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(24)

Odonata Anisoptera from Guatemala.

Collected by Messrs. William Schaus and John T. Barnes.

By PHILIP P. CALVERT, University of Pennsylvania, Philadelphia, Pa.

(Plate III)

Messrs. Schaus and Barnes, whose extensive collecting of Lepidoptera in Guiana, Mexico and Costa Rica is well known, turned their energies to Guatemala in February, 1915, remaining in that country until April, 1918. During that period they sent to me from time to time a number of Odonata which add to our knowledge of the fauna of Guatemala over and above that recorded in the Neuroptera volume of the *Biologia Centrali-Americana*. I have listed them, following the order of the species in the *Biologia* and occasionally adding some descriptive matter. Mr. Schaus made some notes on the fresh colors of some of the specimens and these I have enclosed in quotation marks. He has also given me data on some of the more unfamiliar localities at which they took Odonata, as follows:

Caballo Blanco, "13 miles beyond Retalhuleu on the branch line to Champerico; it consists of grazing country with a little vegetation along the rivers, but no forest near at hand, and the soil is humid and very fertile."

Cayuga, 23.4 miles from Puerto Barrios and a little west of Tene-dores. A farm house recently abandoned was fitted up by the United Fruit Company and placed at their disposal; it was their Guatemalan headquarters. "The house stands on a hill by itself, 150 feet above the railway and river, with the most glorious views in every direction. The chief veranda faces the south with the winding [Motagua] river threading through thousands of acres of bananas, limited by virgin forests, and with the mountains of Honduras in the distance; to the north we are close to forest clad hills and almost all my day collecting is along [their] trails and streams. The elevation of the [railway] station is 107 feet and the forest ridge about 400 feet higher. The hills...on the south side are covered with dense tropical forest, no pines at all." On October 7, 1915, he wrote: "I cannot understand why with the heat and rain there are not more things flying." On April 30, 1917: "The conditions here (climatic) are still disastrous and not an insect is to be seen except a few wasps. Not a drop of rain has fallen since I last wrote and all the weeds around the place are dead and dried up and there are extensive forest fires, fanned into energy by strong easterly gales which blow all afternoon and evening."

Chejel, in Baja Vera Paz, eleven miles from Tucurú, elevation 3100 feet. "I have had five weeks at Chejel, where I have been visiting most charming friends" [in June, etc., 1917].

Iguana, "a flag station, 72.3 miles from Barrios, elevation 493 feet, and at the beginning of the dry section of the Motagua valley; the country is hilly, with scattered pines and swampy in places. We only went there once for a few hours and found your Odonata flying in the wet places."

Joaquima, "a flag station, 170 miles from Barrios, elevation 2269 feet; a dry district owing to steep mountains with muddy ditches along track in rainy season, little vegetation and some 200 feet above river. We were delayed there several hours by a land-slide, so I put my net on and caught a few insects."

Montufar, "44 miles from Barrios (Motagua valley)."

Oneida, "Motagua valley near Morales, 25 miles from Barrios, elevation 300 feet."

Polochic River. Writing Aug. 17, 1917: "I am still in Vera Paz..... since a week I have worked every night with my lamp until 3 A. M. Barnes is doing the day work and rides nine miles down the mountains to the Polochic River and gets in several hours' collecting."

Purulhá "is the correct spelling, not Purula, as Champion spells it."

In the letter just quoted: "I have had.....three weeks at Purulhá."

Quirigua "is 57.4 miles from Barrios, elevation 240 feet, and is in the humid banana district. The Motagua valley is very broad there, with hills on the south side covered with forest of poor growth, chiefly pines and the manaca palms; there are small streams in all the valleys. The forest in the main valley has all been cleared by the Fruit Co." In their first year in Guatemala they had a month or six weeks at Quirigua before going to Cayuga.

San Felipe, "in the department of Retalhuleu, elevation 2056 feet, surrounded by sugar cane and coffee plantations."

Santa Maria, Volcano, department of Quezaltenango, elevation 5500 feet.

Tactic, Baja Vera Paz; "ten days in Tactic" (Aug. 17, 1917).

GOMPHINAE.

Gomphoides elongata Selys. Gualan, August, 1 ♂.

Very close to the only male of *elongata* which is available for comparison, viz., from Guadalajara, Jalisco, Mexico, July, by Schumann, listed in the *Biologia* volume, page 157. This Gualan male is smaller (abdomen 43.5, hind wing 31 mm.), less robust, the lateral margins of abdominal segments 8 and 9 are less dilated, that of 9 less angulate, angle distinctly rounded, superior anteapical angulation of the superior appendages also rounded.

