

ADDITIONS TO THE ODONATE FAUNA OF SOUTH EAST ASIA,
WITH DESCRIPTIONS OF TWO NEW GENERA AND
THREE NEW SPECIES

by

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During the past few years a considerable amount of new material in the Order, from various sources, has come under my notice. This consists of several important collections from the islands of Sumatra and Borneo (Kalimantan), including a great many novelties, as also from the Papuan Region and the island groups of the Pacific Ocean. More important work prevents me from studying this material leisurely and more or less integrally; but it seems time that the most striking new discoveries should be described in advance. In this paper, therefore, the descriptions of two new genera and three new species are offered, the most unexpected and interesting discovery among these being a new Tetrathemine genus, from the remote island of Florida, in the Solomon Islands. Just after the completion of my "Synopsis of the Odonate fauna of the Bismarck Archipelago and the Solomon Islands" (this journal, 20: 319-374, 1949), Messrs A. B. GURNEY and K. V. KROMBEIN gave me the welcome opportunity of examining another small collection of these insects from the same islands, brought together by G. E. BOHART and presented to the United States National Museum, Washington, D.C. The new species just mentioned happened to be among the last consignment and is described in the next pages. The two remaining forms are likewise of exceptional interest as the genera to which they belong are either new to science or had not yet been reported from within Indonesian territory. A word of praise to our diligent Museum assistant LIEM SWIE LIONG, who discovered *Pachycypha*, seems not to be out of place.

LIBELLAGINIDAE

Pachycypha, gen. nov.

Allied to *Libellago* SELYS, but more compactly built. Thorax and abdomen more expanded and wings considerably broader.

Structure of head similar to *Libellago*: clypeus porrect and tumid, shaped as in most species of that genus, with the antero-dorsal edge obtuse-angulate in profile view. Postclypeus with the anterior border

carinate, but devoid of a flattened anterior facet as exists in *lineata* and allied species ¹⁾, strongly and broadly convex above, rounded posteriorly in lateral view; upper border straight and running parallel to the long axis of the body when viewed laterally. Anteclypeus vertical, its surface evenly rounded, strongly convex and projecting a little beyond anterior border of postclypeus in dorsal aspect.

Prothorax of simple structure, similar to *Libellago*.

Synthorax short and robust. Mesonotum and under surfaces clothed with long and rather dense black pubescence.

Legs very long and slender, armature and ciliation exactly as in *Libellago*, but all bristles comparatively a little longer. Posterior femur when adpressed reaching back almost to the end of abdominal segment 3. Tibiae not dilated nor coloured interiorly. Tarsal claws simple.

Wings considerably more expanded than in *Libellago* (fig. 1); posterior wing a little broader than anterior wing and with the apex also more rounded than the latter; greatest width of both about mid-way between nodus and pterostigma. Length and breadth of anterior wing in the ratio of 4 : 0.85, of posterior wing of 4 : 1. (*Libellago lineata* about 7 : 1 in both wings.) Nodus situated more distad than in *Libellago*, the antenodal part and total wing-length in the ratio of about 1 : 2.5. Neuration open, similar in principle to *Libellago* but intercalated short sectors on apical part of wings shorter or obsolete. Arculus situated at the second primary antenodal or a trifle before that level, its anterior portion a little less than half as long as the posterior. Sectors of arculus arising from the same point or very slightly separated at origin. Stalk of M_{1-3} long, the fork slightly asymmetrical. M_{1-2} and *Rs* arising from a common stem, M_{1-2} running straight on from the superior sector of arculus. ²⁾ Petiole very short, wings ceasing to be petiolated well before the level of Ax_1 , the bridge vein separating from the posterior border of wing at a distance about equal to that between Ax_1 and Ax_2 . Anal crossing situated midway between Ax_1 and Ax_2 or a little more proximal, its distance from *Arc* equal to or only little longer than the posterior

¹⁾ The configuration of the 'narus' (ante- and postclypeus) can be used with confidence as a means of distinguishing between the various members of the genus *Libellago*. A distinctly flattened anterior facet between anteclypeus and basal portion of postclypeus is present in both sexes of *L. adami* FRAS., *dorsocyana* LIEFT., *greeni* (LAIDL.), *indica* (FRAS.), *lineata* (BURM.), *mima* LIEFT., *semiopaca* (SELYS), and possibly in other species. This intercalated facet is absent in *aurantiaca* (SELYS), *bisignata* (McLACHL.), *hyalina* (SELYS), *naias* LIEFT., *phaeton* (LAIDL.), *rufescens* (SELYS), *snellemanni* (SELYS), and possibly others which I have not examined. Lastly, the species *asclepiades* (RIS) and *finalis* (SELYS) take rather an intermediate position as in them the clypeus is again somewhat different in shape from either of the two examples mentioned.

