

THE IDENTITY OF SOME MALAYSIAN SPECIES OF *CERIAGRION*, WITH DESCRIPTIONS OF TWO NEW SPECIES (*Odon.*)

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It has for a long time been tacitly understood that the nomenclature and synonymy of some East Asiatic species of *Ceriagrion* are thrown into confusion and that the taxonomic status of even the commonest and best known orange- and red-bodied species of the *coromandelianum* cluster has yet to be cleared up. At one time I have presumptuously announced a thorough revision of all Oriental members of *Ceriagrion*, to which purpose more than three thousand specimens from various sources were accumulated and are still available for study. Unfortunately, progress has been slow and but one species, *erubescens*, could so far be placed on a firm footing (LIEFTINCK, l.c. *postea*, 1933 & 1947). As I have little prospect of being able to continue with these large collections for some time, other series will be reported on gradually in later contributions. Certain results must, however, be anticipated, since it is no longer permissible to treat two well-known Malaysian species under the wrong names, a course that has *ex mera conjectura* been followed by all previous workers on these insects, including myself.

The object of the present contribution, therefore, is to examine the status of these two species in conjunction with that of *coromandelianum* (F.) and *erubescens* SELYS, both of which are much better known.

From the study of a larger series of specimens of each of these four species the author is at present of the opinion that they can easily be held apart. When compared with features that serve to separate other members of the genus, the characters which differentiate them are absolute, and there is no intergradation between the different forms at their points of contact. ¹⁾

Of particular interest are the cases in which certain populations structurally deviate a little from the rest of the species. Considerable doubt still remains as to how to group these into systematic categories

¹⁾ A study of the penile organ of the males of these species has revealed nothing of interest, and since its structure is remarkably similar in the species examined I have deferred describing it. The penis of an African species, *C. platystigma* FRAS., has recently been figured by FRASER (*Proc. R. Ent. Soc. Lond. (B)* 10, 1941: 63, fig. 4).

(species or subspecies) and how to delimit them with regard to each other. As was to be expected, the structure of the male anal appendages is subject to more or less variation, but in every case the differences found appear to be associated with and restricted to a particular section of the range of the species, especially in well-isolated insular populations. Examples of this kind are populations of supposed *erubescens* and *latericum* from the Malay Peninsula, from continental East Asia and from certain islands of the Philippines, Formosa and the Loo Choo group, whose differential characters are extremely slight and merely concern proportional lengths of the appendages and minute deviations in the armature of these organs. There is little doubt that most of these strains will prove ultimately to be geographic subspecies of one or the other of the species discussed here, but in the present revision all doubtful cases have been left out of consideration.

I am including in this paper a key and some camera lucida drawings of male terminal abdominal segments, of four species. Under each heading is found a list of the known localities and an enumeration of the specimens which I consider should be assigned to these species. The references are not intended to be exhaustive, but chiefly to indicate under which name the respective species have been mentioned in the literature.

It should be clearly understood that, until a complete revision can be attempted, several other S. E. Asiatic species of *Ceriagrion* await elucidation.

Of the already described species of *Ceriagrion*, I have had for comparison twelve other Asiatic members of the genus, to which should be added at least five or six unnamed species from various sources still pending their description. The known species are the following: *C. annulosum* LIEFT., *azureum* (SELYS), *bellona* LAIDL., *cerinomelas* LIEFT., *cerinorubellum* (BRAUER), *fallax* RIS, *hoogerwerfi* LIEFT., *inaequale* LIEFT., *melanurum* SELYS, *olivaceum* LAIDL. (and its race *aurantiacum* FRAS.), *praetermissum* LIEFT., and *rubiae* LAIDL.

Key to the species

1. Head relatively small. Insect of solid build, abdomen cylindrical, rod-like, with the intermediate segments but slightly constricted. Antero-dorsal surface of head yellow to orange, this colour strongly contrasting with a very broad brown band that covers most of the upper surface. Thorax mainly olive-green acquiring dorsally a more brownish tinge. Legs lemon yellow to deep chrome. M_2 arising at

the 6th postnodal on anterior, at the 5th on posterior wing. Abdomen unicolorous lemon- to cadmium yellow, rarely the dorsal surface more reddish (apricot orange or rufous). Apical segments of ♀ abdomen never marked with black 2.

1'. Head relatively large. Insect of slenderer appearance, the abdomen less solidly built, more markedly constricted after the basal and before the terminal segments, with the intermediate segments thinner and slenderer. Antero-dorsal surface of head more reddish in colour, ochraceous-salmon through ochraceous-orange to tawny. Thorax darker, mainly tawny-olive to ochraceous-tawny, occasionally even golden-brown, almost russet, the sides often paler and intermingled with bluish-glaucous. Legs pale, varying from lighter to darker ochraceous-buff. *Ab* separating from the posterior margin of wing at the point where *Ac* meets the margin. Position of M_2 variable. Abdomen not yellow, unicolorous, from apricot orange to coral red, sometimes even jasper red or scarlet in live specimens. Apical segments of ♀ abdomen with or without black markings 3.

2. Distal portion of abdomen widest at the apex of segment 8, thence diminishing in width, with the sides of 9 and 10 convergent and the anal appendages closely approximated. Shape and proportions of 10th segment and appendages as in fig. 1. Apical notch on segment 10 very wide and deep, armed with low marginal crenulations, the side angles removed laterad but not produced. Sup. anal apps less than one-half the length of segm. 10, closely approximated and convergent in dorsal view, knob-like and broadly rounded apicad, much shorter than inferior pair, each armed about half-way its length with an inwardly directed acute black tooth which is well visible in dorsal view. Inf. apps with a broad inner shelf-like projection. *Ab* nearly always separating from the wing margin at the point where *Ac* meets the margin or, more rarely, very slightly proximal to that level; *Ab* not so strongly convex distally, its entire course more nearly parallel to the wing margin. ♂ abd. + app. 27.5 - 30.0, hw. 17.5 - 19.5; ♀ 29.0 - 30.0, 20.0 mm. 1) Hab.: India; Assam; Burma.

coromandelianum.