Gomphoides suasa suasa Selys. Cayuga, May, 1917, 1 ♂. Quirigua, forest, June 25, 1 ♂, 1 ♀.

Erpetogomphus schausi n. sp. (Pl. III, figs. 1-6).

Purulhá, forest stream, July 7, 1 ♂, *type*, in the writer's collection at the Academy of Natural Sciences of Philadelphia.

♂. Black or blackish brown, the following bright green: greater part of the frons (except its postero-dorsal and antero-ventral margins), the rhinarium, a transverse streak on the middle of the free margin of the labrum, the greater (anterior) part of the fore prothoracic lobe, anterior margin of the propleuron, the greater part of the transverse dorsal mesothoracic ridge (but not where it joins the mid-dorsal carina or the humeral suture), an antehumeral stripe separating the dark submedian and antehumeral stripes, increasing in width cephalad and ventrad and confluent with the green of the transverse mesothoracic ridge just mentioned (at mid-height this green antehumeral stripe is a little wider than half of the dark submedian and narrower than the dark antehumeral stripe), a rounded triangular spot just below the antealar sinus and anterior to the humeral suture,

almost confluent with the upper end of the green antehumeral stripe (this spot apparently represents the upper end of an otherwise obsolete pale humeral stripe), a mesepimeral stripe wider above, a rounded superior spot and an inferior stripe on the metepisternum, a wider stripe on the metepimeron (each of these three sclerites being margined with black on all sides, but the postero-ventral angle of the metepimeron is green), and the dorsal interalar sclerites. (Pl. III, figs. 1, 2.)

Mandibles, maxillae and labium buff, but the apices of the first two and of the median and lateral labial lobes black.

Ventral thoracic surface dull greenish with pruinose traces in the depressions.

Abdomen blackish-brown, its pale markings evidently faded, such as are visible being the sides of 1 inferiorly, the auricles, a postero-ventral spot and possibly a mid-dorsal stripe on 2, a mid-dorsal basal stripe or spot of indeterminable extent on 3-6, a basal lateral spot on the same four segments, the basal half of 7, a large (reddish) spot on each side of 10.

Femora reddish-brown, blackening distally, fore pair pale greenish inferiorly. Tibiae and tarsi wholly black.

Occiput non-tuberculate, its hind margin moderately convex.

Abdomen narrowing from segment 1 (2.6 mm.) to the middle of 3 (.8 mm.), thence widening very gradually to apex of 6 (1.4 mm.), thence widening rapidly to the apex of 8 (2.6 mm.), thence narrowing to the apex of 10 (1.9 mm.).

Superior appendages (Pl. III, figs. 3, 6) 1.96 mm. long, slightly longer than 10, subequal to 9; in dorsal view, their external margins straight and parallel for two-thirds' length of the appendage, each appendage constricted at its extreme base, following which, on the internal side, it is swollen for its first third, then gradually narrows, the terminal third of the appendage strongly curved mesad forming a blunt hook; in profile view, the superior margin is almost straight for two-thirds of the length of the appendage, the inferior margin subparallel, but swollen a little at two-fifths of the same length, no superior or inferior teeth or tubercles, the terminal third of the appendage curved strongly ventrad to an acute apex; superior appendages yellow, brown at apex.

Inferior appendage blackish-brown, stout, two-thirds as long as the superiors; in profile view, its superior margin concave throughout except for the first fifth of the appendage's length, which is straight, slanting caudad and ventrad, and forms an obtuse angulation where the concave curve begins, terminal half of the appendage curved strongly dorsad and slightly cephalad; in ventral view, the appendage is bifid for its entire visible extent i. e., its distal two-thirds, the proximal third being concealed by the sub-anal plates), the two branches in

contact with each other, their external margins slightly converging, their apices roundedly truncate from within laterad.

Genitalia of abd. seg. 2: (Pl. III, figs. 4, 5). Anterior lamina brown, low, entire, with a marginal row of brownish hairs; the other genitalia darker. Anterior hamules bifid at tip, internal branch the longer and more acute, interval separating it from external branch elliptical, narrower at the mouth. Posterior hamules one-and-two-fifths times as long as the anterior hamules, tapering to an acute apex. Vesicle of the penis projecting subequally with the anterior hamules, having on each side a stout antero-ventral angle of somewhat less than 90 degrees. Posterior margin of each auricle almost straight, slightly convex, bearing 5-6 denticles.