²⁾ It may be remarked incidentally that the point of origin of the vein *Rs* in both anterior and posterior wing has proved to be extremely variable in almost all species of *Libellago* when good series of each species are examined. This vein may arise either from a common stalk and from the same point of M_{1-2} (as in our photograph of the wings of *L. lineata*), or from a point which lies considerably more distad, so as to run parallel to the outset with the vein M_3 (as also in *Pachycypha*).

portion of the former. Antenodal cross-nerves 5-8 (usually 6) in both pairs of wings; no secondary antenodals present between the two primaries. Postnodal cross-nerves 6-9 in anterior, 7-9 (rarely 5) in posterior wing. M_2 originating only little beyond subnodus in both sexes and in all wings. No supplementary sectors between M_3 - M_4 and M_4 - Cu_1 , the intervening spaces sub-parallel. Only a single row of cells between

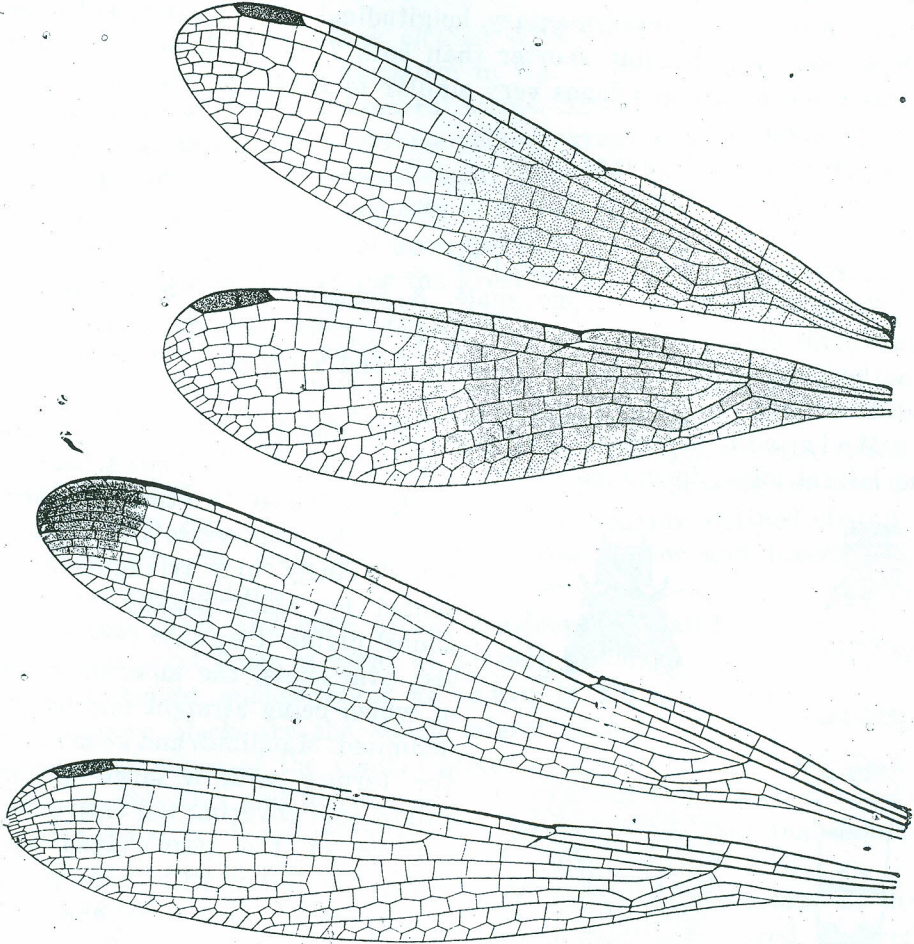


Fig. 1. Wings of *Pachycypha aurea*, gen. et spec. nov., ♂ holotype, S.W. Borneo (upper figure), and of *Libellago l. lineata* (BURM.), ♂, W. Java.

the anal bridge and the posterior border of wing, the cell below Ac enlarged. Area posterior to Cu_2 with only a single row of cells. Quadrangle relatively short, invariably traversed once. Pterostigma of large size, present in both anterior and posterior wing of both sexes. Wing-membrane, with the exception of about the distal one-third of each wing, strongly coloured a rich golden-yellow (♂) or golden-brown (♀).

Abdomen short and very broad, much shorter than the wings; intermediate segments not appreciably longer than the second. Male with

segments 1-2 and 9-10 more or less cylindrical, the intermediate segments semicircular in cross-section, the abdomen being considerably expanded from the base of segment 2 as far as the base of 4, thence almost parallel-sided for about two segments' length, and from there diminishing gradually in width, the last segments being again of normal breadth. Dorsal carina absent on 1, 9 and 10, weakly indicated on 2, but well developed on 3-8 (♂) or 3-7 (♀). Segments 4 to 8 (♂) or 4 to 7 (♀) with complete, sharply pronounced, supplementary longitudinal lateral carinae. Female with segment 8 noticeably shorter than both 7 and 9. Male and female genitalia and anal appendages very similar to *Libellago*, the appendages thin and slender.

Genotype: *P. aurea*, sp.n.

Hab.: S. E. Borneo.

***Pachycypha aurea*, sp.n. (fig. 1-3).**

Material studied. — One male, 3 females (ad.), S. E. Borneo, Kandangan distr., 7 km N. E. of Ampah, near Ranamun, 11, 19 and 22.v.1948, LIEM SWIE LIONG. Holotype ♂ and allotype ♀: Ranamun, 19 and 22.v.1948.

Male (ad.). — Labium chrome-yellow, distal two-thirds of median and lateral lobes, including the palpi and hooks, shining black. Labrum

black, its basal two-thirds chrome-yellow, the transverse bar thus coloured finely and triangularly indented by black basally so as to almost divide it up into two more or less oval spots, the anterior border of which being straight and sharply delimited. Mandibles and genae black, the former with a large chrome-yellow spot covering the entire outer surface of the pear-shaped main body, the latter with two vertical yellow dots placed one above the other along the margin of compound eye. Anteclypeus bright chrome-yellow, only the anterior one-fourth with a transverse black mark and the carina also black. Postclypeus black, save a small yellow dot on either side close to the genal suture.

