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RAFFLES IN MACRITCHIE FOREST? AN OVERLOOKED COLLECTING 'FIRST' FOR SINGAPORE, WITH CONSEQUENCES FOR AVIAN NOMENCLATURE

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ABSTRACT. — Clues from the morphology of adult males that the specimen accepted as the type of T. S. Raffles's *Calyptomena viridis* (Green Broadbill, his 'Burong Tampo Pinang', Aves: Eurylaimidae), came not from south-west Sumatra but from the Thai-Malay Peninsula sink nomenclature introduced on the Asian mainland and force a re-naming of the populations of the Greater Sunda Islands. Touching a small corner of Gathorne Cranbrook's interest in the work of the pioneering zoologists of Southeast Asia, and grist for the mill, this contribution obliges the author to withdraw an opinion (Wells, 2007: 726) that none of Raffles's bird specimens from the Peninsula survived into the modern era.

KEY WORDS. — *Calyptomena viridis*, Green Broadbill, nomenclature, morphological variation, *C. v. viridis*, *C. v. continentis*, *C. v. gloriosa*

INTRODUCTION

While Horsfield (1822) has been credited with authorship of the generic name *Calyptomena* (as demonstrated by Wells & Dickinson, 2010) the combination *C. viridis* is due to T. S. Raffles, who gave his new broadbill species a range: 'retired parts of the forests of Singapore and of the interior of Sumatra' (Raffles, 1822). A century on, Robinson & Kloss (1923) raised a subspecies *continentis* (type locality modern Ban Tha San, latitude 10°30'N, Chumphon province, Thailand) to accommodate large size found to characterise the population in the northern continental part of the species' range (to mid Tenasserim, Myanmar territory), and cleared the way to extending this name south through the rest of the Thai-Malay Peninsula by restricting the type locality of *viridis* to 'Benkoolen' (modern Bengkulu district), Raffles's collecting ground in south-west Sumatra. Their rationale for this action was the finding that, while on average shorter winged than topotypical *continentis*, Green Broadbills in the southern Peninsula ranged larger than on neighbouring Sumatra, and also Borneo. This observation still holds, but from expanded information on geographical variation it appears likely that Robinson & Kloss (1923) introduced *continentis* without a sufficient check of specimen BMNH [now NHM] 1880.1.1.1418 that from at least the date of its transfer to the British Museum (Natural History) (cf. Sharpe, 1906) had been accepted as a type of species *viridis*. Later revisers have been equally culpable.

SAMPLES AND GEOGRAPHICAL VARIATION

Measurements of wing-tip morphology in a large, nearly range-wide sample of Green Broadbills (Wells, 2011) improved appreciation of variation overall, especially of the adult males of this strongly dimorphic bird. Broadly, sex for sex, size declines southward into the Greater Sunda Islands then abruptly reverses on the West Sumatran Mentawai island chain, range of the small-island endemic *C. v. siberu*. Excluding *siberu*, wings of 20 intact, non-moulting adult males from the length of mainland Sumatra plus its northwestern satellite Nias (the largest Sumatran data-set yet assembled) measured 92–99 mm carpo-metacarpal flexure to tip, flattened and straightened; 30 from across Borneo (Sabah south to Kalimantan Tengah province and Sarawak east to Kalimantan Timur) measured 93–100 mm; and 113 continental individuals from Tenasserim to Singapore measured 95–111 mm. Apart from a short series examined for the survey by James Dean (NMNH) all of these were processed by the one investigator. NMH 1880.1.1.1418's wing measured 103 mm. Addition of tail length, measured flat and straightened from insertion of central rectrices to tip, plotted against wing values to generate scatters of points, showed not only that this individual's plot position lay well clear of the maximum polygon envelopes of both the Sumatran and Bornean samples, but closer to the position of the southern Thai male syntype of *continentis* (NMH 1947.60.73) than to the mean plot values of either of these island sets (Fig. 1).