Wings barely smoky yellowish. Stigma dark reddish-brown within black veins, surmounting 5-6 cells. Venation, including the costa, black. Forewings with 20 (r), 18 (l) antenodals, the 7th (r) or 6th (l) thicker, 14 (r), 15 (l) postnodals, two posttriangular rows increasing near the level of the nodus with 7-8 marginal cells, a maximum of three rows of cells in the second cubital area. Hind wings with 13 (r), 14 (l) antenodals, the 6th thicker, 13 (r), 14 (l) postnodals, 3 posttriangular cells, then two rows, increasing near the level of separation of Rs bridge from M+2, with 13-14 marginal cells, proximal row of postanal cells 5, distal row of 4, a maximum of five rows of cells in the second cubital area, anal triangle 4-celled.

Abdomen 33, hind wing 30, costal edge of stigma of fore wing 3.5 mm.

Only the type male has been seen. This handsomely colored species falls near *E. eutainia* and *E. viperinus* in the synopsis of species of *Erpetogomphus* in the Biologia volume, pages 159-160. It differs from *E. eutainia* in the absence of an inferior longitudinal carina on the basal third of the superior appendages, in the strongly ventral curvature of the terminal third of the same appendages and in the shape of their apices, the apparent absence of a second pale antehumeral stripe separating the dark antehumeral and humeral stripes, and of a yellow line on the costa anteriorly, the greater number of ante- and postnodals and the longer wings.

From *E. viperinus*, *E. schausi* differs by the presence of dark markings on the face, the stronger ventral curvature of the terminal third of the superior appendages, the apparent absence of a second pale antehumeral stripe the greater number of ante- and postnodals, etc.

Erpetogomphus diadophis ? Calvert (Plate III, figs. 10-12).

Cayuga, house, October 25, 19. Very similar to the paratype of the species (in coll. Acad. Nat. Sci., Philadelphia) in the shape of the occiput, the very reduced vulvar lamina and the characteristic semicircular groove on the sternum of ♀. It is smaller (abdomen 29, hind wing 24, costal edge of stigma, front wing 3 mm.) and the annulate appearance of the abdomen, on 3-7, due to the presence of a transverse median yellow band in *diadophis*, is on first examination not distinct, owing, perhaps, to the apparently less matured coloration of the body generally. I believe that I can recognize the annuli on segments 6 and 7, at least. Color differences, due, possibly, to the same cause (immaturity), are the smaller extent of the dark paramedian stripes of the thorax (mesepisternum) and of those at the humeral, at the obsolete first lateral and at the second lateral sutures, in comparison with those of the paratype of *diadophis*, as our figures show. (Pl. III, figs. 10 and 11, 7 and 8).

The similarity of the vulvar laminae in the two specimens is not identity. The two lobes of the lamina in the Cayuga female are relatively more widely separated than in the paratype (cf. Pl. III, figs. 12, 9), although the absolute measurements are as follows: from apex of right lobe to apex of left lobe, Cayuga ♀ .3 mm., *diadophis* ♀ paratype .4 mm.; length of lobes measured from the anterior (*a*) of the two transverse lines shown in Pl. III, figs. 12, 9: Cayuga ♀ .2 mm., ♀ paratype .3 mm.

In addition to the possession by both females of the semicircular groove on the ventral side of segment 9, mentioned above and shown in our figures quoted; both females show a transverse groove (*g*) on the sternum of 8, anterior to the vulvar lamina, and situated in both at three-fourths the length of the sternite, measuring from its anterior extremity to the same line *a*.

Neither the paratype of *diadophis* nor the female from Cayuga is in perfect condition; the former, ever since I received it from the late Mr. McLachlan, has lacked segment 10 and the abdominal appendages. Without additional material it is not possible to decide whether these two females are conspecific or not. All that I am able to say at present is that they appear to be very near to each other on the basis of structural characters, while differing in size and in details of coloring.

Epigomphus subobtus Selys. Cayuga, dark forest, April 25, 1 ♀; forest, May 3, 1 teneral ♀; forest, 1 ♂ over stream, 1 teneral ♀; stream in dark forest, May 28, 1 ♂, "oblique black and greenish blue

streaks on thorax. Abdomen black with fine yellow segmental lines; a broad yellow mark before end" [i. e. on segment 7].

CORDULEGASTERINAE.

Cordulegaster godmani McLachlan. Purulhá, forest, July 10, 1 ♂ 1 ♀ "in cop."

AESHNINAE.

Anax amazili (Burmeister). Cayuga, June 2, stormy night, at light, 1 ♀; August 24, at light, 1 ♀.