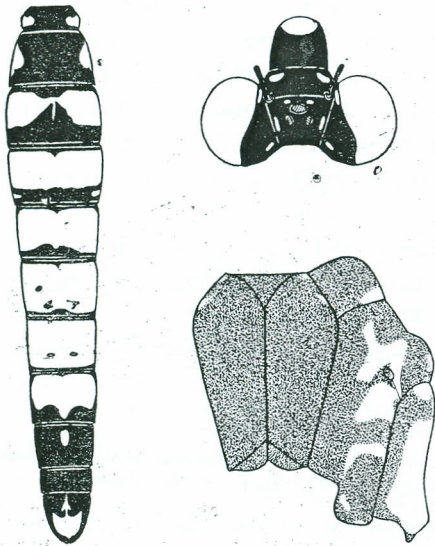


Fig. 2. *Pachycypha aurea*, gen. et spec. nov., ♂ holotype, S.W. Borneo. Head, abdomen and diagram of thoracic colour-pattern.

Head otherwise dull bronzy-black, with a pair of oval yellow spots on frons, a pair of tiny dots just in front of the median ocellus, a linear streak anteriorly along margin of compound eye, and two pairs of small

spots on the epicranium. Rear of the head unicolorous black. Antennae black, the first joint chrome-yellow anteriorly.

Prothorax dull black with two yellow streaks on each side along anterior lobe, a much larger comma-shaped spot on the pleurae, a circular spot on the epimeron, and a yellow streak along latero-ventral border; posterior lobe with only a vestige of a yellowish marginal streak on either side at base.

Synthorax dull bronzy-black clothed with black hairs and marked laterally with chrome-yellow as shown in fig. 2. Mesepisterna with the merest rudiment of a yellow humeral stripe. Mesosternum black, metasternum yellow, poststernum chrome-yellow, except a transverse black encroachment of the metepimeral band pointing inward and nearly meeting its fellow from the opposite side towards the median suture; there is, besides, a tiny black dot upon the middle of the poststernum.

Legs including the spines for the greater part black. Coxae chrome-yellow, with the anterior half of the exterior surfaces black; trochanters and bases of anterior two pairs of femora orange-flesh interiorly, the posterior femora almost for their basal three-fourths pale-coloured on the inside, shading gradually into black towards apices.

Wings with black neuration and with the pterostigmata also black, or nearly so. Membrane deeply tinged with golden-yellow as far out as a level between Px_4 and Px_5 , this colour not sharply defined distally but almost straight from costal to posterior border and leaving off abruptly; apices hyaline.

Abdomen short and very broad, considerably flattened dorso-ventrally, widest point (base of segm. 4) 2.0 mm. Colour deep black, marked above with bright golden-yellow as shown in fig. 2. Ventral surface mainly yellow; black are the sharp lateral carinae of segm. 4-8, the postero-lateral edges of the ventral pieces of tergites 2 to 8, and most of segm. 2. Sternites and tergal pieces of segm. 9-10 obscured, the sternites with indistinct longitudinal yellow spots. Genitalia and anal appendages black, shaped as shown in fig. 3.

Female. — Differing from the male chiefly in the colour of the abdomen, which is much darker and almost wholly obscured in aged individuals; also by the beautifully amber-brown wing spots and the blue pruinescence covering the thorax and parts of the abdomen. All females are adult, but in two of them the colour-pattern of the thorax and abdomen is not only obscured but also partly concealed by a dense bluish pruinescence.

Androchromatic colour-phase (adult, allotype). — Head as in male, the yellow twin-spot on the labrum a little narrower and more deeply indented by black basally, but the yellow genal streaks slightly more enlarged. On the anteclypeus a squarish black patch invades (and has largely superseded) the chrome-yellow ground-colour, which is reduced

so much as to appear in the form of a tiny U-shaped anterior frame. Light spots on dorsal surface of head and prothorax similar to male, those on the prothorax very slightly larger. Synthorax also coloured similarly to the opposite sex except that the rudimentary humeral spots low down on the mesepisterna are a little larger. Also, the lateral pale marks are slightly more extensive, inasmuch as the lowermost yellow spot on metepisternum is broadly attached to the spot dorsal to the spiracle; lastly, the black band covering the anterior part of the metepimeron is narrower. Legs as in male.

Membrane of anterior wing, from extreme base as far out as Px_{2-3} or Px_3 evenly and deeply stained with golden-brown, the outer