2'. Distal portion of abdomen slightly and gradually widened towards the end of segment 9, apical segments not having the pinched appearance of *coromandelianum*; 10 relatively much wider, parallel-sided. Shape and proportions of 10th segment and appendages as in fig. 2. Apical notch on segment 10 small and shallow, armed with low

1) FRASER (loc. cit. 1933) gives: ♂ 28-30, 18-20; ♀ 29-32, 20 mm.

marginal denticles, the lateral angles situated dorsad, not produced. Sup. anal apps more than one-half the length of segm. 10, widely distant in dorsal view, sub-parallel, directed almost straight backwards, each much longer than wide, gradually tapered and slightly twisted, as long as or a little longer than inferior pair; in lateral view appearing somewhat noded about half-way their length, with broadly rounded apex; intero-ventral tooth not visible when viewed dorsally. Inf. apps much slenderer, without conspicuous inner shelf-like projection. *Ab* usually separating from posterior margin of wing somewhat distal to the point where *Ac* meets the border; distal portion of *Ab* usually nearer the wing margin than its proximal part. Size variable. ♂ abd. + app. 27.5 - 33.0, hw. 18.0 - 20.5; ♀ 30.5 - 32.5, 20.0 - 22.5 mm. Hab.: Malaya (Penang); Sumatra; Java; Kangean; Sumbawa; Sumba; Celebes **calamineum**.

3. *M*₂ arising at the 5th postnodal on anterior, on the 4th on posterior wing. Shape of wings as described in tabular form (p. 193); apices decidedly more rounded and pterostigma a little less oblique and shorter than in any of the other species. Terminal segments of abdomen from base of 8 to the end of that segment a little expanded, 9 and 10 with sides sub-parallel. Apical notch of segment 10 very wide and deep, forming a continuous arch, bordered with a row of closely set acute black denticles; lateral angles of notch well pronounced, almost rectangulate, and furnished with a tuft of longish, light-coloured stiff bristles along upper margin. Anal appendages of small size, the superior pair noticeably shorter than inferior pair (fig. 3). Segments 8-10 of ♀ abdomen with sharply defined black dorsal marks. Insect of smaller size and more compact build. Body-colouring darker and deeper in tint than in the next species. ♂ abd. + app. 27.0 - 30.0; hw. 16.0 - 18.0; ♀ 28.5 - 30.0, 18.0 - 19.5 mm. Hab.: Malaya; Sumatra; Java; Sumba **latericum**.

- 3'. *M*₂ arising at the 6th postnodal on anterior, at the 5th on posterior wing. Wings shaped similarly to *coromandelianum* and *calamineum*, i.e. more drawn out, less noticeably expanded beyond the nodus, with the tips more pointed than in the preceding; pterostigma also slightly longer, less red. Terminal segments of abdomen more gradually expanded from apical fourth or less of 7 as far as the end of 9; sides of 10 parallel or even a little convergent. Apical notch of segment 10 wide, though less deep than in *latericum*, obtuse-triangular instead of being strongly vaulted, bordered with a row of closely set acute black denticles; lateral angles of notch gently sloping away and

devoid of longish bristle-like hairs along upper margin. Anal appendages similar in principle to those of *latericium* but the superiors appearing less truncated with the tips more pronounced extero-apically; inferior pair sub-equal in length or only slightly longer than the superiors (fig. 4). Segments 8-10 of ♀ abdomen without any trace of black dorsal marks. Insect of larger size and slenderer build. Body-colouring generally somewhat lighter, the thoracic sides often intermingled with bluish-glaucous and abdomen also lighter red. ♂ abd. + app. 31.0 - 33.0, hw. 18.0 - 19.0; ♀ 29.5 - 32.5, 19.5 - 21.0 mm. Hab.: Celebes (part); Buru; Misool; Salawati; New Guinea; Aru; North Australia; ?Solomon Is. *erubescens*.

Ceriagrion coromandelianum (F.) (fig. 1).

Selected references:

1798. FABRICIUS, Suppl. Entom. Syst. 3-4: 287. — ♂ India or. (*Agrion*).
 1842. RAMBUR, Hist. Nat. Ins. Névropt.: 279 (pars). — ♂ "Sénégal; Bombay; Pondichéry" (*Agrion cerinum*).
 1858. BRAUER, Verh. Zool.-bot. Ges. Wien, 8: 478. — ♂ Ceylon (*Agrion*).
 1876. SELYS, Bull. Acad. Belg. (2) 42: 528 - 529. — ♂♀ India mér., Bombay, Pondichéry.
 1891. SELYS, Ann. Mus. civ. Genova 10 (30): 516 (no descr.). — Burma. [Identity uncertain.]
 1900. KIRBY, Ann. Mag. Nat. Hist. (7) 5: 531, 537. — Hainan. [Identity uncertain.]
 1913. RIS, Abh. Senckenb. naturf. Ges. 34: 519 (key). — "Ceylon, Indien, Birma."
 1914. LAIDLAW, Rec. Ind. Mus. 8: 345, pl. 16, fig. 8, 8a (♂ apps). — ♂♀ NE. Assam.
 1916. LAIDLAW, Ibid. 12: 132 - 135 (notes), fig. 1 (larval labium). — Larva, Calcutta, descr.
 1919. LAIDLAW, Ibid. 16: 188 (key), 190 fig. 2 (♂ apps). — India (sine loc.)
 1924. FRASER, Ibid. 26: 491 (bionomics). — W. India.
 1924. LAIDLAW, Spolia Zeylanica, 12: 369. — ♂♀ Ceylon.
 1930. NEEDHAM, Zool. Sinica (A) 11: 263 - 264, pl. 19, fig. 10 (♂ apps). — "Canton, Fukien, Amoy". [Identity uncertain.]
 1933. FRASER, Fauna Brit. India, Odon. 1: 314 (key), 315 - 316, fig. 133 (♂ apps). — "India, Ceylon, Burma, Malaysia, Indo-China, and South China".
 1942. CHÛJÔ, Taihoku Imp. Univ. 90: 128 (no descr., distrib. pro p.). — Hainan. [Identity uncertain.]