In the key to the species of *Anax* in the Biologia volume, page 176, I stated for *amazili* "Superior frontal marking a triangular black spot, no dark ring," by way of contrast with *junius* and *walsinghami*. In well-colored individuals there is on each side, right and left, of the triangular black spot and separated from it by a yellow line, a triangular blue spot, as Hagen (1861, 1867), Brauer (1866) and Martin (1908) have stated. Occasionally these two blue spots are not visible, as in a Costa Rican female before me; in other cases, as in the Cayuga female of June 2, the blue has become a dark brown, although the two spots are not united anteriorly and hence form no ring as in *junius* and *walsinghami*. Still my statement of 1905, quoted above, is incomplete and hence a little confusing. It may be bettered by inserting after "a triangular black spot:" "usually with a separate triangular blue (sometimes brown) spot to right and left."

The capture of these two females at light is interesting.

Aeshna cornigera Brauer. Chejel, June 26, 1 ♂, "almost entirely black; some pale greenish markings on thorax laterally." Purulhá, forest, July 10, 1 ♂, "Irons and base of abd. turquoise blue. Broad green lateral oblique stripes on thorax. Fine broken green transverse lines on abd." Antigua, 5500 feet, November 24, 1 ♂, 1 ♀. Volcan Santa Maria, November, 1 ♂.

Aeshna multicolor jalapensis (Williamson). Santa Maria, 5500 feet, June 13, 1 ♂. Volcan Santa Maria, October 31, 1 ♀.

Aeshna virens Rambur. Cayuga, on veranda, September 5, 1 ♀.

Gynacantha trifida Rambur. Cayuga, at dusk, April, 1 ♀; forest, August 23, 1 ♀, and 27, 1 ♂.

Gynacantha septima Selys. Cayuga, at dusk, April, 1 ♂; forest, September 16, 1 ♀. The male has the anal triangle 3-celled.

Gynacantha mexicana Selys. Cayuga, at dusk, June 3, 1917, 1 ♂.

Gynacantha tibiata Karsch. Cayuga, forest, August 30, 1 ♀.

Gynacantha gracilis Burmeister. Cayuga, forest, September 4, 1 ♀. This is the most northern locality for this species yet recorded; I have taken it also in Costa Rica, in the Banana River country.*

EXPLANATION OF PLATE III.

Figs. 1-6, *Erpetogomphus schausi* n. sp., type ♂, Purulhá, Guatemala, July 7. Figs. 1, Dorsal, and 2, Right lateral views of the meso-metathorax showing the color pattern. x 66. Figs. 3, Dorsal, and 6, Left lateral, views of the apex of the abdomen. x 7. Fig. 4, Right lateral view of penis and vesicle removed from the other genitalia of the second abdominal segment, inverted. Fig. 5, Right lateral view of genitalia of the second abdominal segment, inverted, penis lying between the hamules of the right and left sides; *ah*, anterior, and *ph*, posterior, hamules; *vp*, vesicles of the penis, *ah'*, anterior hamule viewed antero-laterally to show form of apex; *am III*, anterior margin of abdominal segment 3. Figs. 4-5 x 14.3.

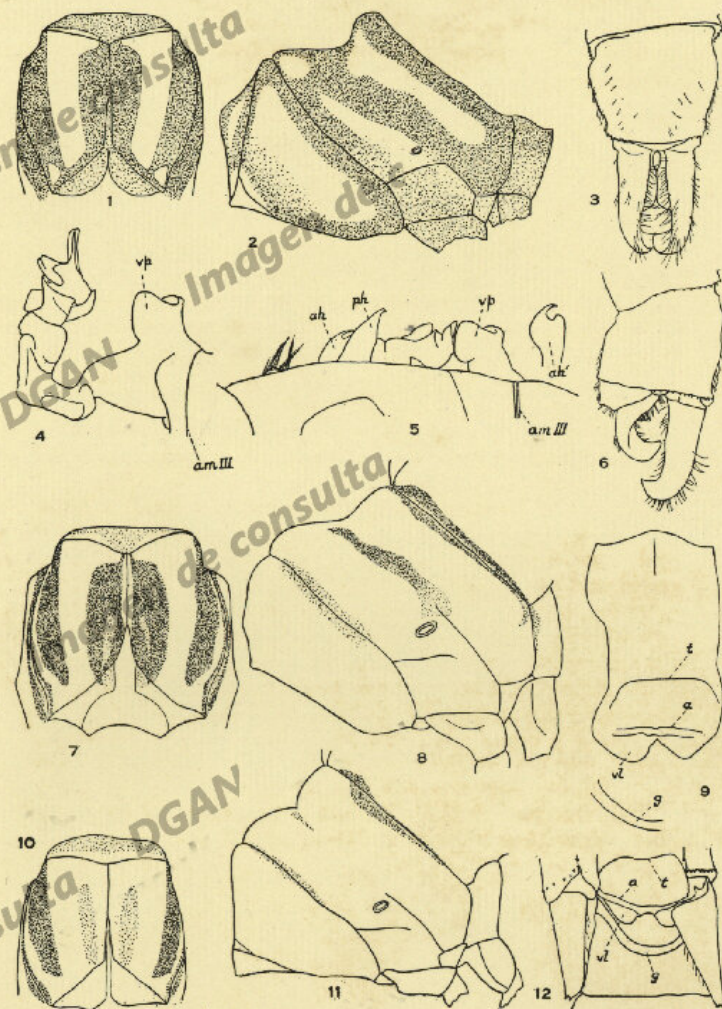
Figs. 7-9, *Erpetogomphus diadophis* Calvert, ♀ paratype, Texas. Figs. 7, Dorsal, and 8, Right lateral views of meso-metathorax showing the color pattern. x 6. Fig. 9, Sternite of abdominal segment 8 and part of groove (*g*) on sternite of segment 9. x 12.