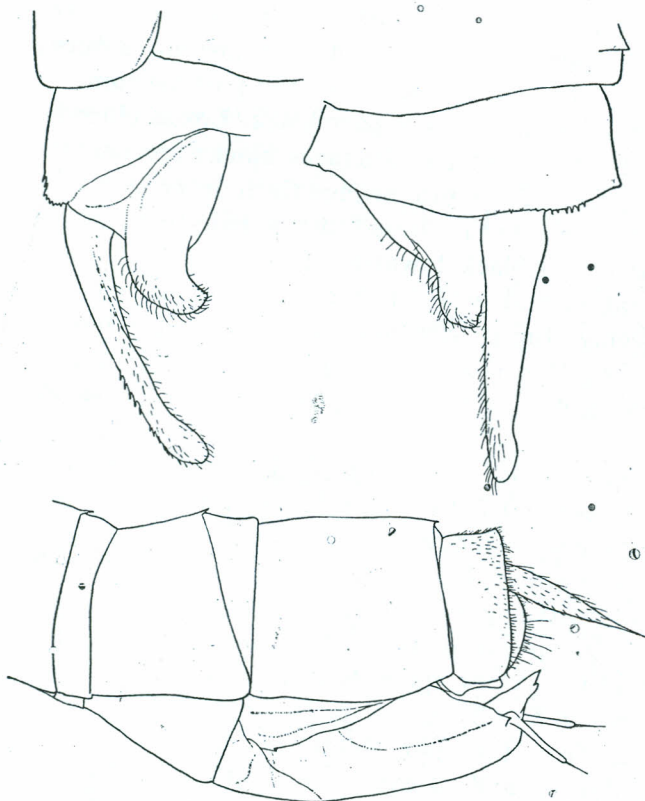


Fig. 3. *Pachycypha aurea*, gen. et spec. nov. Ventral view of right half, and left lateral view, of ♂ anal appendages (upper figures), and apex of ♀ abdomen, left side.

border of this coloured area, though not sharply defined, running abruptly straight across the wing, while the distal portion remains perfectly hyaline. Posterior wing at base coloured similarly to the anterior one but distally the colour soon deepens to a rich rusty-brown, darkest beyond the nodus; this colour-spot — though a little convex and not sharply delimited at its outer border — contrasts sharply with the rest of the wing-membrane, which like that of the fore wing is entirely uncoloured. Pterostigma a little longer and removed

a trifle more distad than in the male, very dark brown on both sides, its centre somewhat lighter distally.

Abdomen shaped similarly in principle to *Libellago*, but considerably more expanded laterally and with the ventral surfaces of segm. 4-7 almost flat. All carinae and intersegmental membranes black or obscurely brown; ground-colour of all segments dirty brownish ochreous instead of brilliant golden-yellow, the dark patches and apical rings of 3-6

relatively broader but not as sharply defined anteriorly, that on 3 occupying the distal two-thirds, those on 4-7 approximately the distal one-third of the segments' length. Segment 8 wholly black, only the latero-ventral border ochreous; 9 ochreous with a thick X-shaped black dorsal mark; 10 entirely ochreous save a black mid-dorsal spot. Ventral surface of abdomen flesh-coloured with pale yellow intersegmental rings, diffuse brownish postero-lateral spots, and black sternites. Valves dirty ochreous, the apices obscured. Anal appendages cylindrical, thin and slender, very acutely pointed (fig. 3).

Dark colour-phase (old adult).— Clypeus entirely black. Prothorax, synthorax, the coxae exteriorly, and the inner faces of femora covered with dense pale bluish pruinescence spread all over these parts and concealing the pigmentation; outer faces of tibiae and tarsi also slightly pruinescent.

Abdomen entirely obscured, uniform brownish-black, intersegmental membranes and under surfaces more or less coarsely pruinescent blue. Valves brown.

Measurements: ♂ abd. + app. 10.7, hw. 14.0 mm (holotype); ♀ 10.5, 14.6 mm (allotype); 10.5-10.7, 15.0-15.6 mm (parallotypes).

As will appear from the above descriptions and the accompanying illustrations, there can be no doubt that this peculiar insect has as its nearest ally *Libellago*. It has retained all essential primitive venational characters of that genus, the most noteworthy feature being the straight course of the vein M_{1-2} , which is seen to continue on in the same line as the upper sector of the arcus. Apart from the curiously solid build of this insect, to which alludes the new generic name, *Pachycypha* is at once distinguished from *Libellago* by its much broader wings, the short petiole, the considerably more distal position of the nodus, the origin of the vein M_2 only slightly distal to the nodus, and by having a much larger pterostigma. Added to these differences, the conspicuously coloured basal part of the wings in both sexes and the densely pruinescent thorax of the female are characters not found in any of its congeners.

It is considered an interesting and noteworthy fact that in *Pachycypha* the numerous specializations are at least equally far advanced in the female as in the male, whereas in *Libellago* and most other Libellaginidae specialization (e. g. modified thoracic pattern, brilliant colouring of the abdomen and wings) is almost exclusively confined to the male sex, which has led to the conclusion that the females are more primitive in these respects, and that evolution in this sex has been arrested at an earlier date than in the males. In the female of *Pachycypha* we notice that the abdominal colour-pattern — though much obscured in aged individuals, the colours being also less brilliant in our examples

than those exhibited by the male — is not fundamentally different from that of the male.

LIBELLULIDAE

Tapeinothemis, gen. nov.

Of the *Tetratheminae*.

Stature of a small *Diplaciza* of the *smaragdina* group.

Head of moderate size, eyes strongly globular, broadly contiguous, vertex a little longer than the median eye-line. Frons rather strongly projecting, rounded, baso-dorsal surface sloping, the frontal tubercles finely transversely wrinkled above; furrow shallow but clearly indicated, except anteriorly. Vertex raised, of the usual rotundo-cordate shape, convex dorsally, its anterior surface almost vertical. Occipital triangle simple, rounded posteriorly.

Prothorax of moderate size, posterior lobe rather large and thick, much broader than long, slightly elevated, not fissured at its middle, side-edges rounded, margin fringed with long soft hair.

Thorax short and rather small.