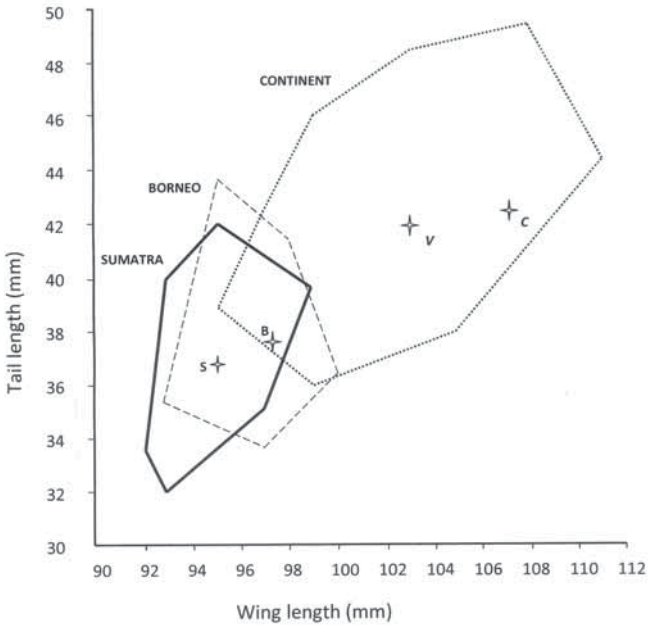

Fig. 1. Adult male *C. viridis* wing-length/tail-length polygon envelopes for Sumatra, Borneo and the combined range sectors of the continent, showing the plot position of the *viridis* type specimen relative to that of *C. v. continentis* and the sample means from Sumatra and Borneo. S = Sumatra; B = Borneo; *v.* = *viridis*; *c.* = *continentis.*

Judged by eye, plumage colour characters varied as follows: underpart greens from clear, brilliant grass to lustred with turquoise blue (cf. Deignan, 1947) and, in parallel, cap to mantle and back (always a shade darker than other green parts) from clear grass green to distinctively deep moss toned (Wells, 2007). Both reached peak consistency in the Sumatran set: blue tint uniformly strong; rear cap to back at the dark, moss green extreme of variation, only a few individuals (geographically well scattered) even slightly deviant. Most Bornean males matched the Sumatran set on strength of blue and mossy darkness of the upperparts, but a few showed reduced to no blue tint and a correlated tendency to grass green rather than moss green upperparts; again, with no geographical bias detected and instances of opposite extremes from one and the same locality, e.g., Mt Dulit, N Sarawak (NHM, Tring).

The continental sample ran the full gamut of variation: instances of maximum blue lustre on the underparts north to latitude about 6°N (extreme southern Thailand), paling but still detectable to at least 10°30'N, including in the type of *continentis*; and (contra Wells, 2007) of upperparts fully dark, moss green north to about 4°N (south Kelantan state); but over the whole distance birds with these island-type characters matched to outnumbered by others that were entirely without blueness and no more than slightly darker rather than moss-toned green above; plus intergrades.

NMH 1880.1.1.1418 fell squarely into the second category: underpart green intense but clear, with no blue lustre, and upperpart tone a poorly contrasting grass green rather than moss green. These characters do near enough match certain of the Bornean males examined whereas size and proportions point unambiguously to this bird having come not from a Greater Sunda Island population but from the continent, where all of its characters are mainstream.

ABOUT THE TYPE SPECIMEN

There is nomenclatural fallout from this discovery, but bridging a half century of history between publication of the description of *viridis* and receipt of the associated specimen at the British Museum (Natural History) in 1880 demands a leap of faith. Sclater (1888) listed an 'ad skin Sumatra (Raffles)' at the museum but with no mention of type status, and the first independent indication is from Sharpe (1906: 396–397) who included *C. viridis* among Raffles type material acquired from the Indian Museum after the latter's dispersal in 1879. This 26-year delay raised suspicion that the accession-book entry: '*Calyptomena viridis* Sumatra (Raffles) Type of the species' might not all have been original, but script style holds across the whole line and matches other dated entries nearby, hence gives nothing away.