Figs. 10-12, *Erpetogomphus diadophis* ? ♀ Cayuga, Guatemala, Oct. 25. Figs. 10, Dorsal, and 11, Right lateral views of meso-metathorax showing the color pattern. x 6.5. Fig. 12, posterior part of abdominal segment 8 and all of segment 9, ventral view. x 12.75.

In figs. 9 and 12: *a*, anterior of the two transverse impressions, and *t*, transverse groove, cephalad of the vulvar lamina (*vl*) (see page 36); *g*, semicircular groove on sternite of 9.

All these figures are based on camera lucida drawings, using a Zeiss compound microscope with objective A (its lower lens off), and ocular 2 (figs. 4, 5, 9 and 12), or compensating ocular 2 (the remaining figures).

* Calvert, A. S. & P. R. A Year of Costa Rican Natural History, New York (Macmillan), pp. 315-318. 1917.



ODONATA ANISOPTERA FROM GUATEMALA.—CALVERT.

1-6, *ERPETOGOMPHUS SCHAUSSI*; 7-9, *E. DIADOPHIS*, PARATYPE; 10-12, *E. DIADOPHIS*?, CAYUGA ♀.

Odonata Anisoptera from Guatemala

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(Continued from page 38.)

LIBELLULINAE.

Libellula foliata (Kirby). Purulhá, 5500 feet, June 30, 1 ♂, "body orange brown, costal margins orange," 1 ♀, swampy road. Guatemala City, July 1, 1 ♂.

These three specimens are younger than those described in the *Biologia* volume and by Ris, in the *Cat. Coll. Zool. Selys*, the males having the frons and vertex pale ochre, the female pale greenish brown, both sexes with the labrum orange yellow. In the male from Guatemala City the genital lobe has a posterior process or lobe similar to that figured for *Brechmorhoga postlobata* (Proc. California Acad. Sci. 3d Ser. Zool. I, pl. xxv) but even more distinctly developed. I find no other differentials correlated with the presence of this process so, in spite of the precedent set by naming this *Brechmorhoga*, do not consider this male worthy of a separate name, at least until additional similar specimens come to hand.

Libellula herculea Karsch. Chejel, 3100 feet, June 26, 1 ♂, "at same place as spec. 1. Thorax laterally and below whitish lilacine. Abdomen above deep crimson."

Pseudoleon superbus (Hagen). Zacapa, June 30, 1 ♂. Sanarate, November 21, 1 ♂, 1 ♀. Escuintla, railway track, July 7, 1 ♀.

Uracis imbuta (Burmeister). Cayuga, forest, May 27, "very dry just now," 1 ♀; edge of forest near half dried stream, May 28, 1 pruinose ♂, "head and body grey-blue"; forest, November 19, 1917, 1 ♀. Quirigua, 500 feet, pine woods, February 17, 1 ♀; February 18, 1 ♂; February 24, 1 ♂; forest, March, 3 ♀. Escuintla, April, 1 ♀.

Uracis fastigiata (Burmeister). Escuintla, May, 1917, 1 ♂.

Tholymis citrina Hagen. Cayuga, January 25, 1916, dusk, 1 ♀, "flew into house"; September 2, 1917, veranda, 1 ♀.

Microthyria didyma didyma (Selys) Ris. Cayuga, forest: June 10, 1 ♀; August 25, 1 ♂, 1 ♀; September 4, 1 ♂.