Legs short and slender. Posterior femora almost straight, reaching back as far as the transverse poststernal groove, armed with a row of 8 minute, evenly spaced spines, the distal spines only slightly longer than the basal ones, which are extremely small, the eighth spine considerably longer than the rest and about equal in length to the interspaces; pubescence scanty. Intermediate femora with a row of about 11-12 interior spines, sub-equal in length and about as long as the interspaces. Anterior femora with a similar row of about 10 short spines. Posterior two pairs of tibiae with a double row of 8-10 strong spines, decreasing only little in length from base to apex and distinctly longer than the interspaces; outer row of spines on anterior tibiae arranged more or less fan-wise, the proximal ones at least twice as long as the interspaces. Tarsi short, the claws distinctly toothed near apex.

Wings hyaline, not coloured, very narrow, especially at the base, the posterior wing being more narrow just beyond extreme base than the anterior wing. Neuration moderately open, highly peculiar. On both pairs of wings the nodus is placed distinctly proximal to the middle of the wing; on anterior wing it is situated almost exactly mid-way between base and proximal side of pterostigma, on posterior wing very slightly more advanced. Arculus placed somewhat distal to the middle between Ax_1 and Ax_2 . Discoidal cells at the same level in both pairs of wings, that of the anterior wing with its costal side markedly fractured, so that the cell appears to be irregularly four-sided; proximal portion of costal side considerably shorter than distal side. Discoidal cell of posterior wing short and triangular, situated widely distal to the arculus,

its proximal side shorter than the costal side. Sectors of arculus united for a long distance, and then separating sharply at an acute angle, the stalk arising from the lower portion of the arculus. Cu_1 and Cu_2 distinctly separated at origin, Cu_1 arising from the distal side of the discoidal cell in both pairs of wings and Cu_2 from the distal angle of that cell. Last antenodal cross-vein complete; antenodal cross-veins fewer in number than postnodal cross-veins. Veins M_2 , Rs and M_3 shallowly convex distally. One row of cells between Rs - $Rspl$, the vein $Rspl$ long, weakly indicated and almost straight. Supplementary bridge cross-vein (Brs) absent. 1 + 1 Cux in anterior wing, 2 in posterior wing. Discoidal cells, internal triangles and hypertriangles uncrossed. Discoidal field of anterior wing consisting of only a single row of cells to much beyond level of nodus, distal to which it dilates rather abruptly and widely; on posterior wing this field is one cell wide as far as level of nodus, but after that level expands strongly so as to enclose six marginal cells. Only one row of cells between Cu_1 and Cu_2 in both pairs

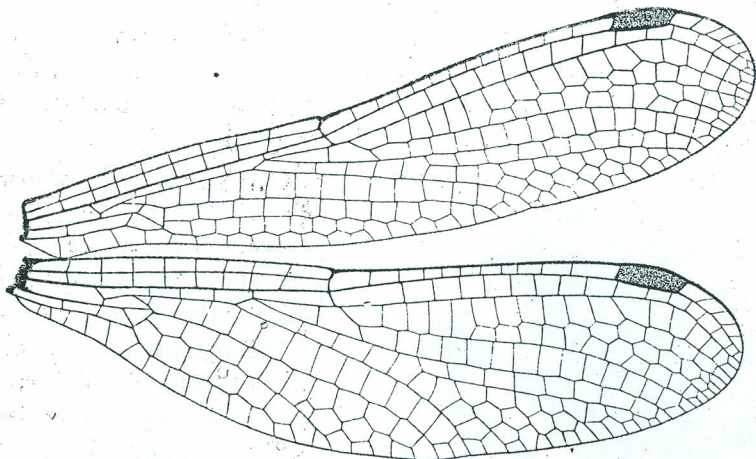


Fig. 4. Wings of *Tapeinothemis boharti*, gen. et spec. nov., ♀ holotype, Little Florida I.

of wings. Anal loop entirely absent. Anal area and area posterior to Cu_2 with only a single row of cells in all wings. Membranula absent. Pterostigma rather large, normal.

Abdomen slender with cylindrical segments; basal segments not inflated. Dorsal carina well-developed on segments 2 to 9, and 2 to 7 each with a sub-basal transverse dorsal suture (very faintly indicated on 7). Tenth segment about half as long as ninth. Valvula vulvae not developed. Ninth sternite longitudinally carinate; styli vestigial. Anal appendages fine and acutely pointed.

Male: unknown.

Genotype: *R. boharti*, sp. n.

Hab.: Solomon Islands.

***Tapeinothemis boharti*, sp. n. (fig. 4-6).**

Material studied. — One female (adult), Solomon Is., Little Florida I., 15-31.iii.1945, G. E. BOHART. Holotype in the United States National Museum, Washington, D. C.

Female (ad.) — Labium lemon yellow, the median lobe very small, a little broader than long, rounded; lateral lobes barely longer than wide, intero-apical edges almost rectangulate and somewhat obscured, the outer angles rounded. Mandible-bases lemon-yellow, the tips black. Labrum yellow, finely bordered with black roundabout, and distal half moreover with a pair of indistinct reddish-brown dots, separated from one another by a blackish median dot. Clypeus chrome-yellow. Frons, with the exception of a narrow and sharply defined yellow anterior stripe, very shiny brilliant metallic-green, the anterior limit of the green colour perfectly straight. Vertex coloured similarly to upper part of frons. Pile brownish-black. Occipital triangle shining black, fringed with long brown hairs posteriorly and behind the eyes. Rear of the head throughout glossy black.

Prothorax dull bronzy black; the anterior lobe, a small more or less rectangular spot upon middle of the median division, as well as the posterior lobe, bright lemon yellow; posterior lobe elevated, margin with a fringe of long, erect, yellowish pencil hairs.