Labels on the skin itself say no more than 'Sumatra Ex Coll Raffles (Ind Mus)', but these are British Museum issue; no 'Ind Mus' or any earlier tag is known even though by 1880 it was no longer Zoology Department policy to remove and replace incoming labels (R. Prŷs-Jones, pers. comm.). From evidence of wire punctures on the soles of its feet, however, this individual had once been mounted (Warren & Harrison, 1971) hence older information might have been discarded with a socle of some kind. In any event, no more tangible link with its past seems to have survived.

Further back in time, Horsfield & Moore (1854) listed the Indian (then East-India Company) Museum itself as holding a drawing and two specimens of *C. viridis*, 'Sumatra. Presented by Sir T.S. Raffles'. Still earlier, Vigors (1832) claimed that Raffles specimens of *C. viridis* had found their way into the holdings of both the East-India Company and the Zoological Society of London. Among sources to be considered, a collection pulled together around Bengkulu during two months of 1824 to replace one lost in a ship fire in February of that year (Kinnear & Robinson, 1927) came too late in time. Once back in London, however, Raffles is stated to have taken delivery of other, earlier specimen consignments (Bastin, 1990). These would have included a large one rich in birds shipped from Bengkulu in June 1820, and from which it is reckoned that most of his 1822 *Catalogue* descriptions had been taken before packing. Critically, this shipment could have included material that Raffles and his scientific assistants W. Jack, P. Diard, and A. Duvaucel would have carried to their Bengkulu base from visits made to Singapore during December 1818 – February 1819 and June 1819 (Burkill, 1916; Bastin, 1990). Thus even though some merging of consignments may have occurred before material reached the above institutions, in theory at least, a male *C. viridis* from one of these Singapore forest expeditions could have made its way to the Indian Museum and remained there correctly attributed to a donor if not to a collecting locality.

About the only countervailing evidence is 1880.1.1.1418's state of preservation, unexpectedly good in a rare survivor of collections mostly lost well over a century ago (Sharpe, 1906). Having been re-made as recognised type material, on the other hand, means that a British Museum curator is likely to have given it special attention. As pointed out by Warren and Harrison (1971), however, the wording of Raffles's 1822 *Catalogue* also implies that notice had been taken of at least one other individual. No contender has re-surfaced and the only available clue to one could be the aforementioned drawing (now British Library cat. no. NHD4/661), linkable directly to Raffles. Among artwork shipped from Bengkulu and in London by 1821 (Burkill, 1916; Archer, 1962), this shows just an adult male, greens now slightly blue-tinged but, critically, as bright/light above as on the underparts, with no sign of the moss tone that would certainly have been apparent to an artist handling a Sumatran bird. A near-contemporaneous painting of a male Green Broadbill from Horsfield (1822) shows that contrast clearly. Regardless of when, or whether, it was painted at Bengkulu, the model appears to have come from elsewhere; indeed there is no way of excluding the possibility that this is a picture of 1880.1.1.1418 itself.

If only by default it follows that 1880.1.1.1418's type status is best upheld. Pursuant to Recommendation 73F and Article 74.7 of the International Code (ICZN, 1999) for lack of an original selection among supposed paratypes, NHM 1880.1.1.1418 is thereby designated lectotype of species *viridis*.

CONSEQUENCES FOR NOMENCLATURE

The upshot of this finding is that Robinson & Kloss's (1923) restriction of the type locality of *viridis* be rejected in favour of a re-restriction to Raffles's stated range alternative: 'Singapore', i.e., Singapore Island. Exactly where on the island, of course, cannot be known but undoubtedly within a block of habitat of which the modern central catchment area, including MacRitchie forest, currently in the conservation news, forms a critical, never completely deforested remnant.