Microthyria aequalis (Hagen). Cayuga, August 25, 1 ♀ on veranda.

Orthemis ferruginea (Fabricius). Cayuga, at light: March 7, 1 teneral ♀; April 3, 1 teneral ♀; August 12, 1 ♂ (adult); September 20, 1 ♂, "abdomen purple."

Cannaphila insularis funerea (Carpenter) Ris. Cayuga, April 20, 1 teneral ♂ *a*, 2 ♂ *b*; Cayuga, Rio Negro trail, forest, April 30, 2 ♂ *a*; trail behind Cayuga, forest ridge, dry, May 17, 1915, 1 ♂, 1 ♀ *b*; Cayuga, forest, May 27, 1 ♀ *b*, "abdomen above golden brown with black segmental lines"; June 5, 1 ♂ *b*; in forest, June 20, 1 ♀ *a*, "body fuscous; pale dorsal yellowish line interrupted segmentally; a similar short lateral streak at base of abdomen; oblique pale greenish streaks on thorax." Escuintla, July 7, 1 ♀ *b*.

This is the *Cannaphila angustipennis* (Rambur) of the *Biologia* volume, page 241, a name which Dr. Ris has shown to be untenable on account of the priority of *angustipennis* Stephens, a homonym. The letters *a* and *b* are employed in the above list of specimens as in the *Biologia* to indicate specimens with entirely yellow labium (*a*) or with the labium more or less marked with black (*b*). It would seem that this difference in labial coloring has no geographical, seasonal or ontogenetic significance.

Cannaphila vibex (Hagen). Tactic, July 30, 1 ♂. Escuintla, May, 1917, 1 ♀.

Anatya normalis Calvert. Cayuga, April 21, 1 ♂; forest, August 31, 1 ♂, 1 ♀, both teneral; September, 1 ♂.

Erythrodiplax funerea (Hagen). Gualan, August, 1 ♂. Caballo Blanco, August, 1 teneral ♂. Polochic River, July 25, 1 ♂. Purulhá, October, 1 ♀. Iguana, open marsh country, August 24, 1 adult ♂.

Erythrodiplax umbrata (Linnaeus). Iguana, open marsh, August 24, 1 ♂. Quirigua, February 8, 1 teneral ♂; open country, March 3, 1 ♂ not fully colored, the dark band on the wings smoky brown instead of pale ochraceous, ill-defined, much narrower at the hind margin than at the costa.

Erythrodiplax ochracea ochracea (Burmeister) Ris. Cayuga: forest, March 29, 1 teneral ♂; April, 1 ♂; May 19, 1 ♂; near stream in bananas, May 28, 1 ♂, "thorax black; abdomen reddish purple; base of wings rich brown"; ♀, "thorax greenish yellow shaded with brown above, abdomen black with yellowish streaks on each segment; base of wings orange brown"; August, 1917, 1 teneral ♂. Quirigua, 1 teneral ♂.

Erythrodiplax connata fusca (Rambur) Ris. Cayuga, May 1, 1916, 1 ♀, "at light, 2 a. m., quiet night," abd. 16, hind wing 20, pter. f. w. 2.5 mm.; stream in bananas, May 28, 1 ♂, "thorax, base of abdomen and base of wings dark brown, abdomen lilacine, terminally black," abd. 20, hind wing 22.5, pter. f. w. 3.5 mm., the brown at base of hind wings not quite attaining triangle; October 27, 1 ♀, 16, 20 and 2.5 mm.; bananas, October 29, 1 teneral ♂, 17, 22, 2.5 mm., 1 ♂, 16, 20, 2.5 mm. Montufar, November, 1917, 1 ♂, 16, 20, 2.5 mm. Iguana, open marsh, August 24, 3 ♂, 16.5-18, 19.5-22, 2.5-3 mm. All of these specimens fall under the section *Erythrodiplax connata*, c, *Biologia*, pages 259, 261. The measurements and other data here given may aid in the ultimate elucidation of this variable species.

Dythemis velox Hagen. Cayuga, forest, September 4, 1 ♂. Gualan, August, 1 ♂. Joaquina, April 28, 1 ♀.

Brechmorhoga vivax Calvert. Chejel, June, 2 ♂, one having in the posttriangular field, hind wings, three single cells, then two rows, hence as in *B. nubecula*.

Brechmorhoga praecox praecox (Hagen) Ris. Escuintla, forest stream, July 12, 1 ♂.