Ground-colour of synthorax shining metallic greenish bronzy-black, marked with chrome-yellow as shown in fig. 5; yellow are: the

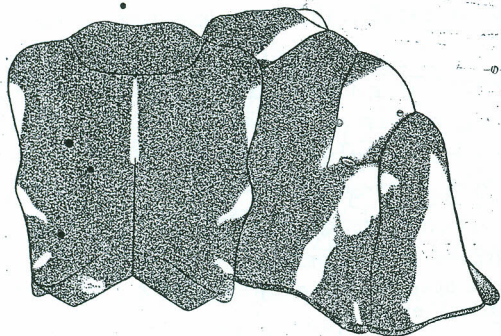


Fig. 5. *Tapeinothemis boharti*, gen. et spec. nov. ♀. Diagram of thoracic colour-pattern. Holotype.

lower half of the mid-dorsal carina, three small mesepisternal spots along the humeral suture, the posterior one-third of the mesinfraepisternite, two large rather oblique irregular marks on metepisternum, and a conspicuous triangular or wedge-shaped spot occupying little less than the posterior half of the metepimeron. Venter of thorax black, poststernum with a yellowish mark

upon its middle, and a transverse streak upon posterior division.

Legs comparatively short. Coxae yellow, obscured anteriorly; trochanters chrome-yellow. Femora short and rather thick, outer surfaces blackish, inner surfaces bright chrome-yellow. Tibiae bright chrome yellow, strongly keeled exteriorly, their inner surfaces and all spines blackish. Tarsi black.

Shape of wings and venation as described for the genus, and as appears from fig. 4. Neuration black; membrane hyaline. Pterostigma

very dark blackish-brown: Antenodal cross-nerves 9 in fore wing, 8 in hinder wing; postnodals 13 in fore wing, 10 in hinder wing. (Postnodals of second series, 8 and 7 respectively.)

Abdomen slender, with cylindrical segments, distinctly shorter than posterior wing; three to four basal segments a little inflated in lateral dimension, but dorso-ventrally of even width throughout; dorsal carina on segments 2-3 very fine, on 4-9 distinct. Colour mainly black, basal segments with slight metallic lustre, marked with chrome-yellow as follows: — 1 with a circular spot occupying most of the sides; 2 with a rather broad stripe bordering the lower margin of the tergite. Segments 3-7 each with a pair of very small sub-triangular ventro-lateral basal spots, pointed apicad, and moreover with similar, though slightly larger, spots bordering posterior margin; all anterior spots (except that on segm. 3) restricted to the lower portion of the tergite below the lateral carina, the posterior spots on 3-5 slightly prolonged upwards along hind margin though not nearly meeting on mid-dorsum. On segm. 6 and 7 the basal spots are barely discernible, whilst 8-10 are entirely black.

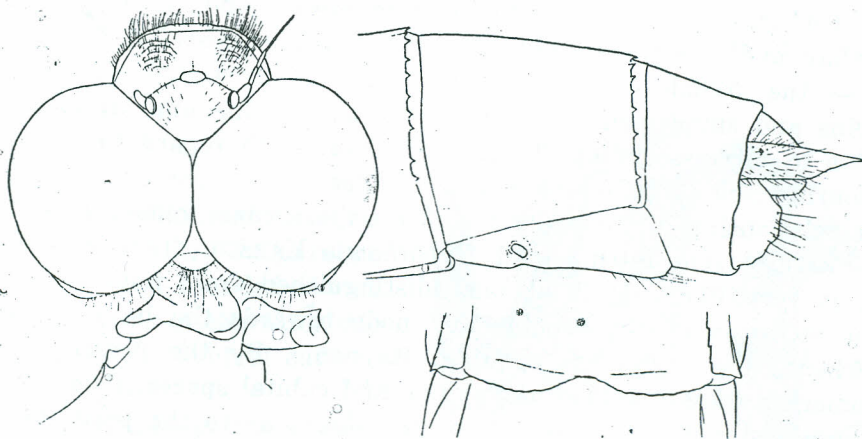


Fig. 6. *Tapeinothemis boharti*, gen. et spec. nov., ♀ holotype. Head, apex of abdomen, and ventral view of genital valve.

Vulvar lamina not developed, border of 8th sternite somewhat dilated, shaped as shown in fig. 6. Ninth sternite yellowish basally. Anal appendages brownish-yellow, tipped with black.

Measurements: abd. + app. 20.5, hw. 23.5, pt. fw. 1.0, pt. hw. 1.2 mm.

The present new species, which forms the type of a new genus, is of rare interest in respect that the nodus is situated proximal to the middle of the wing, a peculiarity, as far as I know, not found in any member of the subfamily. It is further characterized by the unusual position of the arculus between the first and second antenodal instead of between the second and the third, i. e. the archaic position which

the arculus has retained in almost all Tetratheminae including a few evidently archaic African species of *Tetrathemis*. Or, to express it in other words, this proximal position of the arculus is nowhere to be found among the Tetratheminae except in the more advanced members of *Tetrathemis* itself, but otherwise is attained to almost throughout the whole family Libellulidae. ¹⁾

Venationally, *Tapeinothemis* is reminiscent of the Brachydiplacine genus *Brachygonia*, with which it agrees in the great reduction of the wing, the proximal shifting of the nodus and arculus and the extreme narrowing of the wing-base. In spite of this, *Brachygonia oculata* for instance, shows in its venation a considerable number of recent elements (e. g. the double row of cells in the discoidal field of fore wing, the normal triangles, the presence of an anal loop, etc.) which all point to the recent origin of the genus. ²⁾ As has been justly remarked by FRASER ³⁾, the interesting mixture of archaic and recent elements in the venation of *Brachygonia* presents the finest example of evolution by reduction to be found in the suborder Anisoptera.

