Javan *C. c. cochinchinensis* male and (2) *Chloropsis cochinchinensis auropectus* subsp. nov., male, illustrating the species type locality controversy (see also Plate 2); and (3) *C. jerdoni* male, (4) *C. kinabaluensis* female, (5) *C. c. viridinucha* female, (6) *C. aurifrons incompta* female, and (7) *C. media* female, illustrating key comparisons among taxa newly elevated to species rank. Original painting by John Gale.



Colour plate 2: [Upper and lower figures] Buffon's 'Le Verdin de la Cochinchine' (Martinet's figure 3 of plate 643 of *Planches Enluminées*: Daubenton); *Phyllornis cochinchinensis* (from Plate 484 of *Planches Coloriées*: Temminck & Laugier de Chartreuse), to be compared mutually and, for best fit, with images (1) and (2) of Colour plate 1 (from copies in the library of the National Museum of Natural History, Leiden).

Irena puella (Latham, 1790)

Stated to have occurred in central Sri Lanka during the late 19th century (Phillips, 1978); gaps between the ranges of remaining W and E Ghat populations and those of the far-NE Indian subcontinent may not so long ago have been smaller than they are now (witness old records from Maharashtra and a 1975 sighting in the Simlipal hills of N Orissa state: Ripley, 1982). Present-day remoteness may not be a reason for assuming nominate *puella* Latham, 1790 (type locality Kerala state) in the south and north-eastern populations have diverged far genetically. Northern birds are believed to average larger and on this one character (measured as wing-length) Whistler & Kinnear (1933) separated them to a subspecies *sikkimensis* (type locality, Sukna, Darjeeling district, Bengal). From the E Himalayan foothills through SE Asia, on the other hand, distribution is still more or less continuous, and within this latter range size relaxes back, eventually, to birds in the northern half of the Thai-Malay Peninsula that are as small as, or smaller (adult male wing 120-129 mm, n = 21) than in S India (124-132 mm, n = 20). With no detected discontinuities of size or any other clinal variable in the east, Delacour (1960) synonymized *sikkimensis* and recognized only *I. p. puella* throughout the main continental part of the species range.

After publication of the relevant part of Peters's Check-list, Abdulali (1964) described *I. p. andamanica* from Long island, Middle Andaman. This and *I. p. sikkimensis* were synonymized by Ali & Ripley (1971), and Abdulali (1971) himself came to doubt the distinctiveness of *andamanica*'s slightly heavier bill and longer tail relative to birds of the NE Indian subcontinent (the only population with which it was then compared). Later, Abdulali & Sethna (1981) quantified these differences in more detail: an average greater bill-width at nostril level in *andamanica*, and a tail/wing ratio (t/w x 100) consistently over 80, versus not above 78 on the mainland. They also declared S Indian females to be brighter blue on the body, especially the tail-coverts, than those of the NE Indian subcontinent (plus Burma), and resurrected subspecies *sikkimensis* on that basis. At the same time, their study made no reference to the findings of Handkte (1978) whose comparison of a larger sample with Burmese birds demonstrated Andaman bills to be consistently deeper relative to length but showed an overlap of tail/wing ratio ranges, that expanded as material from other parts of the species geographical range was added.

A re-examination of these various claims using the BMNH series reveals as follows. (i) That the birds of the NE Indian subcontinent are indeed larger than elsewhere (adult male wing 131-140 mm, n = 8), that relatively large birds occur across the whole of northern SE Asia, south at least to mid Tenasserim (adult male wing 127-134 mm, n = 14), but that within the Thai-Malay Peninsula, from latitude 11°N to the northern limit of range of *I. p. malayensis* Moore, 1854, male wings are in the range only 120-129 mm (see above). The abruptness of this southern shift has not been determined. Male *I. p. andamanica* are in the range 127-134 mm, equivalent to northern mainland SE Asian birds. (ii) That the tail of male *I. p. andamanica* is proportionately long (tail/wing ratio 79-87, mean 83, n = 9) relative to all northern and eastern mainland populations sampled: 74-83 (mean 77) in NE India; 75-80 (mean 77) in northern SE Asia; 73-81 (mean 77) in the northern Thai-Malay Peninsula, but is closer to S Indian populations (ratio 77-84, mean 81). (iii) That the *andamanica* bill is indeed proportion-

ately deep, plus broader than in any of the above continental populations. (iv) That within the above range, intensity of blue in the body plumage of adult females shows greater individual than geographical variation.

From this we conclude (i) that *I. p. andamanica* is a weak race, just acceptable relative to continental populations (see also Rasmussen & Anderton, in press) on bill-shape, and that alone; (ii) that taxonomically significant differentiation may have occurred in the area of S Tenasserim but has yet to be investigated; and (iii) that until this is investigated variation demonstrated over continental Asia outside of the range of *I. p. malayensis* is such as not to warrant disturbing the Check-list's definition of the range of nominate *I. p. puella*. Were others to accept a subspecies *sikkimensis* on grounds of size, we would expect that name to apply generally across northern mainland SE Asia.

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