The first good description of the ♂ has been given by SELYS (1876) who had seven males and two females before him, all from India. RIS (1913) had specimens from Ceylon, possibly also from India and Burma; he was the first to differentiate between "*erubescens*" (at that time still a composite species) and *coromandelianum*, and his diagnosis of the latter is essential. As RIS had no material from the Malaysian region, any possibility of confusion with *calamineum* is precluded. Of LAIDLAW's own sketches of the ♂ appendages, after a specimen from N. E. Assam (l.c.

1914), the same author remarks in a later paper: "My figures of the anal appendages of the male are not satisfactory. They were drawn from a shrivelled specimen. Normally the inferior pair projects directly backwards and slightly exceed the upper pair in length. Each member of a pair is curved inwards at its free extremity, more finely pointed than in the figure and tipped with black. Also when viewed directly from above the extremities of the lower pair can be seen projecting beyond the upper pair." (l.c. 1916: 132). In a later paper, LAIDLAW reported the species from

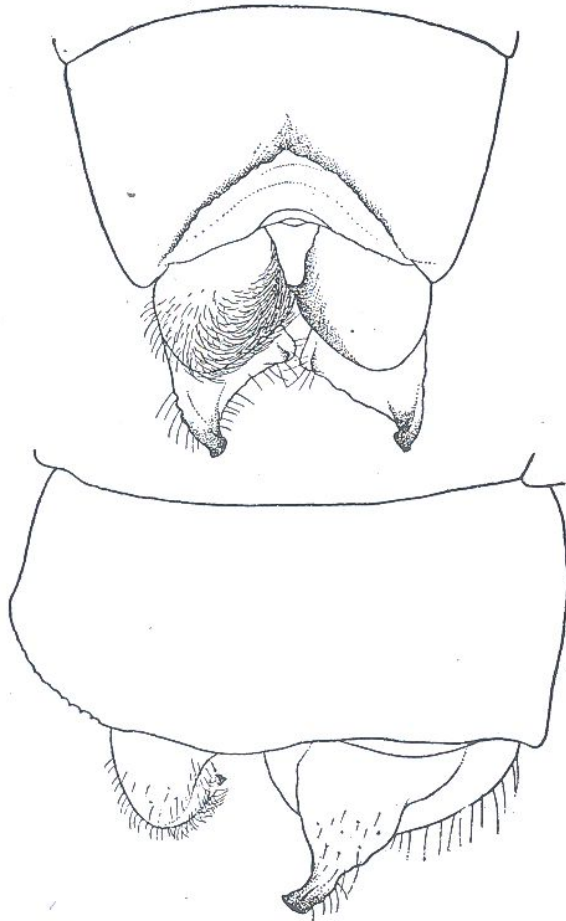


Fig. 1. — *Ceriagrion coromandelianum* (F.), Ceylon. Dorsal and right lateral view of ♂ anal apps.

India, giving a better figure of the appendages and supplying the following colour-description taken from fresh, well-preserved spirit specimens:

"Head. — Upper lip, post- and ante-clypeus lemon-yellow, frons gray-yellow up to level of anterior ocellus, and extending obliquely upwards and inwards from the eyes to enclose the posterior ocelli. Vertex and occiput bright golden-brown. This colour is delimited from the eyes and from the gray-yellow of the frons by exceedingly fine black lines. The eyes are uniformly pale olive-green.

The thorax and prothorax are uniformly olive-green of a less intense tone than the eyes. On the dorsum it takes on a slightly brown tinge; below it fades to greenish-white.

Abdomen uniformly lemon-yel-

low, as are the legs; the latter have black spines.

Anal appendages lemon-yellow, darker towards their apices and tipped with black." (l.c. 1919).

Again, in 1924, LAIDLAW, quoting E. E. GREEN's colour-notes of a live male, says: "Thorax bright green, darker above; head reddish above, yellow below, eyes green, abdomen gamboge yellow."

The fullest account of *coromandelianum* (both sexes)^o is found in FRASER'S "Fauna of British India" volume (1933), but the accompanying

figures of the male appendages are too crudely drawn, while the characteristic deeply emarginate posterior border of the tenth segment is not shown.

The characters employed in the key have been taken from a series of both sexes in my collection from Peninsular India (ex coll. F. C. FRASER) and from Ceylon, the latter having been collected by the author on a weedy tank near Passara (Uva Prov.), 3600 ft, Sept. 20th, 1938. To quote FRASER (loc. cit. 1933: 316), this species "breeds in weedy ponds and tanks, on the banks and borders of which it may be found for the greater part of the year, threading its way through the rank herbage or reeds."