Notwithstanding the similarity above alluded to, *Tapeinothemis* seems to find its proper place in the Tetratheminae; and — in spite of the peculiar and rather puzzling feature of the recessed nodus and arculus — the archaic character of the discoidal area, the course of main veins and supplements, and the reduction of the anal area, are favourable to this association. The same is true with regard to facies, body-colouring and structure of genital organs.

The relationship of *Tapeinothemis* with the archaic genera *Palaeothemis* FRASER, from Burma, and *Hypothemis* KARSCH, from the Fiji Islands, is very likely. It is at once distinguished from both by the aberrant recession of the arculus and node towards the base of the wing, whence the genus has acquired its name. By the presence of supernumerary cross-nerves in the bridge and cubital spaces, *Palaeothemis* is supposedly the most archaic of the three; as to the position of the nodus it stands between *Hypothemis* and *Tapeinothemis*, but in other venational characters the two last mentioned genera approach each other more closely.

Unfortunately, the male of this interesting species remains to be discovered, and this is the more regrettable as it would no doubt offer a better clue in the problem of its affinities.

Named in honour of Mr G. E. BOHART, the collector of the species.

¹⁾ See FRASER, Notes on the genus *Tetrathemis* BRAUER with descriptions of three new African species. *Proc. R. Ent. Soc. Lond.* (B) 10, 1941: 137-138.

²⁾ It should be noted here that the two other known members of *Brachygonia*, viz *ophelia* RIS and *puella* LIEFT., are still more reduced in regard to the wing-venation, so much more so in fact, that several modern elements that would stamp them as "recent species" have disappeared almost completely (cf. RIS, *Cat. Coll. SELYS*, fasc. 11, 1910: 354, fig. 205, and LIEFTINCK, *Treubia* 16, 1937: 105-107.).

³⁾ *Proc. R. Ent. Soc. Lond.* (B) 11, 1942: 102.

Phyllothemis raymondi, sp. n. (fig. 7-9).

Material studied. — 1 male (ad.), N.E. Sumatra, Deli, Serbalawan, Dolok Ilir Estate, 200 m, 17.v.1948, R. STRAATMAN.

Male (ad.). — Labium bright citron-yellow, the median lobe and a stripe along the inner border of each of the lateral lobes, deep black, the joint median band thus formed only very little narrower than the median lobe and continued anteriorly along the distal margin of the lateral lobes as a fine black line. Labrum black, with a small yellow dot on each side at the base. Ante- and postclypeus light green. Frons and vertex brilliant metallic-blue, the former with a rather squarish light green dorsal spot on each side near the eye-margin. Frons low, rather flat, evenly convex in profile view, broadly and shallowly notched above; its vertical portion narrow, surface coarsely punctured, separated from the rest of the frons by a low transverse ridge, incomplete on either side. Vertex rather broad, somewhat trapezoidal in frontal view. Occipital triangle and rear of the head black.

Prothorax small, black; anterior and posterior lobes and traces of lateral spots, light green. Posterior lobe relatively short and small, broader than long, about three-fifths of the width of the prothorax, rather depressed, surface slightly convex, its posterior margin evenly rounded and but slightly pilose.

Thorax of moderate size, colour-pattern sharply defined, deep velvet-black with light green. Antehumeral stripes almost straight, subparallel, incomplete and rounded above; ante-alar spots of characteristic shape (fig. 97). Ventral surface blackish-brown.

Legs slender and very long; coxae black with a light green mid-lateral stripe on anterior and intermediate pair and a triangular lateral stripe along hind margin of posterior pair. Femora black, the anterior pair with a yellow stripe along basal three-fifths of the inner surfaces; remainder of legs black. Posterior femora slightly curved, 6 mm long, reaching as far back as about 1 mm beyond hinder border of 2nd abdominal segment, and armed with a row of about 20 closely set, evenly sized, backwardly directed microscopical teeth. Posterior tibiae very slender, 5.6 mm long; posterior tarsi 3 mm, claws distinctly toothed.

Wings long and narrow, shaped much as in *eltoni* (fig. 8). Neuration black; membrane hyaline, except the extreme bases which bear very

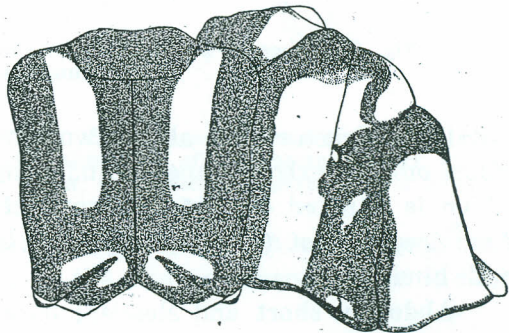


Fig. 7. *Phyllothemis raymondi*, sp. n. ♂ holotype, N. E. Sumatra. Diagram of thoracic colour-pattern.

small and diffuse pale golden-yellow spots: Membranula vestigiál (almost absent). Pterostigma short and small, removed apicad, dark brown in colour. Antenodals 11 on fore, 9-10 on hinder wings; postnodals 9-10 on fore, 9 on hinder wings. Neuration on left pair of wings similar to that of the right, except that there are three undivided basal cells in the discoidal field of left fore wing. Triangles of fore wing with the