One direct outcome of this re-restriction for taxonomy at subspecies level is a confirmation of the sinking into the synonymy of *viridis* of *caudacuta* Swainson, 1838, a name applied to continental populations (Deignan, 1947; Dekker & Dickinson, 2000; Wells, 2007) although without original designation of a type locality or any proven surviving type material (but identified to species from Swainson's sketch of undoubted adult male Green Broadbill tail feathers). By the date, types of *caudacuta* are likely to have been trade skins (from Melaka?) and Robinson (1927), who called it '*acuticauda*', thought this name might be applied to the population of the far south of the Peninsula should that after all prove to be separable from his *continentis*. Later, Chasen (1935) assigned it specifically to Singapore territory.

Other outcomes depend on the real nature of geographical variation on the continent. Since Kloss (1930), all reviewers have recognised at least one subspecies endemic to the continent, but with no regular agreement about its southern limit of range. Lambert & Woodcock (1996), Dekker & Dickinson (2000), Bruce (2003), and Wells (2007) followed Robinson & Kloss (1923) in taking this to the southern terminus of the land, including by inference Singapore territory. However, the possibility of a taxonomic boundary occurring on the mainland somewhere north of Singapore (cf. Wells & Medway, 1976) has never been rejected formally.

In a two-stage check of what remains of the facts (see below), mean wing-lengths were compared between Sumatra as a whole, Borneo as a whole, and six two-degrees-of-latitude sectors of the continental range north to 16°N. Apart from the dip of an unreliably small 14>16°N sample (well north of the type locality of *continentis*) and kink at 02>04°N, mean wing-length fell away smoothly south to sea-gap drops between the southern end of the Peninsula and Greater Sunda Islands (Table 1).

Wing/tail-length plots for the same range sectors, but for sampling reasons north on the continent only to latitude 12°N, were then used to generate a two-way test of diagnosability between sectors (cf. Amadon & Short, 1992) based on the proportion of plots per sample falling outside the area of overlap of adjacent polygon envelopes and taking 75% of plot positions as the lower limit of acceptability. The results (Table 2) tracked the trend of mean wing-lengths. Between continental sectors, only one value (coinciding with the kink in the wing-length slope) cleared the limit for taxonomic recognition: 85% diagnosable between the sectors 02–04° and 04–06°; but this was not supported by a reciprocal value of hardly above half that level. Only at the southern extremity sea-gap were values in the critical range both ways—to near absolute between sector >02° and Sumatra, and still above 80% when >02° was summed with 02>04° (covering the wing-length kink).

Recognition of a subspecies break between Sumatra and the Peninsula is supported. However, the original question of whether that break occurs at the sea-gap itself or, as Robinson (1927) later surmised, further back into the tip of the continent is hampered by the fact that Green Broadbills were eliminated from Singapore territory itself around 70 years ago (Lim, 1992), with hardly any additional representation of this one-time population left in study collections. Only two other males have been found, one of them not fully adult, and short of these and the type specimen, placement of this island population rests on inference. Luckily, the mainland part of the southernmost continental range sector is fairly well sampled and includes males of wing up to 104 mm collected near the coast of the Johor Strait, directly opposite Singapore Island. It is also on record that one of the Strait's larger islands, Ubin, was well populated with Green Broadbills, making it unlikely that for a bird known to be a disperser (cf. Wells, 2007) this narrow waterway represented a serious barrier to gene-flow. No cross-strait morphological divergence has been reported in any other shared forest bird species.

Table 1. Adult male *C. viridis* wing-length per sector of geographical distribution (see text): sample size, range limits, and mean (mm).

Range sector (>°N)	n	Limits (mm)	Mean (mm)
>16	04	103–105	*103.8*
>14	03	104–108	106.2
>12	11	102–108	105.4
>10	14	100–109	104.5
>08	12	99–108	103.8
>06	18	100–106	102.9
>04	34	95–104	99.2
>02	16	98–105	100.8
Sumatra	20	92–99	95.2
Borneo	30	93–100	97.0

Table 2. Measures of diagnosability, taken from the proportion of wing/tail-length plots falling outside the area of overlap of the scattergram envelopes of adjacent range sectors. Percentage values supporting taxonomic recognition are in bold.