It is impossible, from the existing descriptions and drawings alone, to judge whether *coromandelianum*, reported from Burma, Hainan, Fukien (E. China) and Canton, are really this species or belong to a nearly related one.

Distribution. — India and Ceylon, and Assam. Further range not yet known.

Ceriagrion calamineum, sp. n. (fig. 2).

1934. LIEFTINCK, Treubia, 14: 394 - 395. — ♂♀ W. & C. Java (*coromandelianum*).
 1934. SCHMIDT, Archiv Hydrob. Suppl. 13: 353, fig. 53 (♂ apps). — ♂♀ E. Java (*erubescens*).
 1935. LIEFTINCK, Misc. Zool. Sum. 92 - 93: 10. — ♂ S. Sumatra (*coromandelianum*).
 1939. NEEDHAM & GYGER, Philipp. J. Sci. 70: 281, pl. 17, fig. 247-248. — ♂ Philippines (*coromandelianum*).

Material. — Malay Peninsula: 10 ♂, 1 ♀, Penang I., ex coll. F. FÖRSTER (ex Michigan Museum, Ann Arbor). Sumatra: 1 ♀, S. Sumatra, Lampongs, Kotaagung, sea-level, 26.xii.1934, M. A. LIEFTINCK; 2 ♂ (ad), id., Telokbetong (Oosthaven), 3.vi.1929, F. C. DRESCHER. Java (numerous specimens of both sexes in all colour-phases); W. Java: Ujung Kulon Peninsula, P. Handeuleum, 7-12.ix.1942; Ujung Genteng Bay, ix.1936 and 27-29.iii.1937; further localities: Pasauran; Malingping; Bogor, 250 m; Tjisangiang near Bolang, 150 m; Mt Pantjar, 500 m; Mt Gedeh, Tjibodas, 1400 m; Radjamandala, 350 m; Mt Tangkuban Prahau, 1500 m; Mt Papandajan, 1700 m; Tjidaun, Sempurtjondong (S-coast); Tjideres near Cheribon, 100 m. C. Java (S-coast): Babakan, Djeruklegi, Patimuan and Kaliputjang (Penandjung Bay) in Banjumas. C. Java (N), Telawa near Djetès, and Mt Muria, Tjolo, 800 m. Kangean I.: 1 ♂, 1 ♀, Ardjasa, ii.1936, M. E. WALSH. Sumbawa I.: 1 ♂ (juv.), E. Sumbawa, Raba, 20.v.1949, A. M. R. WEGNER et al. (Swiss-Dutch Sumba

Exped.). S u m b a I.: 1 ♂ (ad.), C. Sumba, Langgaliru, 500-800 m, 6.x. 1949, same collectors. Celebes: 3 ♂, 1 ♀, S. W. Celebes, Watampone & Neëngo, 500 m, 4.vii.1935 & 23.vi.1936, C. VEEN & L. J. TOXOPEUS; 1 ♂, id., Mt Lompobatang, 1000 m, iii.1896, H. FRUHSTORFER (Mus. Hamburg); 16 ♂, 6 ♀, Makassar & surroundings, 1930-1949, all the year round, various collectors; 12 ♂, 10 ♀, Maros & Bantimurung, 1930-1949, id.,