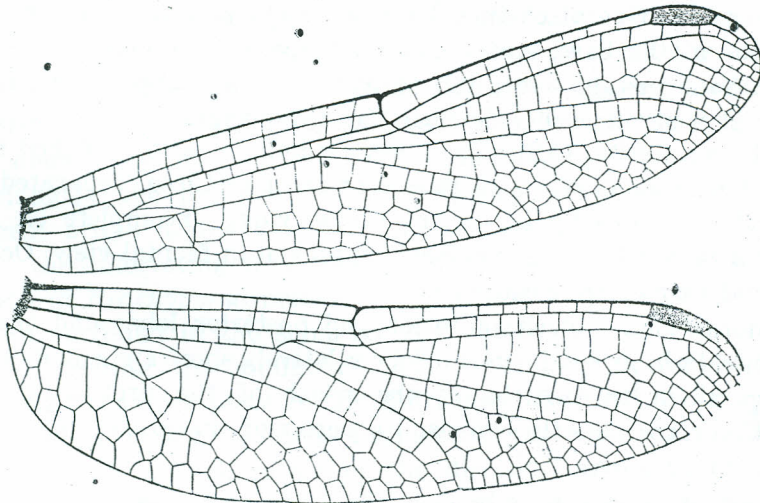


Fig. 8. Wings of *Phyllothemis raymondi*, sp. n., ♂ holotype, N. E. Sumatra.

costal side fractured at about two-thirds of its length, those of hinder wings only at extreme apex. Hind wing triangles slightly distal to *Arc*, which is situated exactly mid-way between Ax_2 and Ax_3 in all wings. Anal loop absent (or very irregular in shape), made up of 6 cells in both hind wings.

•Abdomen short and slender; basal segments only little inflated in both dimensions, succeeding segments cylindrical and parallel-sided, the apical ones very slightly higher. Black, marked with green as follows: — 1 black with a small triangular lateral spot and the intersegmental membrane also green; 2 with very large baso-lateral mark occupying nearly all of the anterior half of segment, and with a squarish spot on mid-dorsum posterior to the jugal suture; 3 with large rectangular lateral spot before the jugal suture, followed by a point just after it, and with a pair of longitudinal linear streaks on mid-dorsum beginning after the jugal suture; on 4-6 the paired mid-dorsal streaks are a little shorter than on 3, whilst the latero-basal spots are much smaller on 4, vestigiál on 5, and absent on 6. On 7 the paired mid-dorsal streaks are again much longer, attaining two-thirds of the segment's length and placed about mid-way on dorsum. Remaining segments unmarked.

Genitalia with the anterior lamina large and prominent, strongly arched, cowl-shaped, dull green in colour; hamuli small, black, placed in the long axis of the body, apices of anterior division slightly incurved; genital lobes rather large and squarish, slightly oblique and convergent (fig. 9).

Anal appendages of the usual shape, considerably longer than the very short 10th segment; superior pair almost straight, approximated, tips very slightly outbent in dorsal view, shaped and armed as appears from fig. 9; inferior appendix broadly triangular, sides convex in proximal portion, apex bluntly truncated.

Length: abd. + app. 21.0, hw. 24.0, pt. hw. 2.3 mm.

Female: unknown.

This new species, which I have named after its discoverer, fits well in with the diagnosis of *Phyllothemis* FRASER, which was erected for the reception of a small Tetrathemine, *P. eltoni* FRAS., described from King Island, Mergui (Lower Burma).¹⁾ According to FRASER, the genotype and only species so far known resembles *Tetrathemis platyptera* SELYS very closely and it is impossible to distinguish them on the wing or even without a close examination.

Our new species *raymondi* is at once distinguished from *eltoni* by its superior size (*eltoni*: abd. 19, hw. 22 mm) and by having the lower part of the frons black instead of citron-yellow. It also differs markedly from the genotype in that the superior anal appendages are only slightly curved, lacking a sub-apical ventral spine. In other respects the two species apparently are much alike and appear to be closely related.

The type of *raymondi* was found among low vegetation at a sunny spot bordering a stream in virgin forest.

Of both species of *Phyllothemis* the female remains to be discovered.

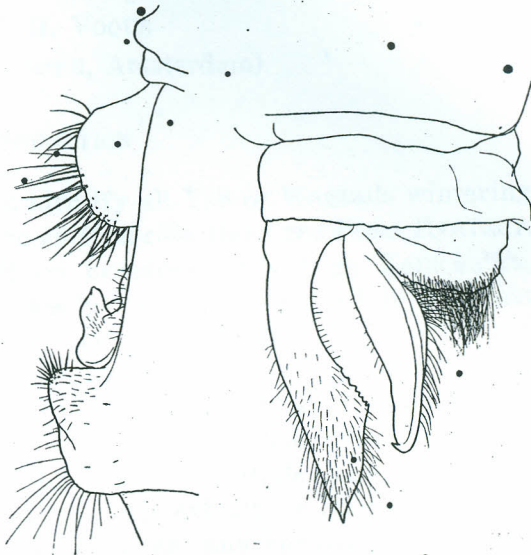


Fig. 9. *Phyllothemis raymondi*, sp. n. ♂ holotype. Genitalia of 2nd segment, left lateral view, and anal appendages, right side.

1) *J. Bombay Nat. Hist. Soc.*, 37, 1935: 890-891.