Range sector (>°N) pairs north to south	n/n	Plots outside area of envelope overlap	Percentage individuals diagnosable
>12°/>10°	10/14	05/09	50/64
>10°/>08°	14/11	06/04	43/36
>08°/>06°	11/15	07/03	64/20
>06°/>04°	15/33	07/28	47/**85**
>04°/>02°	33/16	15/03	45/19
>02°/Sumatra	16/15	16/14	**100/93**
>02°+>04°/Sumatra	49/15	41/13	**84/87**
Sumatra/Borneo	15/26	04/16	27/62

Accordingly, the name *v. viridis* is taken to apply north as well as south of the Johor Strait, and may thence be taken to absorb clinal variation northward, past the type locality of *continentis* provisionally to the limit of continental range. As such, *continentis* joins *caudacuta* in the synonymy of *viridis*. The last line of Table 2 supports continued treatment of Sumatran (other than small-island *siberu*) and Bornean birds as one subspecies, but it follows that re-restriction of the type locality of *viridis* here has deprived both of these Greater Sunda Island populations of a name. Though introduced just with reference to Borneo, not to Sumatran material, the next one in line of availability is believed to be H. G. Deignan's *gloriosa*: Deignan, 1947, holotype an adult male, USNM 182844, type locality Karangan river at coordinates 1°19′N: 117°42′E, Kalimantan Timur province, Indonesian Borneo, collected by H. C. Raven on 9 November 1913.

The proposed total revision then reads:

Genus *Calyptomena* Horsfield, 1822 (see Wells & Dickinson, 2010);
Calyptomena viridis Raffles in Horsfield, 1822, type locality Singapore Island;
Calyptomena v. viridis – provisionally, all of the continental range, absorbing local and clinal variation;
C. v. gloriosa Deignan, 1947, type locality Karangan river, Kalimantan Timur province – of Borneo and Sumatra and satellites including, provisionally (no material seen), Bunguran island in the N Natuna group, S China Sea);
C. v. siberu Chasen & Kloss, 1926, type locality Siberut island – restricted-range inhabitant of the W Sumatran Mentawai islands Siberut and N and S Pagai: darker, slightly bluer and, sex for sex, absolutely larger than on neighbouring mainland Sumatra, but not larger than in the north of continental range, weakening the suggestion of Bruce (2003) that this divergence might be at species level.

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LITERATURE CITED

Amadon, D. & L. L. Short, 1992. Taxonomy of lower categories: Suggested guidelines. *Bulletin of the British Ornithologists' Club*, **112A**: 11–38.

Archer, M., 1962. *Natural History Drawings in the India Office Library*. HMSO, London. ix + 116 pp., 25 pls.

Bastin, J., 1990. Sir Stamford Raffles and the study of natural history in Penang, Singapore and Indonesia. *Journal of the Malaysian Branch, Royal Asiatic Society*, **63**: 1–25.

Bruce, M. D., 2003. Family Eurylaimidae (Broadbills). In: del Hoyo, J., A. Elliott & D. Christie (eds.), *Handbook of the Birds of the World*. *Volume 8*. Lynx Edicions, Barcelona. Pp. 54–93.

Burkill, I. H., 1916. William Jack's letters to Nathaniel Wallich, 1819–1821. *Journal of the Straits Branch, Royal Asiatic Society*, **73**: 147–268.

Chasen, F. N., 1935. A handlist of Malaysian birds. A systematic list of the birds of the Malay Peninsula, Sumatra, Borneo and Java, including the adjacent small islands. *Bulletin of the Raffles Museum*, **11**: i–xx, 1–389.

Chasen, F. N. & C. B. Kloss, 1926. Spolia Mentawiensis. Birds. *Ibis* (series 12), **2**: 269–306.

Deignan, H. G., 1947. New races of Asiatic broadbills (Eurylaimidae). *Proceedings of the Biological Society of Washington*, **60**: 119–122.

Dekker, R. W. R. J. & E. C. Dickinson, 2000. Systematic notes on Asian birds. 2. A preliminary review of the Eurylaimidae. *Zoologische Verhandelingen, Leiden*, **331**: 65–76.