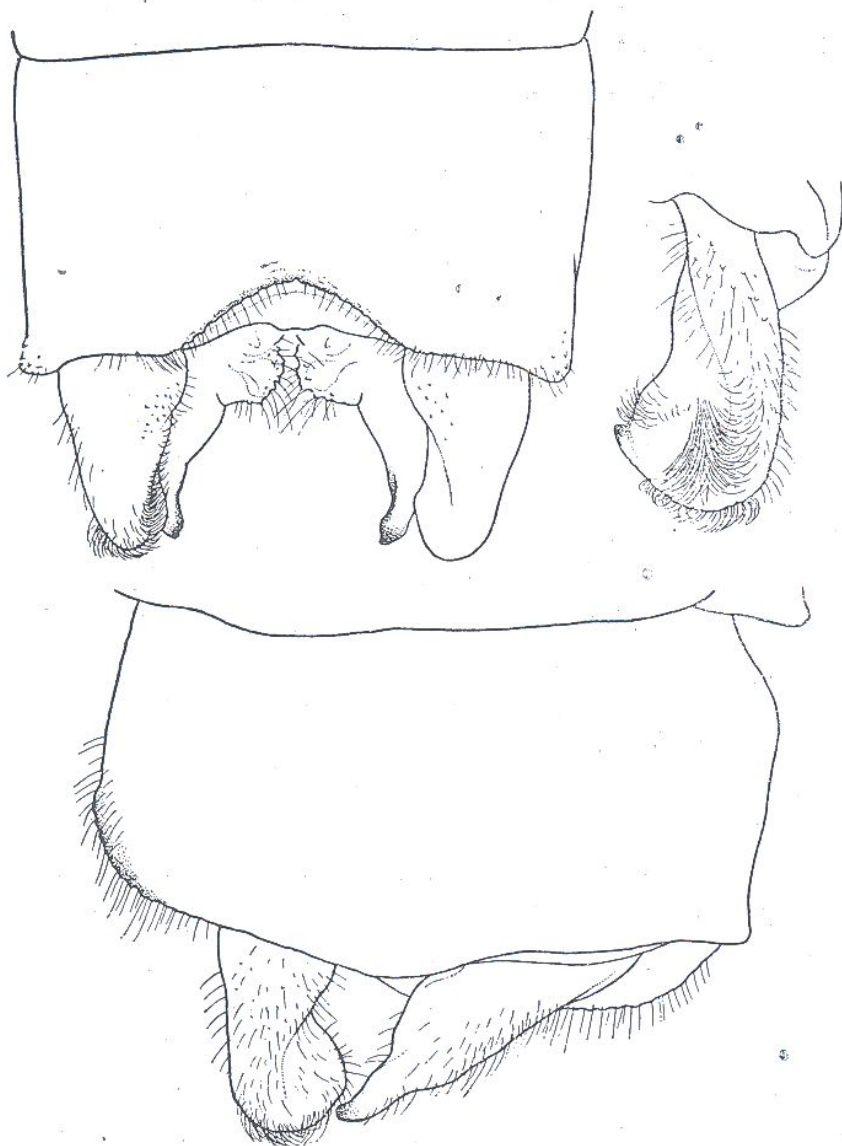


Fig. 2. — *Ceriagrion calamineum*, sp. n., S. Java. Dorsal and right lateral view of ♂ anal apps, and oblique intero-dorsal aspect of right sup. app.

various collectors. — Holotype ♂ and allotype ♀: W. Java, Bogor, Botanic Garden, 250 m, 23.viii.1930, AUTHOR (Mus. Leiden).

On reaching maturity both sexes pass through various colour-phases of which only the ultimate ones will serve our purpose, i.e. of describing the adult insect.

Here follow brief descriptions ¹⁾ based on freshly captured individuals, the first being taken from field notes, the second being prepared with the use of RIDGWAY'S "Color Standards ..." &c.

♂ (ad., holotype). — Mouth-parts, clypeus and frons as far upwards as the base of antennae, vivid orange-yellow. Remainder of head, inclusive of the eyes, light grass-green, the epicranial lobes and occipital region slightly darker green; eyes gradually turning lighter from above down, lower surface lemon-yellow. Pro- and synthorax throughout grass-green, pleurae changing gradually to clear yellow-green and turning almost pure white underneath. Legs orange-yellow. Abdomen dorsally bright chrome-yellow (Hardmudth's Koh-I-Noor), turning lighter aside and acquiring ventrally a light yellow tint.

♂♀ (ad., last colour-phases, A & B). — Anterior surface of head orange buff to deep chrome; or, labrum and postclypeus yellow ocher, anteclypeus and anterior portion of frons warm buff; head above tawny, this colour rather sharply delimited. Eyes Paris green, changing gradually to Veronese green. Prothorax ochraceous-tawny, the anterior lobe and the posterior border greenish. Thorax above Rinnemann's green, changing to light oriental green on the middle of the sides and to Veronese green behind the second suture; venter pale chalcedony yellow. Legs orange buff. ♂ (ad., A): Abdomen above throughout cadmium yellow, the sides and under surfaces pale orange-yellow; ♂ (ad., B): Abdomen above apricot orange or rufous, sides and under surfaces light chalcedony yellow (dorsum orange-rufous in very old examples). ♀: Abdomen yellow ocher (phase A), or cinnamon to tawny (phase B); sides and under surfaces as described for the ♂.

Head and thorax without traces of black sutural lines, but a black point is present at the upper end of the thoracic sides, one each just behind the anterior and posterior alar processes; also a short streak along dorsal (posterior) border of meta-postepimerum.

Legs unmarked; all spines and apices of tarsal claws black. Femoral spines short, numbering 3 — 4 — 5-6.

Wings shaped as described on p. 193; membrane often slightly tinged yellowish. Neuration, especially the position of *Ac* relative to the antenodal nervures, slightly variable; otherwise as described in the key. Postnodal

¹⁾ In this particular case it has been found impossible to differentiate between colour hues on the one hand, and shades or tints on the other. Admixtures of whitish and black pigments, either caused by the more or less teneral condition of the insect, or by decomposition of the internal organs, are of frequent occurrence in *Ceriagrion*. Hence differences in 'colour' between closely allied species can only be relied upon in the field or when using freshly killed specimens.

cross-nerves of second series 10-11 on fore wing, 8-10 (usually 9) on hinder wing. Pterostigma oblique, parallel-sided, costal and anal sides approximately one and one-half times as long as the proximal and distal sides; colour lighter to darker ochraceous-buff, margin scarcely paler.

Abdomen without any trace of dark markings, but apical segments often seemingly darker (colours faded by decomposition of intestinal contents). Colour of dorsal surface of first six segments deepening to apricot-orange in aged individuals; in such cases very narrow basal annules just posterior to the intersegmental membranes remain yellowish-white. Apical notch of 10th segment and spines along posterior border of preceding segments often a little obscured, but never black.

Anal appendages pale-coloured; intero-apical tooth on the superiors and apices of inferior pair obscured, almost black; pubescence greyish-white (fig. 3).

Female (ad.). — Very similar to the ♂ in almost every respect, though more uniformly coloured. Beneath eyes, coxae and thorax ventrally slightly pruinulent white. Posterior carinae of femora often indistinctly darker than the rest of the legs. Eyes brilliant "grass green". The colour of the thorax in live examples occasionally is a delicate olive-green, turning paler laterally. The abdomen at times acquires a soft reddish-green tint above, the sides being light green; there are no dark markings. Posterior portion of 10th segment not strongly pinched, its hind border not noticeably excavated, except in the median line where the segment presents a conspicuous longitudinal slit or furrow which extends almost back towards base for about two-thirds of the length of segment.

Anal appendages pale-coloured, barely three-fourths as long as 10th segment, conical, gradually tapering towards apex, which is bluntly pointed. Valves small and of simple structure, barely surpassing apex of last segment.

Size variable, especially the length of the ♂ abdomen, which may vary from 27.5 to 33 mm in Javan individuals taken in one and the same locality.