Brechmorhoga pertinax pertinax (Hagen) Ris. Purulhá, June 27, 1 ♂; forest stream, July 7, 1 ♀. This is *B. pertinax*, *a*, of the *Biologia*, page 284.

Brechmorhoga rapax crocosema Ris. Chejel, June 18, 1 ♀. "markings greenish blue, spot on abdomen orange;" June 17, 1 ♂; August, 1 ♀. This is the Guatemalan-Costa Rica form of *rapax* which is the *Biologia*, page 285, not of the original type form of *rapax* which is Venezuelan.

Brechmorhoga inequiunguis (Calvert). Escuintla, July 6, 1 ♀.

Dr. Ris (Cat. Coll. Zool. Selys, fasc. ix, p. 34, 1909; fasc. xv, pp. 868, 870, 1913), defining the genera on a somewhat different basis, has referred this species to *Macrothemis*, as I

originally did, and placed it as a subspecies of *M. tessellata* (Burm.). I have not restudied the questions involved.

Macrothemis pseudimitans Calvert. Escuintla, July 6, 1 ♂; track, August 8, 1 ♂, "eyes, shoulders and dorsum lilac."

Macrothemis hemichlora (Burmeister). Quirigua, March, 1 ♂, 1 ♀, the latter "railway track." Caballo Blanco, August, 1 ♀. Mazatenango, November 30, 1 ♀.

Macrothemis inacuta Calvert. Zacapa, June 30, 1 ♂, 1 ♀; July 26, 1 ♂.

Tramea cophysa Hagen. Cayuga, at light: September 10, 1 ♀; October 11, 1 ♂; November 15, 1917, 1 ♀. The October male is of the "*longicauda*, var?" of the *Biologia*, page 303, which, following Dr. Ris, I place here.

Perithemis domitia (Drury). In listing this material I have followed the order of the *Biologia* volume and have given data on the individual specimens, believing such will be useful in later studies of this protean species.

P. domitia form *domitia* (Drury) ? Cayuga, February 2, 1918, 1 ♂; front wings, internal triangle 2-(right) or 3-(left) celled, three posttriangular rows begin at the level of separation of Rs from M1+3; all wings uncolored from base to nodus posterior to subcostal space, yellow for whole width from nodus to apex and in subcostal space from base to nodus. Cayuga, Rio Negro trail, forest, April 30, 1 ♀; front wings, internal triangle 2-(left), 3-(right) celled, discoidal triangle 2-celled (right), free (left), three posttriangular rows begin at the level of separation of Rs from M1+3; discoidal triangles, hind wings, free; all wings orange from base to apex for entire width, a little paler toward hind margin on front wings.

P. domitia form *iris* (Hagen), i. 4 ♂ unlabeled as to locality or date.

P. domitia form *iris* (Hagen), ii. Gualan, November 4, 3 ♂. 1 of them with discoidal triangle 2-celled, all wings, internal triangle free (right), 2-celled (left).

P. domitia form *iris* (Hagen), ii or iii. Cayuga, bananas, October 29, 1 ♂.

P. domitia form *mooma* (Kirby). Cayuga: open hill top, June 4, 1 ♂; August, 1 ♀; September 27, close to house, 1 ♀; October 23, house, 1 ♀. Caballo Blanco, August, 1 ♀. The male, of course, might equally well be referred to form *iris*, iii.

Rhodopygia hinei Calvert. Onaida, March 1, 1917, 1 ♀.

The female of this species has not been described, wherefore the following:

Vertex and frons ochre brown, clypeus and occiput paler, more yellowish. Lips yellow, a tendency toward orange in the free margin of the labrum. Rear of the head and bases of the mandibles pale greenish.

Prothorax obscure yellowish, inclining toward ochre in the middle lobe. Thorax brownish yellow, darker on the mesepisterna, which in addition to the long hairs bear numerous closely-set brown spinules.

Abdomen brownish yellow, perhaps even golden yellow in life, more robust than in *R. hollandi* ♀, the only species of this genus of which a female is available for comparison, compressed and evidently partly distorted. Vulvar lamina reaching to one-fifth the length of the lateral margin of 9, flattened on to the sternum thereof so that it is impossible to state its angle of projection, bilobed in its distal half by a semi-circular emargination whose width is a little greater than its depth and is subequal to one-fourth of the basal width of the whole lamina. Appendages concolorous, longer than 10, a little shorter than 9, rather stout, very acute at apex.

Legs brownish yellow becoming darker distally on the tibiae and tarsi, the third tarsal joint almost black; spines on the legs black.