Horsfield, T., 1822. *Zoological Researches in Java, and the Neighbouring Islands—Part 4*. Kingsbury, Parbury & Allen, London. 110 pp.

Horsfield, T. & F. Moore, 1854. *A Catalogue of the Birds in the Museum of The Hon. East-India Company*. *Volume 1*. W. H. Allen & Co., London. 804 pp.

ICZN, 1999. *International Code of Zoological Nomenclature*. *4th Edition*. International Trust for Zoological Nomenclature, London.

Kinnear, N. B. & H. C. Robinson, 1927. Communication on a volume of coloured drawings of Sumatran birds made under the superintendence of Sir Stamford Raffles while Lieutenant-Governor at Fort Marlborough. *Bulletin of the British Ornithologists' Club*, **47**: 127–130.

Kloss, C. B., 1930. An account of the Bornean birds in the Zoological Museum, Buitenzorg, with a description of a new race. *Treubia*, **12**: 395–424.

Lambert, F. & M. Woodcock, 1996. *Pittas, Broadbills and Asities*. Pica Press, Sussex. 280 pp.

Lim, K. S., 1992. *Vanishing Birds of Singapore*. Nature Society (Singapore), Singapore. 103 pp.

Raffles, Sir T. S. 1822. Second part of the Descriptive Catalogue of a Zoological Collection made in the island of Sumatra and its vicinity. *Transactions of the Linnean Society of London*, **13**: 277–340.

Robinson, H. C., 1927. *The Birds of the Malay Peninsula*. *Volume 1. The Commoner Birds*. H. F. & G. Witherby, London. 329 pp.

Robinson, H. C. & C. B. Kloss, 1923. Eleven new Oriental birds. *Journal of the Federated Malay States Museums*, **11**: 53–57.

Sclater, P. L., 1888. *Catalogue of the Passeriformes or Perching Birds, in the Collection of the British Museum* [*Catalogue of the Birds in the British Museum*, *Volume 14*]. Taylor & Francis, London. 872 pp.

Sharpe, R. B., 1906. Birds. In: Lankester, E. R. (ed.), *The History of the Collections Contained in the Natural History Departments of the British Museum*. *Volume 2*. Longmans, Quaritch, Dulau & Kegan Paul, & Trench, Trübner & Co., London. Pp. 79–515.

Swainson, W., 1838. Animals in menageries. In: Larder, D. (ed.), *The Cabinet of Natural History*. Longman, Orme, Brown, Green & Taylor, London. Pp. 281–373.

Vigors, N. A., 1832. Catalogue of zoological specimens [birds]. In: Raffles, Lady Sophia (ed.), *Memoir of The Life and Public Services of Sir Thomas Stamford Raffles F.R.S. & C, Particularly in the Government of Java 1811–1816, and of Bencoolen and its Dependencies, 1817–1824; With Details of the Commerce and Resources of the Eastern Archipelago*. John Murray, London. Pp. 648–685.

Warren, R. L. M. & C. J. O. Harrison, 1971. *Type-Specimens of Birds in the British Museum (Natural History)*. *Volume 2. Passeriformes*. Trustees of the British Museum (Natural History), London. 628 pp.

Wells, D. R., 2007. *The Birds of the Thai-Malay Peninsula*. *Volume 2, Passerines*. Christopher Helm, London. 848 pp.

Wells, D. R., 2011. Unique mid-tract loss of a primary remex in male broadbills of the Southeast Asian genus *Calyptomena*: Timing and possible implications. *Ibis*, **153**: 429–432.

Wells, D. R. & E. C. Dickinson, 2010. Authorship of the broadbill genus name *Calyptomena* and the correct citations for this and *Calyptomena viridis* Raffles. *Bulletin of the British Ornithologists' Club*, **130**: 143–145.

Wells, D. R. & Medway, Lord 1976. Taxonomic and faunistic notes on birds of the Malay Peninsula. *Bulletin of the British Ornithologists' Club*, **96**: 20–34.