As is evident from the characters enumerated in the key, *calamineum* and *latericum*, though often found in company of each other, belong to different species groups, the former being a development of the Indian *coromandelianum*, the latter a close ally of the eastern species *erubescens*. They are distinguished at a glance by the following characters:

Head comparatively small, mouth-parts less prominent, eyes a little smaller and less bulging, occipital lobes less strongly convex posteriorly.

Synthorax (pterothorax) comparatively longer (width of head : length of mid-dorsal thoracic carina about 8 : 7). Wings less plainly petiolated, distal portion comparatively narrow, the apices less expanded and the tips slightly more pointed. Distal portion of anal bridge (*Ab*) gradually curving towards the wing margin so as to reach the lower (anal) portion of the medio-anal link at a point not far removed from the margin (sometimes very near to it); hence marginal arm of the medio-anal link posterior to *Cu*₂ at least slightly shorter than the arm separating *Ab* from *Cu*₂. Anal vein in the great majority of specimens separating from the hind margin of wing distal to the cubito-anal cross-vein (*Ac*) by a distance one-half or more of the length of that cross-vein. Position of *Ac* slightly variable in both pairs of wings, usually nearer to the level of the first than of the second antenodal. *M*₂ arising at the 6th postnodal on the anterior, at the 5th on the posterior wing *calamineum*

Head noticeably larger, mouth-parts more projecting, eyes larger and more bulging, occipital lobes distinctly convex posteriorly. Synthorax (pterothorax) short and high (width of head: length of mid-dorsal thoracic carina about 8 : 6). Wings more distinctly petiolated and more noticeably expanded beyond the nodus, the tips decidedly more rounded. Distal portion of anal bridge (*Ab*) evenly and but slightly curved, more nearly parallel with the anal margin, reaching the lower portion of the medio-anal link well distant from the margin; hence marginal arm of the medio-anal link posterior to *Cu*₂ more nearly equal in length to the arm separating *Ab* from *Cu*₂. Anal vein separating from the hind margin of wing at, or less frequently a little proximal to, the cubito-anal cross-vein (*Ac*). Position of *Ac* like the preceding. *M*₂ arising at the 5th postnodal on the anterior, at the 4th on the posterior wing *latericum*.

Unlike *latericum* and *erubescens*, this new species is often encountered far away from its breeding places (marshes, ponds and lakes), and in this respect seems to resemble the Indian species *olivaceum* LAIDLAW, from which it can be distinguished by its much brighter colours, smaller size, and different appendages. *C. calamineum* moreover frequents still waters whereas *olivaceum*, according to FRASER, breeds in streams. It tends to congregate in immense numbers where found and, if this be the case, swarms of both sexes may be found in long dry grass well away from water.

Ceriagrion latericum, sp. n. (fig. 3).

1898. KRÜGER, Stett. entom. Zeitg. 59: 120. — ♂ N. E. Sumatra (*erubescens*).
 ?1927. RIS, Zoöl. Meded. Leiden, 10: 25. — ♂♀ C. Sumatra (*erubescens*).

1934. LIEFTINCK, Treubia, 14: 395.—♂ S. Java (*erubescens*).

1935. LIEFTINCK, Misc. Zool. Sum. 92-93: 10.—♂ S. Sumatra, Lampong distr. (*erubescens*).

• **Material.** — Malay Peninsula: 1 ♀, 1 ♂, Perak, Kuala Kangsar, B. JACHAN vendt. 1-iv.1901 (ex Mus. Hamburg). Sumatra (N. to S.): 1 ♀, N. Sumatra, Atjeh, Pulu Wé, Anak Laut, 25.ix.1938, M. A. LIEFTINCK; series, N. E. Sumatra, Deli, Serbalawan, Dolok Ilir Est., 100 m, v-ix.1948, R. STRAATMAN; 5 ♂, 4 ♀, S. E. Sumatra, Palembang & environs, viii-xi.1937, L. COOMANS DE RUITER; 1 ♂, E. Sumatra, Inderagiri, Kuantantenam, 19.iii.1939, P. BUWALDA; 1 ♂, 1 ♀, S. Sumatra, Lampongs, Telokbetong (Oosthaven), 3.vi.1929, F. C. DRESCHER. Java (W. to E.): series, W. Java, Ujung Kulon Peninsula, P. Handeuleum & other places on the mainland, 7-12.ix.1942, M. A. LIEFTINCK; 2 ♂, Tjarita (W. coast of Bantam), 7.xii.1941, common in forest-marsh, M. A. LIEFTINCK; 8 ♂, Ujung Genteng Bay, 27-29.iii.1937 & 30.vi.1939, on pools, M. A. LIEFTINCK; 1 ♂, Rantjabau near Tjitoë (S-coast), 17.ix.1935, M. BARTELS; 4 ♂, C. S. Java, Banjumas, Djeruklegi, 12.v. & 19.x.1929, F. C. DRESCHER. Sumba I.: 2 ♂, E. Sumba, Rende Wai (lake), 5 km W. of Prai Jawang, 150 m, 14-15.vi.1949, and 2 ♂, id., Lai Rundi near Langgai, 17 km N. W. of Laloku, 700 m, 9.vii.1949, A. M. R. WEGNER et al. (Swiss-Dutch Sumba Exped.). Holotype ♂: S. E. Sumatra, Palembang, Bukit besar, "dark rubber plantation", 25.ix.1937, L. COOMANS DE RUITER; allotype ♀: Palembang, "own garden", 3.ix.1937, same collector.