Wings hyaline, front wings very pale yellow at base, almost impossible to say where this color ceases but hardly visible distad of the level of the arculus; hind wings a slightly deeper yellow at base, also gradually fading out at the level of the triangle and at about two cells posterior to the level of the hind end of the ash-colored membranule. Stigma pale brownish yellow. Front wings with 19 antenodals, 13R, 14L postnodals, 2 rows of cells between Rs—Rspl a maximum of 3 rows in the anal field proximal to the triangle. Hind wings with 14R, 15L antenodals, 15 postnodals, 1 row (with 1 double cell) R, 2 rows L between Rs—Rspl, 4-3 rows between A3 and the hind margin at the level of the triangle.

Abdomen 33, hind wing 43.5, costal edge of stigma of front wing 4.5 mm.

I refer this individual to *hinei* because of its robust abdomen and the presence, in three of the four wings, of two rows of cells between the subnodal sector (Rs) and the supplementary sector next below (Rspl).

In this connection, I may remark that the size of the pterostigma and very venational characters which Dr. Ris has commented on in his descriptions of *R. hollandi* and *R. chloris* (Cat. Coll. Zool. Selys, Libell. fasc. xiii, pp. 610-612, 1911) lead me to think that it is his *chloris* which is the same form as that which I described previously as *hollandi*, and that

his *hollandi* requires a new name. As far as I can judge the anterior lamina of the true *hollandi* and of *chloris* is less prominent than in his *hollandi*. "*Dunkel* braun" is rather too dark for the basal spot of the hind wing of true *hollandi*.

Having written Dr. Ris to this effect, he has replied (15 ix, 1918):

"*Rhodopygia hollandi* as described by myself from Surinam shows evidently some slight differences from your type of Matto Grosso. Besides the specimens recorded in the main text of Lib. li. e. Cat. Coll. Selys cit.] there are three more mentioned in the appendix from the Williamson collection. No doubt Mr. Williamson will send you his specimens for inspection. From these my *Rh. chloris* is evidently different and seems more closely allied to *cardinalis* than to them."

Mr. Williamson has kindly lent me two males from British Guiana, Tumatumari and Georgetown, respectively, both bearing Dr. Ris' own identification label "*Rhodopygia Hollandi*." An examination of them does not incline me to change my opinion as to their difference from the typical *hollandi* as expressed above. On comparing them with two paratypes of *hollandi* Calvert (Demerara 1 ♂, Cuyaba 1 ♂), now in the Academy of Natural Sciences of Philadelphia, I find that they have

One row of cells between *Rs* (subnodal sector Selys) and *Rspl* (supplementary sector next below) on all the wings (two rows in true *hollandi*); costal edge of the stigma, front wings, 3.25-3.5 mm. (4 mm. in true *hollandi*); the apex or posterior angle of the external branch of the hamule less acute than in typical *hollandi*, when the hamule is viewed in profile so that both external and internal branches are visible at once (as in fig. 54, pl. IX, Biol. C. A. Neur., which does not exaggerate the acuteness of this apex); first femur blackish anteriorly for the whole length (reddish brown in typical *hollandi*), first tibia blackish both above and below (pale reddish or pale reddish yellow in typical *hollandi*), second legs blackish on femur and tibia near their articulation (not so in typical *hollandi*); coloring at the bases of the front and hind wings a darker brown, but of the same extent as in typical *hollandi*. Abd. 32, hind wing 35-36 mm.

Whether *hollandi* Ris varies into *hollandi* Calvert can only be determined by fuller series of specimens.

Sympetrum illotum virgula (Selys). Volcan Santa Maria: October 22, 1 ♂, "abdomen crimson;" October 31, 1 ♂ and 1 pair "in cop."

(5500 feet); November 1, 1 ♀. Antigua, 5500 feet, November 24, 1 ♂. In none of these males does the yellow of the front wings extend continuously to the nodus where each, however, has a small yellow cloud; the blackish basal streak in the subcostal space of the hind wings reaches to the level of the arculus in those of October 22 and November 24; in the other two and in the two females it stops at the first antenodal or but slightly distad. The female of October 31 has the basal yellow confined to a very narrow border around the blackish basal streaks and a mere trace of yellow at the nodus, in that of November 1 the yellow in the subcostal space fades out just beyond the level of the triangle, but the nodal cloud is distinct.

Erythemis attala (Selys). Cayuga, edge of forest in bananas, June 20, 1 ♂, "body brown black, 4 large paired yellow spots on abdomen dorsally." Quirigua, forest, September 16, 1 ♀.

Lepthemis vesiculosa (Fabricius). Cayuga, August, 1 ♂, "emerald green and black."