Male (ad.). — Labium and beneath eyes pale orange yellow, rear of the head slightly pruinulent white. Labrum capucine yellow, mandible-bases, genae and anteclypeus orange-buff. Postclypeus and dorsal surface of head mars yellow, the epicranial lobes usually deeper in tint, orange-buff to Sanford's brown to as far as a line drawn transversely just posterior to the ocelli, beyond which it becomes abruptly lighter, xanthine orange. The incomplete epicranial furrow, or suture, is distinctly though very finely black, this line being continued posteriorly along the margin of compound eyes.

Pro- and synthorax coloured as described in the key, but often faded to old gold, isabella or ecru-olive, paling to honey yellow or olive-ocher laterally and to pale pinkish-buff beneath thorax. Traces of black are present on the following parts of the thorax: a line along basal carina of mesothorax, interrupted mid-dorsally; a point just posterior to the anterior and posterior alar processes; and a short streak along dorsal (posterior) border of meta-postepimerum. ¹⁾

¹⁾ Terminology after COWLEY, *Proc. R. Ent. Soc. Lond.* (B) 10, 1941: 5-7, figs.

Legs pinkish buff to light ochraceous-salmon, apical border of femora finely obscured, all spines and apices of tarsal claws black. Femoral spines numbering 3 — 4 — 5-6.

Wings shaped as described on p. 193; neuration lighter to darker brown. Postnodal cross-nerves of second series 9-10 on fore wing, 8 (rarely 7) on hinder wing. Pterostigma comparatively short and not very oblique, about one and one-fourth longer than high, colour cinnamon to almost russet, its margin paler.

Abdomen of slender build, the intermediate segments distinctly less expanded than the basal and terminal ones. Unicolorous apricot-orange in semi-adult males, deepening to coral and jasper red and finally to almost scarlet in live matured specimens; sides of basal segments usually somewhat paler, apricot buff. Spines on posterior border of terminal segments also reddish, the apical incision of 10th segment obscured.

Anal appendages, basal portion of superior pair reddish, the distal part gradually obscured to reddish-black, the incurved apical ridge (including the interior tooth) shiny black; pubescence silvery-white; inferior appendages reddish, the tapering outer branches becoming also black apically (fig. 3).

Female (ad.). — Resembling the ♂ in stature and size, the colours generally paler, less intermingled with red. Labrum ochraceous-orange in fresh adults. Dorsum of thorax tawny-olive to old gold, sides fading to chamois or olive-buff. Legs ochraceous-buff.

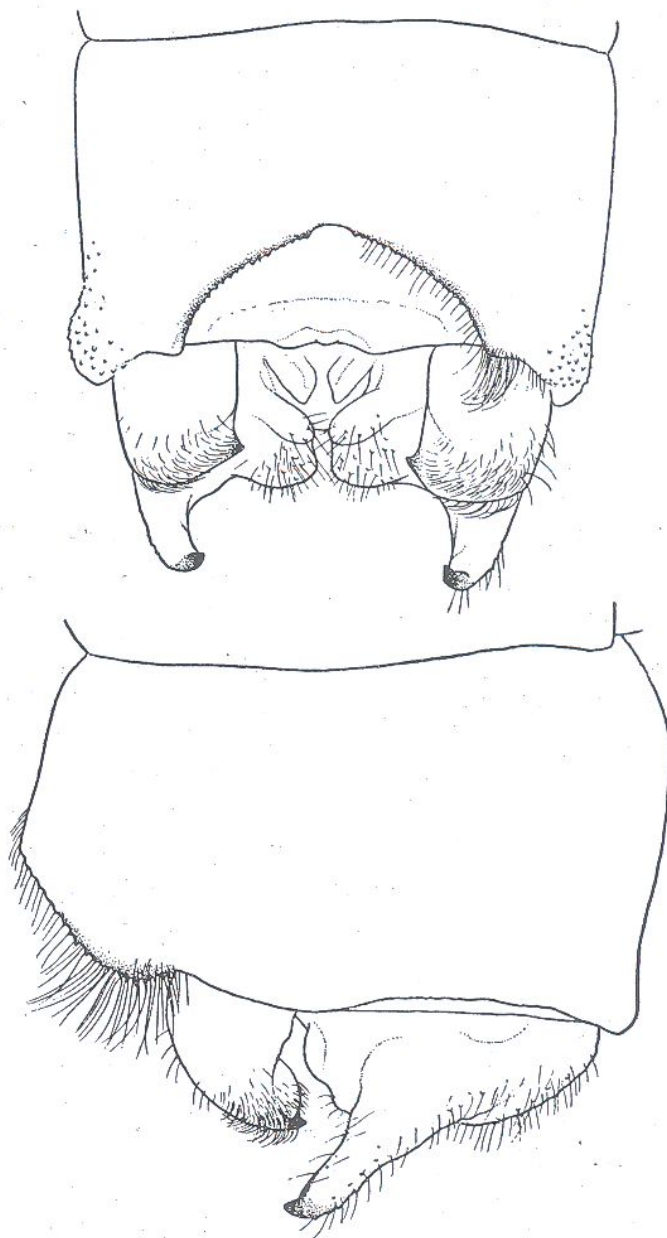


Fig. 3. — *Ceriagrion latericium*, sp. n., E. Sumba, Rende Wai. Dorsal and right lateral view of ♂ anal apps.

Abdomen with the first five or six segments zinc orange in well-preserved specimens, succeeding segments gradually a little darker and less vividly coloured; intersegmental membranes of 1-2 obscurely reddish, those of 3-6 dark brown above. Segm. 7 nearly always with very diffuse, more or less V-shaped, sub-apical brownish spot occupying also part of the sides. Segm. 8 and 9 each with a sharply delimited blackish-brown or black dorso-lateral patch, broadly attached to the base of segment; on 8 this mark has parallel sides, extending about $\frac{3}{4}$ the length of segment, after which it narrows abruptly, the apex being either rounded or squarely cut off; on 9 the dorsal spot is rather more triangular in shape, the point of the triangle almost reaching the apex of segment, and its basal portion often prolonged downwards on either side to as far as the ventral border of the tergite. Segm. 10 with a blackish-brown stripe or band, similar in principle to those on preceding segments, occupying about the basal half or a little less of the segment's length. Posterior border of 10th segment rather pinched, deeply triangularly excised. Anal appendages reddish, shorter than 10th segment, conical, pointed. Valves pale-coloured, of simple structure, tips not surpassing apex of last segment.

This species has long been mistaken for *erubescens*. It is chiefly characterized by its broad wings that have the apices well rounded. The structure of the 10th abdominal segment as well as that of the anal appendages of the ♂ are also good distinguishing features, while the ♀ differs from all allied congeners in having the terminal abdominal segments definitely marked with black.

C. latericum is widely distributed and apparently fairly common all over the island of Sumatra, while on Java and elsewhere in Malaysia it is a much more local and undoubtedly less adaptive insect than *calamineum*, frequenting places where it is not subjected to exposure.

It is significant that neither *latericum* nor yet *calamineum* have ever been found in Borneo, both being replaced there by *C. cerinorubellum* (BRAUER), which is an extremely abundant species occurring all over the island in low country.

Distribution. — Malay Peninsula; Sumatra; Java; Sumba.

Ceriagrion erubescens SELYS (fig. 4).

1891. SELYS, Ann. Mus. Civ. Genova 10 (30): 516 - 517. — ♂ Queensland only (*coromandelianum* Race ? *erubescens*).
1933. LIEFTINCK, Revue Suisse Zool. 40: 421 - 422, fig. 5. — ♂♀ Queensland.
1949. LIEFTINCK, Nova Guinea N. S. 5: 194, fig. 241. — ♂♀ New Guinea; ♂♀ Aru Is.; ♂♀ N. Australia. Also Celebes and Buru I.

As to previous papers dealing with this species I refer only to the original description and the most recent summaries, in which all important references have been given.

Rigidly construed SELYS did not fix the topotype of *erubescens*, which therefore had to be selected from one of the three localities mentioned, viz, Queensland, Shanghai, and Rangoon (Burma); of these the first one was chosen by LIEFTINCK (1933).

FRASER's "*Ceriagrion erubescens*" in vol. I, Odonata, of the Fauna of British India series (1933), was described and figured after specimens from Siam and Burma. This is no doubt a different species, which to all appearance requires a new name. As I have not yet seen individuals from these countries that are in a sufficiently good state of preservation to enable their easy recognition, I prefer for the present to leave this species unnamed.

In its habits and structure, as well as coloration, this carmine-bodied species is remarkably similar to *Ceriagrion latericium*, to which it must be closely related. Both insects breed in marshes and are usually fairly abundant where found, but as they have the habit of keeping in shady places among overhanging vegetation, they are not very conspicuous insects.

Distribution. — Australo-Papuan region. Its western and eastern limits are not yet definitely known.

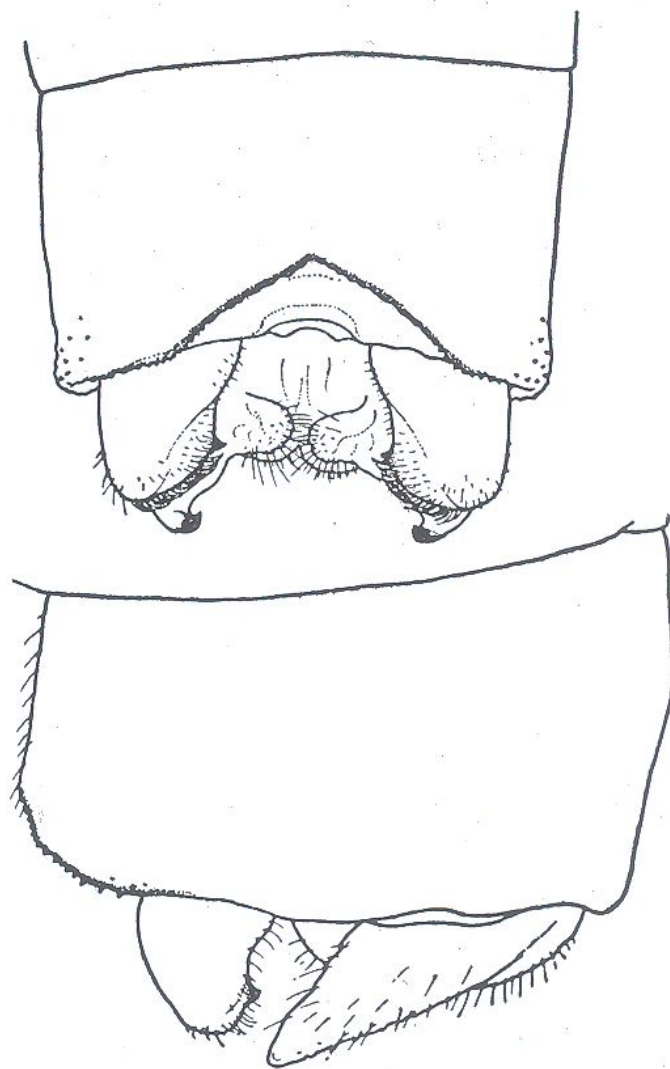


Fig. 4. — *Ceriagrion erubescens* SELYS.
N. Queensland, Redlynch. Dorsal and right
lateral view of ♂ anal apps.